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Deconstructing a biofuel hype : the stories of jatropha projects in South Sulawesi, Indonesia

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Deconstructing a Biofuel Hype

The Stories of Jatropha Projects in South Sulawesi, Indonesia

Henky Widjaja

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Deconstructing a Biofuel Hype

The Stories of Jatropha Projects in South Sulawesi, Indonesia

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Acronyms

AbF	Agriculture beyond Food
ACDI-VOCA	Agricultural Cooperative Development International - Volunteers in Overseas Cooperative Assistance
AMARTA	Agribusiness Market Support Activity
APBD	*Anggaran Pendapatan dan Belanja Daerah* (Annual Local Income and Expenditure Budget)
APBD-Perubahan	*Anggaran Pendapatan dan Belanja Daerah-Perubahan* (the revised Annual Local Income and Expenditure Budget)
APEX	Asian People Exchange
AusAID	Australian Agency for International Development
B2TP	*Balai Besar Teknologi Pati* (Center of Starch Technology)
B10	A mix-fuel product composed by 10% biofuel and 90% fossil fuel
B30	A mix-fuel product composed by 30% biofuel and 70% fossil fuel
BaKTI	*Bursa Pengetahuan Kawasan Timur Indonesia* (Eastern Indonesia Knowledge Exchange)
BNPM	*Badan Nasional Penanaman Modal* (National Investment Board)
BPPT	*Badan Pengkajian dan Penerapan Teknologi* (Agency for the Assessment and Application of Technology)
Bupati	Head of District
CDM	Clean Development Mechanism
CPO	Crude Palm Oil
CSR	Corporate Social Responsibility
DME	*Desa Mandiri Energi* (Energy Self Sufficient Village Program)
FSTI	*Federasi Serikat Tani Indonesia* (Indonesian Peasants Union Federation)
GEXSI	Global Exchange for Social Investment
GTZ	*Gesellschaft für Technische Zusammenarbeit* (German Organization for Technical Cooperation)
HiVOS	*Humanistisch Instituut voor Ontwikkelingssamenwerking*
IPB	*Institut Pertanian Bogor* (Bogor Agricultural Institute)
ITB	*Institut Teknologi Bandung*
JARAK	Jatropha Research and Knowledge Network
KADIN	*Kamar Dagang dan Industri Indonesia* (The Indonesian Chamber of Commerce and Industry)
KKSS	*Kerukunan Keluarga Sulawesi Selatan* (The South Sulawesi Family Association)
KNAW	The Netherlands Royal Academy of Sciences
KUT	*Kredit Usaha Tani* (Farmer Credit Program)
LVD	*Landbouwvoorlichtingsdienst* (The Dutch Agricultural Extension Service)
MoU	Memorandum of Understanding
NGO	Non Governmental Organization
NTB	*Nusa Tenggara Barat* (West Nusa Tenggara)

NTT	*Nusa Tenggara Timur* (Eastern Nusa Tenggara)
NWO	The Netherlands Organisation for Scientific Research
Perum Perhutani	*Perusahaan Umum Perusahaan Hutan Indonesia* (Indonesia state-owned forest enterprise responsible for management of the State-owned forests)
PIKUL	*Penguatan Institusi dan Kapasitas Lokal* (Local Capacity and Institution Strengthening)
PT	*Perseroan Terbatas* (Limited Liability Company)
PT ACI	*PT Anugrah Cemerlang Indonesia*
PT EIT	*PT Energi Indonesia Timur*
PT INCO Tbk	PT International Nickel Indonesia Tbk
PT JBS	PT Jais Bone Sejahtera
PT JOP	PT Jatro Oil Plantation
PT JPN	*PT Jarak Pagar Nusantara*
PT PGN	*PT Perusahaan Gas Negara* (State Gas Company)
PT PLN	*PT Perusahaan Listrik Negara* (State Electricity Company)
PT PN	*PT Perkebunan Nusantara* (the state-owned plantation enterprise)
PT Rekin	*PT Rekayasa Industri* (Industrial Engineering)
PUSPHA	*Pusat Teknologi Tepat Guna Jatropha* (Appropriate Technology Center for Jatropha)
SADI	Smallholder Agribusiness Development Initiative
SME	Small and Medium Enterprise
SOE	State-owned Enterprise
Timnas BBN	*Tim Nasional Bahan Bakar Nabati* (The National Biofuels Team)
UKIP	*Universitas Kristen Indonesia Paulus*
USAID	United States Agency for International Development
VDRC	*Companhia Vale Do Rio Roce*
VOC	*Vereenigde Oost-indische Compagnie* (The Dutch East India Company)
WALHI	*Wahana Lingkungan Hidup*
YDD	Yayasan Dian Desa

1 Introduction

1.1 Background

In the early of 2000s, *Jatropha Curcas,* popularly known in Indonesia as *Jarak Pagar,* emerged as a popular focus of both research and investment in biofuels sector. In that period of time, jatropha was introduced worldwide as a 'wonder crop' for the claim that it is a low maintenance crop suitable to most climatic and soil conditions with an ability to withstand drought. By its promoters, jatropha was described to have critical advantages in comparison with the conventional biodiesel alternative, oil palm, for its inedible characteristic and ability to grow productively in marginal lands which address the risks of direct trade-off of 'food versus fuel' and land grabbing over productive agricultural lands (Achten *et al.* 2007 and 2008, Erliza *et al.* 2006, Prihandana 2006, Siang 2009, Wahyudi 2008, Tim Jarak Pagar RNI 2006), and as a 'money tree' that can produce a constant stream of income, as well as using many other superlative names, such as 'trophy tree', 'savior', 'resource of dreams', and 'green hope' (Hunsberger 2012: 99-100).

Jatropha was also promoted as a potential 'flex crop'. Flex crop is defined as a crop with multiple uses (food, feed, fuel, fibre, industrial material, etc.) that can be easily and flexibly inter-changed (Borras *et al.* 2015: 2). Crops with this material flexibility, such as oil palm, sugarcane, cassava and maize, are attractive for investors because the flexibility allows investors to be flexible in deciding what to produce and sell based on price signals, vis-à-vis in diversifying markets for their investment while dealing with a single crop (Hunsberger *et al.* 2016: 225).

Tjeuw (2017: 6 and 25) points out that the potential for jatropha value addition and niche marketing was introduced to support its commercial value. According to her, based on her compilation of multiple uses of jatropha from various literature, all parts of the crop have some beneficial applications for humans and/or animals. She suggests that technologies are already available to extend the production chain of jatropha to produce a variety of intermediate and end products of this crop. Traditionally, aside from its medicinal applications, jatropha is used by farmers as boundary hedges, or to protect crops from browsing animals. Jatropha grown from seedlings are effective in reducing soil erosion. Jatropha oil can be used directly as a fuel for lamps and stoves. The technology is very simple, however for its use as biodiesel it needs a modified engine or blending with fossil diesel fuel or transesterification to jatropha methyl ester or jatropha biodiesel. Proteins extracted from jatropha seed/press cake or leaves can be utilized for cattle or poultry feed, protein based adhesives, or protein-based emulsifiers. Jatropha seeds also have been used as a purgative and the oil as a fish poison and pesticide. The seed husks can be

used as cooking fuels, the branches, leaves and ashes to produce cooking salt and textile dyes and tannins. The leaves can be used as food garnish once steamed or stewed, while the bark is a source of wax. Jatropha can also be used to produce a soap that has very high anti-bacterial qualities. Finally, all waste parts (press seed cake, fruit husk, seed shell) generated by the oil extraction process can be used for biogas production or as source of organic fertilizer.

However, in spite of the above mentioned multiple uses, none of them are robustly proven either scientifically and commercially. The technology of biodiesel processing and co-products appears to be still in early stages of development. Meanwhile, markets for its primary use as biofuel substitute for diesel fuel and kerosene as well as for most of the anticipated co-products have not yet viably emerged.

Approximately, from 2008 onwards public opinion turned 180 degrees from initial wide support to almost universal antagonism (Nielsen *et al.* 2013: 8). Following the failures of many jatropha projects around the globe, starting from around 2007 criticisms as well as corrections towards the overwhelming positive claims on jatropha have become the main lines of today's research on jatropha.[1]

The absence of viable market and technology pull factors was suggested as the main cause of failure. Critics were raised on the insufficient markets and financial supports availability. The critics were in tandem with the criticisms on the unproven technological claims. Many of the claims appears to be not yet supported by scientific evidence. This was the fact that many of the jatropha claims were largely based on non-peer-reviewed reports and the underlying information could not be verified (Jongschaap *et al.* 2007, Baker and Ebrahim 2012: 1, Tjeuw 2017: 4). An example of such claims was the overwhelming agronomical claim on the potential productivity of jatropha, which affects the reliability of seed supplies vis-à-vis the profitability at farm level (Ariza-Montobbio 2010, Bowyer 2010, GTZ 2009, and Kachika 2010).[2]

In parallel with the critics on the market and technological failures, jatropha has been widely criticized for its adverse effects, especially on the agricultural and forestland conversion, land grabbing, competition with food crops and the impoverishment effects on farmers (Friends of the Earth 2009, Friends of the Earth 2010, and Milieu Defensie 2012).

The existence of reports on jatropha failure has led to an opinion labeling jatropha as a failed crop. Yet, such opinion can also be considered as premature. Proponents of jatropha in their counter debate critically noted the tendency of exaggeration in many of the

[1] See Jongschaap *et al.* (2007) as an example of early corrections towards the claims.

[2] According to Kant *et al.* (2011:25), jatropha was favoured in comparison with the other available biodiesel crop species due to its early seed production or short gestation. This advantage as a short rotation crop was crucial to attract low income farmers. But the reality is that the physiological ability to produce seeds is quite different from ability to produce seeds at scales which are commercially viable. Trees, particularly those that are expected to grow wild conditions over vast marginal lands in the absence of irrigation and intensive management common in horticultural plantations would take longer in coming to a commercially viable seeding stage.

criticisms. A report by HIVOS points out that many of the opponents have been cherry-picking their information by selecting only papers or paragraphs, which support their agenda and caused many of the criticisms to lose their objectivity, out of context and misrepresenting the reality (Nielsen *et al.* 2013: 13).

Furthermore, the proponents have also argued that while jatropha is not a wonder plant, but it does have attributes to suggest that it could become 'one of the most productive and promising dedicated bio-energy crops' (Hawkins and Chen 2011: 5) and has certain niches where it performs well and is attractive in comparison with the other biodiesel alternatives (Nielsen *et al.* 2013: 14). The central counter argument against the current criticisms said that the failure was caused by the reality that jatropha curcas was still a poorly studied plant. Jatropha is for all practical purposes still a wild undomesticated plant where even very basic knowledge like yield and productive lifespan is highly uncertain (*ibid*: 9).

Recent reports on jatropha (for example Baker and Ebrahim 2012a, 2012b, Hawkins and Chen 2012, Afiff 2014) have been explicitly stating that its popularity in the first decade of 2000s was nothing more than a hype phenomenon. Hype is defined as 'a phase characterized by an upsurge of public attention and high rising expectations about the potential of the innovation' (Konrad 2006: 317 as cited in Afiff 2014: 1687). According to Ruef and Markard (2010: 519), 'hype therefore stands for "extravagant claims" that can be deliberately misleading or deceiving. […] The notion of hype is thus charged with a rather negative connotation, and implies a drop of publicity as well as the possibility of disillusionment or disappointment of extravagant claims.'

As a new biodiesel innovation, jatropha was promoted in an exaggerated fashion but many failed to realize that apparently the plant at the center of this excitement was still a wild species that had been subjected to very little scientific research and development (Hawkins and Chen 2012: 4). Therefore, the proponents of jatropha have argued that further enrichment of scientific and agronomic knowledge of the plant should be established to provide a stronger base of confidence to expand its commercial production. They believe that Jatropha has the potential to evolve into a useful commercial feedstock for the biofuels sector on condition that adapted genetics of the crop are planted in suitable areas and are managed professionally towards productive cultivation (Hawkins and Chen 2011, 2012, Nielsen *et al.* 2013).

The proponents of jatropha based their optimism on a long list of empirical evidence of successful commercial crops, which at their initial development stage were very poor in terms of productivity and market. Hunsberger (2012: 221-222) points out that jatropha proponents in Kenya cited the painstaking development process of tea and coffee – that faced skepticism at first, and took time to research and develop but eventually became economically important – to describe the current difficult stage of jatropha and their belief on its potential to become a future commercial crop as long as a steady work on this commodity continues.

Until today, various new research projects on jatropha, consisting of research on plant

breeding up to processing technologies are still on going in countries, such as the Netherlands, China, Taiwan, India, Japan and Indonesia. Many claims on improvements regarding improved seeds, planting technologies, seed yields, and oil potentials were made by these research projects.

This continuity of optimism and efforts has been encouraged by many factors. One main factor is the existence of mandatory use of biofuels in many countries that boosts market opportunities for biofuel products as well as the expansion of investments by countries along with the provision of abundant funding and subsidies for biofuels research and development (Schott 2009: 3-4).[3] Market opportunities also come from the extraction and transportation industries, which promote the use of biofuels to enhance their green credentials and to save their operational costs (see the example of the jatropha biofuel application by airline industry in the 2012 report of Milieu Defensie 2012).

The other important factor that helps to revive the optimistic narrative on jatropha is the existence of initiatives to further explore the potentials of jatropha as a flex crop, by advancing the alternative applications of jatropha for other valuable products under the bio-based economy,[4] which include the production of high-value cattle feed from the press-cake residue of jatropha oil extraction by detoxifying the material so jatropha would thus be food and fuel which significantly adds its value and prospect (Wageningen UR 2011).[5]

1.2 Research Questions

The still evolving development of jatropha sector as described earlier suggests the importance to have an objective critical analysis on the experiences and the current state of jatropha sector. Baker and Ebrahim (2012a: 1) call for a comprehensive analysis of recent events, trends and scientific evidence concerning jatropha to explain the current failure of this sector. This requires an understanding of the plant and the history of its cultivation and an explanation as to why many of the investment vehicles associated with the crop to date, have disappointed, in some case spectacularly (Hawkins and Chen 2011:

[3] Countries in the world has set up policy targets for alternative energies consumption, such as the European Union Biofuels Directive in European Union countries, the Kyoto Protocol in Japan, the Middle and Long Term Development Plan of Renewable Energy in China, and the National Biofuels Development Blueprint in Indonesia.

[4] The Biobased Economy is an economy driven by efficiency in using crops and biomass for food, feed, chemicals, energy and fuels (http://wageningenur.nl/en/Research-Results/Themes/theme-biobased-economy.htm – accessed on 11 August 2013). In the biobased economy, biomass is replacing part of the mineral oil as a source of carbon. Biomass can then be used to produce the same universal elements that are currently produced by means of petrochemistry. The unique biomass components can also be put to maximum use after further improvement via chemical, enzymatic or microbial transformation for food, chemistry and energy applications (http:// biobasedeconomy.wur.nl/UK/ - accessed on 11 August 2013).

[5] One of the initiatives came from the Sinarmas Group that has been consistently involved in the research and development of jatropha curcas since 2007. Through its subsidiary, PT Bumi Mas Ekapersada, the Sinarmas Group conducts a jatropha breeding and research program and has produced its commercial jatropha curcas varieties with a brand name of *Jatromas®*. The Sinarmas focuses on the development of non-toxic jatropha varieties to allow the production of food and feed products from jatropha aside from its biofuel potential. Besides the product diversification, the company also aims to target the jet fuel market as a high value market for jatropha biofuel (Liwang 2014).

4). HIVOS in its 2013 report on jatropha after the hype points out the importance to learn from the failure by emphasizing that the failure of the past years provides many insights into where and under what circumstances jatropha can play a role; and what it will take in terms of support, infrastructure, markets, and so forth, in order to make it works (Nielsen *et al.*: 12).

Most approaches and analyses on the rise and fall of jatropha had focused only on the normative explanations about the causes of the failure with limited discussions and analyses aimed at interpreting and contextualizing the failure itself. A provocative notion to see the failure of jatropha from different perspective was presented by McCarthy, Vel and Afiff (2012) who argue that in many cases, 'failed' projects might become successful in other ways. From this perspective, a failed initiative might not be a total failure for those involved. For some actors a failed jatropha project was not a loss because they gained economic benefits through a wide range of opportunities and even some failures might pave the way for competing agendas.[6]

This research is concentrated in South Sulawesi Province to investigate the implementation of jatropha projects in the period of 2006-2011 in this province. This research examines the key factors that were influential in the rise and fall of these projects. This research also presents an analysis about the failure of the projects to understand what opportunities and benefits that were pursued by the involved actors and how the achievements of the opportunities and benefits redefine the failure of the projects.

To achieve the above objectives, the following key research questions guide the analysis in my research: *What explained the emergence of jatropha hype in Indonesia? What were the key factors that influential in the rise and fall of various jatropha projects in South Sulawesi? What were the key drivers and motivation that made various actors participate in jatropha projects?*

The research questions are further elaborated in four sets of sub-questions as follows:

The first set of questions examines the jatropha hype in Indonesia by focusing on the background of the hype and the role of key actors. *What was the process of introduction and promotion of jatropha curcas as feedstock for modern biofuel production in Indonesia? Who were the key actors and what were their roles?*

The second set of questions deals with the local factors that had been significant in the implementation of jatropha projects in South Sulawesi. *What were the local factors that contributed to the implementation and outcome of jatropha projects in South Sulawesi? In specific, which actors, events and systems that influential to the implementation and the outcome? Why have these factors been influential in farmers' decisions on crop choice and responses to jatropha promotion?*

[6] McCarthy, Vel and Afiff gave an example of the failed Kalimantan Mega-Rice Project, which apparently paved the way for green acquisitions and oil palm plantations in the ex-project location.

The third set of questions examines the observed jatropha projects in in South Sulawesi to understand the motivations and drivers of the projects. It seeks to identify opportunities and benefits that were pursued and materialized in the observed projects. *What were the opportunities and benefits that pursued by the involved actors in their projects? How do the pursued opportunities and benefits redefine the current failure of jatropha?*

The last set of questions synthesizes the implications of this study beyond jatropha by questioning *What can we learn from the observed jatropha stories for the other miracle crops?*

1.3 Conceptual Background

This study is inspired among others by the agrarian political economy approach,[7] which is one of the critical analytical tools applied to historical episodes of rapid expansion of large-scale, industrialised, capitalist, monocrop agriculture, including towards the global phenomenon of agrofuels[8] development since decades ago (White and Dasgupta 2010: 599). Borras *et al.* (2010: 575) point out that an engaged agrarian political economy combined with global political economy, international relations, and social movement theory provides an important framework for analysis and critique of the conditions, dynamics, contradictions, impacts and possibilities of the global biofuels trend. In this research, the political economy analysis is used to understand the rise and fall of jatropha as a biofuel crop in Indonesia.

Most of the agrarian political economy research and academic discussions on the failure of jatropha so far were focusing on the main causes and impacts on land and agrarian changes,[9] with limited focus on the discussion and analysis on the experiences of actors in jatropha projects. Scholars who contribute to this specific focus, among others are Carol Hunsberger (2010 and 2012) who investigates the motivations, strategies and and experiences of actors in jatropha projects in Kenya, and Amir *et al.* (2008) and Fatimah *et al.* (2009) who applied the actor network theory to discuss the networks and politics of jatropha introduction in Indonesia.

[7] Agrarian political economy is defined as an 'investigation of the social relations and dynamics of production and reproduction, property, and power in agrarian formations and their processes of change, both historical and contemporary' (Bernstein 2010: 1).

[8] Due to its controversy, the term 'biofuels' has been challenged and criticized by many activists and social scientists who prefer to use another term 'agrofuels' as an expression of their criticisms on the use of agro resources for fuel production. According to Bruckman (2008: 1), the prefix 'bio' which is used to indicate that the source material is derived from renewable feedstocks is considered to be misleading by many experts and environmental organizations. In many countries, 'bio' is associated with the legally binding prefix for the products of organic agriculture – which means no application of synthetic pesticides, growth stimulants, fertilizers, generic manipulation and radiation to comply the basic principle of maintaining the most natural and sustainable form of agricultural production. In fact, these criteria are not applicable to the cultivation of biofuel feedstock as the demands of crop maximization require intensive fertilization and chemical crop protection. Some initiatives around the world also include genetic manipulation in order to increase crop yield for the production.

[9] For example, Ariza-Montobbio *et al.* (2010) in their research on the cases of jatropha plantations for biodiesel in Tamil Nadu, India, point out that jatropha reinforces the processes and structures that increase pressures on the ecological integrity of tropical forests and further wrest control of resources from subsistence farmers, indigenous peoples, and people with insecure land rights.

The introduction of a biofuel crop, such as jatropha is closely affected by the complex relationships between the state, capital and society in regards to their motivations, expectations and strategies. This thesis aims to enrich the political economy discussion of jatropha by focusing the analysis on jatropha actors' motivations, strategies and experiences in contextualizing the current failure of the crop.

The discussion and analysis will be guided by three conceptual tools: the concepts of hype, non-market factors and social networks. The concept of hype is used as an entry point to apply the non-market factors analysis as the tool to identify the non-oil opportunities and benefits that were pursued by actors in the observed projects. Finally, the concept of social networks will be used to analyze the interconnections between actors and how their networks provide access to the targeted resources in their projects.

1.3.1 Hype or Boom?

In the first decade of 2000s, jatropha curcas was massively cultivated in Africa, Asia and Latin America. According to the GEXSI in its 2008 Global Market Report on Jatropha (2008: 13), there was 242 jatropha projects around the world that covered approximately 900,000 hectares - where more than 85% was located in Asia, Africa counted for approximately 120,000 hectares followed by Latin America with approximately 20,000 hectare. While some literature refer the global wide cultivation of jatropha as 'jatropha boom',[10] in this dissertation I use the term 'jatropha hype' to define the trend by arguing that both terms are significantly different in their definitions and characteristics as will be explained below.

Derek Hall defines crop booms as 'taking place when there is a rapid increase in a given area in the amount of land devoted to a given crop as a monocrop or near monocrop, and when that crop involves investment decisions that span multiple growing seasons (usually because it is a tree crop that takes some years to grow to maturity and begin producing' (Hall *et al.* 2011, Chapter 4). According to Hall in his observation on crop booms in Southeast Asia, crop booms have played a critical role in agricultural expansion in the region for centuries. Hall identifies five characteristics of crop booms as follows:
One unifying factor is that Southeast Asian booms have been driven primarily, though not exclusively, by export rather than domestic market demand. Second, booms have (as the name suggests) been highly lucrative for many, but by no means all, participants. Much of the money, of course, is made by non-agrarian actors, but enough has been made by farmers that get-rich-quick stories can seem compelling. State actors, too, have been excited both by the promise booms hold of contributing to the realization of key state objectives like foreign exchange earnings and rural development, and by the opportunities they present for personal enrichment (through kickbacks or direct participation). Third, and relatedly, booms make the land on which the crop can be grown more valuable, making various actors more inclined to try to control it. A fourth point runs against this enthusiasm: booms frequently go bust, as production value and/or volume drops in

[10] Literature using 'jatropha boom' can be found easily by typing the keyword on the internet search engines.

response to diseases, pests, or falling prices. Committing to monocropped production of these crops is risky. A fifth common feature of crop booms is their connection to the notion of the frontier. While not all boom crop production takes place on frontiers, all the crops discussed here have been associated with the frontier in at least some of the following senses (Hall 2011a: 840).

While jatropha might seen to fit with the definition of crop boom and the given characteristics, however, a careful check will show that it does not represent a boom at all, but more only as a hype phenomenon. Afiff (2014: 1699) points out that the up-and-down experienced by jatropha did not resemble the normal cyclical boom and bust process faced by boom crops mainly because jatropha is not yet a reliable market commodity but still at the stage of technology innovation.[11] In this sense, Afiff emphasizes that non-market factors, such as incentives and funding for pilot projects were the main drivers of the recent jatropha hype. This suggests a clear difference between jatropha and boom crops, such as oil palm, coffee and cacao, which booms and busts were influenced by market mechanism of supply and demand.

As will be elaborated in the next sub-section on the non-market factors in the current failure of jatropha, the hype was not built on a concrete market and price mechanism, but by expectations to benefit from a niche created by the skyrocketing of fossil fuel prices in 2007 (Dillon *et al.* 2008) and further exaggerated by abundant of funding and subsidies available for alternative fuel innovations (Hunsberger 2010 and 2012, Milieu Defensie 2012). Baker and Ebrahim (2012b: 3) note that a market based process is ultimately stable and self-correcting but when significant public funds involved as subsidies, grants and tax incentives, along with the other non-market factors, then questions on market failure arises. Therefore, different from boom crops, the bust of jatropha was actually not because of the fall of prices or supply or by pests and diseases attacks as normally experienced by boom crops, but because of the failure to materialize the overwhelming expectations and claims and the shortage of funding to continue the operational of pioneer projects which turn out mostly to be pilot stage only or as a showcase to attract potential investors.

It is also noted that jatropha projects were driven by investors and were not initiated by smallholders themselves as in the cases of boom crops. Smallholders were persuaded by various incentives and promises and engaged through many forms of business model, without being informed that those investments were actually still at pilot stage leaving them as the victims bearing the costs of the experiments (Ebrahim and Baker 2012a, 2012b, 2012c, Franken 2010).

[11] She argues that the correct term for a technology innovation such as jatropha should be 'hype' and 'hype-disappointment' by referring to the increased economic investment side of technology innovation at the time of hype and backlash of investment in the innovation at the time of hype-disappointment. Ruef and Markard point out that hype culminates in a peak of high media attention and of high rising expectations, and is followed by a decline or downturn of both. It can only be detected *ex post*. Typically, increase as well as decline of media attention is steep, and the decline should be significant but does not have to go back to zero (Ruef and Markard 2010: 520). The process is cyclical since it can easily reoccur at any time when the innovation corresponds with global or national problems (Afiff 2014: 1700).

The control of information on jatropha during the hype is very important to maintain the spectacle around the plant. Spectacle plays a pivotal role in attracting investments and building momentum for new innovations, such as jatropha. However, lessons from the jatropha hype also suggest that spectacle can create knowledge gaps about the differences between claims and realities on the ground, which then causing the supply of inaccurate information in the decision making process (*ibid*: 217).

In 2010, FAO issues a warning against jatropha hype by stating that many of actual investments and policy decisions on jatropha were made without sufficient based knowledge.[12] As a hype, jatropha was full of overwhelming expectations and claims causing a serious gap with its material reality. Hype is characterized by an upsurge of public attention and high rising expectations about the potential of the innovation, which is driven by 'extravagant claims' that can be deliberately misleading or deceiving. The optimistic discourse on jatropha was built by communicating, repeating and adopting positive messages, whether or not those who were involved realized that these were only part of the story; guarding (or suspecting that others were guarding) information; and challenging or suppressing dissenting information or views (Hunsberger 2012: 234). The 2009 GTZ report on jatropha reality check points out that in many cases, jatropha was promoted extensively with information mainly taken from the internet, where as few, if any, of the authors had conducted any multi-year research trials of their own to verify the claims they were making on productivity (GTZ 2009: 9).[13] A lack of reliable information about jatropha, compounded by barriers to the free sharing of knowledge created a situation where unclear or even conflicting claims could continue to circulate (Hunsberger 2012: 251).[14]

The other significant difference between jatropha hype and the crop boom is that the jatropha hype, so far, did not cause massive migration and the expansion of production to frontier areas. Although jatropha has been claimed and targeted for rural employments

[12] See: FAO Warns Against 'Jatropha' Hype at http://www.commodityonline.com/news/fao-warns-against-jatropha-hype-30281-3-30282.html (accessed on 27 December 2012)

[13] Major problems have been reported with calculating jatropha seed yields, for example due to extrapolating from individual, mature trees instead of tracking the yield of a stand of trees grown under similar conditions. Like most statistical analysis of survey information, the compilation of the yield data was complicated by inconsistencies in the raw data, commonly referred to as noise. The two main causes of noise are errors of data collection or inaccurate estimation of yields provided by farmers (GTZ 2009: 6). Seed yields are frequently presented in terms of weight, ranging from less than 0.4 to more than four tons of seeds per hectare, without specifying the tree spacing, or whether the seed husks were included in the calculation. Projected seed yields of up to twelve tons of seed per hectares were reported without supporting documents (Hunsberger 2012: 88).

[14] According to Jongschaap et al. (2007), data are particularly lacking for jatropha yields under dry and low-nutrient growing conditions, even though these are the very conditions under which jatropha should be grown if it is to avoid competing with cultivation for food production. The claim on jatropha's advantage of being able to thrive in poor soils and semi-arid has been proven to be exaggerated. Although jatropha appears able to survive in low-nutrient conditions, its oil yield is strongly enhanced by the application of fertilizers. Its ability to withstand periods of dryness says nothing about its ability to produce oil while experiencing water stress. Presenting jatropha as a crop that can thrive in environments that are too harsh to grow food crops seems misguided if it is necessary to alter those harsh conditions to produce ones that could also support food production in order to successfully grow jatropha. In other words, jatropha would take up the same agricultural production potential (in terms of land area, water and nutrient inputs) as food crops would if one were to make the effort to grow them in the same semi-arid areas.

creation, the early bust of jatropha, which was experienced by the pioneer producers has demotivated other smallholders to cultivate this crop. The bust also has cancelled the opening of subsequent employments, both on farm and off farm, which can cause the expected migration back to rural and marginal areas.

It is important to note that similar with the commodity boom, hype and disappointment are also cyclical. Tjieuw (2017: 35) wrote that one factor that might contributing to this was that the scientific literature generated during the hype phase is not matched by an equivalent documentation of the subsequent disappointment. When the disappointment aspect is forgotten, the cycle will repeat itself.

1.3.2 Non-Market Factors in the Current Jatropha Failure

Studies have suggested that targeting real market of biofuel is not (or not yet) the main objective of many jatropha projects. In her analysis, Vel suggests the existence of 'other products than just the biodiesel and the plant oil' as the drivers for various jatropha actors. They are often the first products, even before there is any activity in the field (Vel 2009). In her more elaborated explanation, Vel emphasizes that there are more types of actors involved, and they are interested in more 'products' of the jatropha value chain than just biodiesel or plant oil (Vel 2010: 6 and Vel 2013: 1).

These drivers include the foreign capital investment, subsidy from carbon credit scheme, international funding for green fuel programs and various national subsidies available for biofuels sector, such as interest rate and infrastructure subsidies, tax reduction as well as the research and development funding (Dillon *et al.* 2008). Against this background, jatropha projects can be seen as 'Trojan Horse'[15] for jatropha actors to pursue their other interests which were hidden behind the narratives of green energy potential of the crop.

Hunsberger (2012: 162 and 171-173) points out the importance of the actors' motivations analysis to understand the multiple agendas that have driven and guided the promotion of Jatropha. She grouped the motivations of actors into the categories of environmental, humanitarian, economic, personal and institutional with considerable overlap and convergence between them. These motivations contributed to actors' decision about jatropha. On an individual level, actors were driven by their thematic interest in science, agriculture or renewable energy. Other saw opportunities to advance their careers through business or job opportunities connected to jatropha. On an institutional level, inevitably the mandates and interests of actors' organizations formed a central part of their motivations for working with jatropha. For the private sector, the likely return on investment plays a paramount role in company decision. For government, the importance of following policy mandates and maintaining public support provided significant guidance and constraint. While for NGOs, their involvement

[15] The phrase 'Trojan Horse' is borrowed from Annie Shattuck who argues that agrofuels are the perfect 'Trojan Horse' for biotechnology corporation to dominate agriculture in poor countries instead of helping to address the energy crisis problem in those countries (Shattuck 2009: 89).

in the jatropha development activities were linked to their interests in accessing available funding under various jatropha schemes.

The significant involvement of non-market factors (such as subsidies, grants and tax incentives), as well as the involvement of major global issues such as climate change and environmental destruction in the ultimate aim has been suggested as one reason of why markets for jatropha failed to operate (Baker and Ebrahim 2012b: 3). Based on her research on jatropha in Kenya, Carol Hunsberger suggests that the overwhelming availability of donors funding for various jatropha projects run by NGOs (in many projects paying premium prices in addition to other incentives to the participating farmers) has distorted markets in such a way that businesses were unable to compete (Hunsberger 2010: 950).

The existence of various non-market factors as described above has become a background for some scholars to develop conceptual arguments in explaining the current failure beyond the conventional market factors. One of the conceptualization on the non-market factors in jatropha sector can be seen in the work of Jacqueline Vel on 'discursive commodities.' Vel (2013: 3) defines discursive commodities as objects of trade that do not exist in the real material world (yet), which have obtained market value because of the narratives that science, technology, politics and business have created about them. Markets in these discursive commodities have therefore emerged from complex encounters between science, technology and politics (Fairhead *et al.* 2012: 241). She argues that discursive commodities reflect markets that do not exist in reality, but rather in financial markets speculating on future profits from increased value of land and projected commodity production. Citing Fairhead *et al*. (2012: 247), she describes jatropha as an example of 'contemporary green valuations, circulations and commodification, along with associated business and market logics, that are being shaped in global fora, media and actor-networks which are sometimes virtual and often dislocated and distanced from the places they govern' (Vel 2013: 2).

The key analytical line in Vel's concept of discursive commodities originates from the discussions on science-policy discourses of green markets by several other scholars who suggest the creation of new value of nature in association with the global discourses of environmental protection, which is traded in the form of discursive commodities (Fairhead *et al.* 2012: 241). For example, there would be no carbon-trading without the science-policy discourses that have discerned global warming (Newell and Patterson 2010 as cited in Fairhead *et al.* 2012: 241).

In developing her argumentation and analysis on the discursive commodities, Vel proposes an analytical approach that distinguishes four key phases of jatropha commoditization: 'first the creation of the idea of jatropha as a miracle energy crop and the supporting technology; second the translation of the ideas into policies and business proposals in search of capital investments; third the phase of initial activities in the field; and fourth, the materialization of jatropha projects, plantations and processing at the level of full production.' She notes that discursive commodities are central in the first phase of the commoditization process where a new idea or technology was invented and then justified

through a narrative about how it contributes to address societal problems (such as crisis, loss and scarcity) stressing the importance of this new invention. The new invention is further being used to produce various discursive commodities through the mediation of brokers who connect the new technology with the necessary capitals, land and labor by creatively translating the new invention into various imaginary opportunities - such as access to thousands hectares of land, promise on high yielding seeds, high value by products, and potential to access funding from carbon credit scheme, government subsidies and incentives. Vel stresses that discursive commodities can exist because the various actors in a production network depend on each other for information concerning access to the production factors that are required for material production. These actors, either independent from each other or collaboratively construct overwhelming positive stories on their jatropha projects emphasizing their growth potential and profitability creating bubbles of spectacle to sustain their projects (Vel 2013).

For discursive commodities, spectacle is very essential since investors are looking for the appearance of success. Spectacle in jatropha sector attract the attention of venture capitalist, who specialize in identifying high risk - high profit short-term market opportunities for return on their capital, and who are not necessarily interested in the material production that results from their investment. And for these venture capitalist, they cannot afford to find out if a product is solid; by then their chances of profit will be gone (Tsing 2008: 141 as cited in Vel 2014: 2816).

1.3.3 Actors and Spectacle in the Jatropha Hype

To understand how the spectacle around jatropha was created, spread and maintained in Indonesia, the discussion on key actors in jatropha hype becomes central in this research. Hunsberger (2012: 133) suggests that the identification of key actors, their motivations and influence is important in understanding how jatropha assumed its privileged position and what kept it there during the hype period.

The existing studies on actors in jatropha hype have shown a vast network of actors with various individual roles and interests. In this vast network, spectacle in various narratives have been identified as a key factor used by actor in attracting, convincing and persuading other actors. The stimulation of new technologies implementation by and large is shaped through complex negotiations based on the strength of narratives and lobbying activities in the social networks.

Social networks can be defined as simply a set of actors – individuals or other social entities – and their relationships with each other (Koehly and Shivy 1998: 3) and can be viewed as transactions where messages, goods and services are flowing and exchanged between the actors (Hartveld 1996: 37). Social network represents a powerful image of social reality where individuals are tied to one another by invisible bonds and knitted together into a criss-cross mesh of connections (Scott 1988: 109).

Many important aspects of societal life are organized as networks. The importance of social networks becomes a central part of Ribot and Peluso argumentation in defining the 'Theory of Access', by stating that social relationships are significant in constraining or enabling people to benefit from resources. Some people and institutions control resource access while others must maintain their access through those who have control (Ribot and Peluso 2003: 154).

Social networks, as coined by Vel (2013: 3), play important role in providing intermediary services, usually linking capital with knowledge/technology, land and labor, developing project plans and proposals to investors, as well as translating global discourses to national and local levels. Hunsberger (2012: 17) points out that the connectedness to key individuals can represent a crucial form of social power, by enabling people to leverage status and popular opinion, as well as (often) access to tangible resources in achieving the desired outcomes.

The social network analysis is used to analyze the interactions between actors at various levels in the jatropha commoditization process. The village level analysis of social network, as presented in Chapter 6, will focus on the analysis of the organization, mobilization and social relations between actors, in which special attention is given to the intermediary forms and interactional patterns between the actors.

1.4 Research Methodology

1.4.1 Initial Activities and Research Plan Changes

This research was carried out as part of the research cluster of 'JARAK: The Commoditization of An Alternative Biofuel Crop in Indonesia'[16] to study the socio-economic impact of jatropha cultivation in Indonesia. This research was started with an original research title 'A Model for Co-Management in Jatropha (*Jarak Pagar*) Production Area' with designated research locations in Flores, Eastern Nusa Tenggara and Central Kalimantan. Under the original title, the research project was designed to focus on the organization of the sustainable production of jatropha on the basis of co-management arrangements between local farmers, traders and processing companies and the government in its facilitating and controlling roles.

As a preparation of my PhD research project, I conducted a pre-fieldwork in Sikka, Flores on 31 July to 7 August 2010 together with Loes van Rooijen, my PhD researcher colleague

[16] The interdisciplinary cluster team conducted research on policy, legislation, technical crop qualities and production possibilities, and on the socio-economic impact of jatropha cultivation in Indonesia. It is part of a broader research program of 'Agriculture beyond Food', which is funded by the Netherlands Royal Academy of Sciences (KNAW) and the Netherlands Organisation for Scientific Research (NWO) This cluster is implemented as a joint research effort of the Van Vollenhoven Institute of Leiden Law School, the Institute of Cultural Anthropology and Development Sociology of Leiden University and the Plant Research International and Plant Production Systems of Wageningen University in collaboration with the University of Indonesia, University of Gadjah Mada, Parahyangan Catholic University, University of Mulawarman and the Agricultural Research Institute of Bogor.

in the JARAK Program. In Flores we visited two jatropha projects, one ran by a broker and another one by a national NGO, Yayasan Dian Desa in cooperation with a Japanese NGO, APEX (Asian People Exchange). Many important findings were encountered in this visit. Findings consist not only key points of observation on the two projects but also key points from the observation on farmers' experiences with jatropha under the two projects.[17]

The findings from Flores served as a solid beginning for me to understand how this sector operates on the ground and the findings become an important update for the JARAK Research Program on the state of the sector on the ground. It is important to note that by 2010 when the JARAK Research Program officially begun, it was also the year when the failure of jatropha was already globally recognized. This development together with the findings from Flores has contributed to the changes of the JARAK research focus in general as well as the individual research projects.

In regards to my research project, major changes occurred immediately in the first nine months of my PhD period. The first major change was the shifting from the initial focus on co-management topic to a study on the contextualization of the current failure of jatropha projects. The reason for the change was because the absence of a successful jatropha project that can be used as a case study on co-management practice in jatropha sector. It is also noted that the topic on co-management was drafted in 2007, at the time when jatropha hype was still at the peak. The current reality of global failure by itself has made this topic to be irrelevant.

Against this background, the JARAK research team decided to focus on what actually happened with jatropha or in jatropha projects. Findings from each individual fieldwork have suggested that the current failure might not be a total failure for those who were involved. Apparently many actors evaluate the story of jatropha from another perspective. Therefore, the current failure should not only be understood from the business and technical agriculture perspectives, but needs to be broadened to include research on the political economy to investigate the motivations and drivers of those involved. The efforts by the JARAK team to redefine the current jatropha failure have led to the development of several new concepts (including McCarthy, Vel and Afiff 2012 and Vel 2013) that I use to support the analysis in my research.

In this new focus of research, I also included the comparison of jatropha with the other potential biofuel crops found in the research location. This decision was driven by the emerging of new potential biofuel crops after the fall of jatropha, such as *kemiri sunan* (*Reutalis Trisperma*) and *nyamplung* (*Calophyllum Inophyllum*). In my research, the comparison was made between jatropha and cassava. The main objective of the comparison was to examine factors of success and failure of the two crops.

The last important change in my research was the decision to move my research location from NTT to South Sulawesi. This decision was made after considering the importance to broaden

[17] A brief discussion on these findings will be presented in Chapter 4.

the research locations of the JARAK research program in order to gain a more comprehensive understanding on the process of jatropha commoditization in Indonesia. With this change, the JARAK research program expanded its location coverage to include Yogyakarta, Flores and Sumba in NTT, Sumbawa in NTB, West Kalimantan, South Sulawesi and Papua.[18]

1.4.2 South Sulawesi as Research Area

The primary data are collected through field research in South Sulawesi Province of Indonesia. The selection of South Sulawesi as a research site was made for several reasons. Firstly, the province meets the conditions stated in the criteria for selecting research sites as determined in the JARAK Program Proposal: (1) actual jatropha cultivation takes place; (2) TIMNAS BBN designated area as preferential for jatropha cultivation; (3) cooperation projects between government, private companies and local population for commercial jatropha production; and (4) areas designated as marginal, either degraded forest or 'waste' lands in Eastern Indonesia.

According to the data on the distribution of suitable areas for jatropha cultivation in Indonesia (*penyebaran lahan yang sesuai untuk jarak pagar di Indonesia*) issued in 2006, South Sulawesi had approximately 435,483 hectares land suitable for jatropha cultivation.[19] The data were supported by the result of my initial searching of jatropha projects in South Sulawesi during my first nine months in Leiden that indicated the existence of some jatropha projects in the province. I searched through the internet and also through contacting my networks in South Sulawesi who informed me about the existence of the projects. In addition to this, prior to my departure to Leiden in 2010, I had done a short phone interview with a jatropha company in Makassar, PT Jais Bone Sejahtera (JBS), which was owned by a Japanese investor. With the decision to do research in South Sulawesi, I then continued to collect further information on this company, which was available online at that time, and also started to establish contact with the company staff as the preparation of my fieldwork.

My other reason to select South Sulawesi as my research site is because of my familiarity with this province. The capital city of South Sulawesi, Makassar, is my hometown where I grew up and spent most of my professional career as a program staff and a consultant for several development projects in this province where I had been involved in various local agro-commodities development projects in South Sulawesi which provided me with a sufficient background knowledge on the issues related to agriculture and commodity development both on-farm and off-farm. Living and working in South Sulawesi has also provided me with a strong network with the local development actors, especially the governments, NGOs and academia. All of these become my key advantages in performing my field research in South Sulawesi.

[18] The extensive research locations refers to the research locations of PhDs and Post-Docs of the JARAK Research Program: Juliana C. (Central Java, Yogyakarta, Sumbawa in NTB and Papua), Henky Widjaja (South Sulawesi), Gunawan (Yogyakarta), Loes van Rooijen (Flores in NTT), Jacqueline Vel (Sumba in NTB) and Pujo Semedi (Central Kalimantan).

[19] In addition to the 435,483 hectares land that were categorized as the most suitable areas (S1/*sangat sesuai*), there were also 122,407 hectares of S2 (*cukup sesuai* or mid quality) and 613,780 hectares of S3 (*sesuai marginal* or minor quality). The total land available was 1,171,670 ha. This number was calculated and presented in Mulyani *et al*. (2006).

In collecting some preliminary information on the potential companies and projects for my field work, I also started to establish contact with them where I was not only using conventional ways in contacting companies by their official e-mail addresses but I also used the Facebook to find people who have connections with these companies. This decision was taken because I noticed that it is usually not easy to access companies because of the complex bureaucratic procedure. Social media, such as the Facebook provides an opportunity to access potential respondents in informal way by becoming a Facebook friend with them. In my experience usually a Facebook friend will be cooperative when being asked for assistances since at least he or she already has a basic information about me by referring to my photos and personal information displayed on the Facebook page, and therefore can be easier in engaging and trusting. In this research, many key respondents were initially contacted via the Facebook and most of them were very cooperative.

My fieldwork in South Sulawesi was focused on a village named Moncongloe Bulu in Maros District. My first visit to this village was in July 2011 as part of my research on the case of PT Jatro Oil Plantation (PT JOP). After making several short visits to the village doing observation and interviews I found that Moncongloe Bulu was an interesting location for my village level fieldwork. Firstly, I found that the village does not only have experience with jatropha production but also currently becomes a location for cassava production. The existence of intensive cassava development which was driven by the increasing demand of the processing industry for bio-ethanol production has made this village becomes a good location to do a comparative study on biofuels crops. The second reason to focus on Moncongloe Bulu is the on-going agrarian change process in this village, where this village has been designated to be included in the Metro Makassar Urban Expansion Area. A rapid deagrarianization process is in place affecting the decrease of available land and labor for agriculture activities. Against this background, the discussion on Moncongloe will focus on the effects of the on-going agrarian change, in relation to the changing of land use and ownership in the biofuels crops development in this village.

1.4.3 Data Collection: Finding Jatropha Projects in South Sulawesi

The type of data collected in this research consists of primary data and secondary data. The primary data collection was conducted in two periods of fieldwork in South Sulawesi. The first fieldwork was conducted from June 2011 to January 2012, while the second one was from April 2012 to September 2012.

At the time when I commenced my fieldwork in June 2011, I started with a limited list of potential case studies and respondents. The list slowly became longer after series of initial interviews where I applied the snowball method asking my respondents to refer me to the other potential respondents and projects. The snowball research technique is often used in hidden populations,[20] which are difficult for researchers to access - and

[20] According to Heckathorn (1997: 174), 'hidden populations' have two characteristics: (1) The absence of sampling frame, which makes the size and boundaries of the population are unknown; (2) The existence of strong privacy concerns, because membership involves stigmatized or illegal behavior, leading individuals to refuse to cooperate, or give unreliable answers to protect their privacy.

identifying a list of already terminated and not publicly known jatropha projects falls perfectly into this category. This technique allowed me to make estimates and develop analysis about the connecting networks between some of the projects.

For my first fieldwork, as already discussed in the section above, several preparations to identify and establish contacts with jatropha projects in South Sulawesi were made prior to my visit to the field. Finding contact information and secondary data on jatropha projects via internet turned out to be a challenging work since most of the projects were not covered by media nor had their own websites. At that time I was only able to gather information about three jatropha projects. They were PT JBS (Jais Bone Sejahtera), PT JOP (Jatro Oil Plantation) and Green Light Biofuels. The first two (PT JBS and PT JOP) were located through website research, since their news were both covered by the local on-line media and they also had their webpages publishing their activities.[21]

As I have briefly mentioned in the previous section, my contact with PT JBS was initiated before my departure to Leiden in August 2010. When it was decided to move my research location from NTT to South Sulawesi, I then continued to collect further information about PT JBS through the internet and also started to contact some of the employees and former employees, whose profiles can be accessed online,[22] to ask for their willingness to be interviewed in my fieldwork. However, until the time of the fieldwork I received no response from those who I tried to reach. At the same time, the office and the processing plant of PT JBS had been relocated to West Sulawesi in 2010 and no further information can be gathered in 2011 when I did my fieldwork to know if the company was still operating after the relocation.[23]

For PT JOP, I also collected the initial information about this company from the internet. Both PT JBS and PT JOP had appeared in the news of online media (mostly South Sulawesi based media) and both had webpages that provide significant hints on their profiles and activities.[24] Prior to my fieldwork, I succeeded to get confirmations from some key people in PT JOP to be interviewed. Our communication was established through the Facebook, where I added them as my 'Facebook friends' and after they accepted my friendship request, we started to communicate about my research. The number of my interviewees grew after Istarted my interview process where I asked the respondents to refer to other people who can be the next potential respondents.

[21] PT JBS operated a business website, while PT JOP used a facebook page to publish information on their activities with links to related news websites. Both website and page were closed down around 2012 approximately at the same time when both companies stopped their operations.

[22] I tried to contact them using their Facebook and the Linkedin accounts.

[23] The information on the office and processing plant relocation was published on the website of PT JBS, www.jaisbst.com. The website contained the profile and the updates of the company activities. However, the website was no longer available in 2012. It was estimated that PT JBS also stopped operating in that year or even earlier.

[24] Different from PT JBS, PT JOP owned a Facebook page, which was created and operated by its employee. The page consisted of photo albums of the company activities. The page was closed down around 2012 after the official termination of the company.

Meanwhile, for the Green Light Biofuels, the initial information about this company and its jatropha project came from my network in South Sulawesi. It happened to be that the key operators of the project were also the people that I know. So I immediately contacted them and received positive responses from them to be interviewed. The interview process was taken place in my fieldwork period and consisted of one face-to-face interview and one questionnaire interview.

I started my research fieldwork in June 2011. I visited several institutions and contacted individuals within my personal networks in Makassar to search for the information on jatropha projects in South Sulawesi. I went to the BaKTI (*Bursa Pengetahuan Kawasan Timur Indonesia* or Eastern Indonesia Knowledge Exchange) to look for jatropha literatures and also to collect the local planning data of South Sulawesi. From BaKTI I received information on Yoel Pasae, a biodiesel researcher from *Universitas Kristen Indonesia Paulus* (UKIP) in Makassar whose profile was published in BaKTINews 2006 edition.

I met and interviewed Yoel twice at his office in UKIP. Aside from discussing about his jatropha related activities, Yoel also informed me about two other jatropha projects which he knows. The first one was a jatropha investment by a retired army general, who was once asking for his advice on the jatropha business development plan. The second one was a community development project run by PT PLN in Makassar. Yoel was familiar with this project because he supplied one unit of oil pressing machine to the project. I tried to follow up his information on these two projects, but I only managed to explore the project of PT PLN. I was helped by a friend of mine, from my Hasanuddin University alumni network who is currently working at PT PLN in Balikpapan, East Kalimantan to facilitate me in accessing PT PLN in Makassar. Unfortunately, I was not able to follow up the information on the jatropha investment by the retired army general due to the lack of information about this case.

In my research, I frequently received information on the already terminated projects. However, researching these projects presents significant challenges, especially if the initial hints on the projects are limited or unavailable. Therefore, luck plays an important part in my success to investigate projects with limited hints. For example, when I did my research on PT JOP case, one informant told me about another jatropha investment project (the case of PT Luwu Agro Raya) which he had no exact information. He only provided me with an unclear hint about the home address of the owner. I spent several days to locate the address by asking people in the indicated location before I can find the exact address. After that it took me several weeks to get the consent from the businessman to be interviewed,

During my fieldwork, I significantly benefited from the supports of my networks in South Sulawesi, ranging from my links in the Hasanuddin University alumni network, my friends inside the government, the local NGO networks as well as friends of my family. They helped me in accessing people and also projects, including in gaining permit and also providing asisstances when I visited locations of jatropha projects.

Some of the projects and people that were introduced to me happened to be interconnected with the projects that I researched. For example, I was helped by a friend

from my Hasanuddin University network to do research about jatropha nursery business in Jeneponto District, which apparently was one of the seedlings suppliers of PT JOP. I was also helped to contact a lecturer at the Agricultural Faculty of Hasanuddin University, who ran a jatropha research project and was also a senior agronomist of PT JOP.

Using personal networks was also useful for me in getting permit to do research in corporation. I was assisted by a friend of mine who was a senior staff at PT Vale Indonesia (formerly PT INCO), the biggest nickel mining company in Indonesia which is operating in Sorowako, East Luwu District, to do research on the jatropha project ran by the company for their ex-mining area rehabilitation purpose. I received assistance to get the official permit from the company management to do my research and also all assistances during my fieldwork in their site. Later on I expanded my research on the jatropha project of PT Vale by also researching a local agro-inputs company, PT Anugrah Cemerlang Indonesia (PT ACI) in Makassar that once engaged in a cooperation with PT Vale to supply jatropha seeds and other agro-inputs to its jatropha project.

To complete my assessment on the jatropha projects ran by private investors, I visited KADIN South Sulawesi (*Kamar Dagang dan Industri* or the chamber of commerce and industry) to look for information on jatropha investments and to learn about the perspective of the Chamber on this new investment sector. In my interview with Gazali, the Executive Director of KADIN South Sulawesi,[25] I was informed that during the hype years of jatropha, KADIN assisted several potential investors to link with the local governments in South Sulawesi in discussing about their investment plans in jatropha sector. Most of these potential investors were the members of KADIN from outside South Sulawesi, and the rest were non-members who visited KADIN to ask for assistances to lobby the local governments as well to find potential business partners among the members of KADIN. In lobbying the local governments, the investors were focusing on linking directly with the targeted district governments. Under the current decentralized system in Indonesia, a regent or a mayor as the head of district level government has the most authority over investment licensing decisions. A regent or a mayor has authorities regarding land concession provision, licensing approval, and so forth.[26] The main interest of these investors was to look for access to vast area of land to establish their jatropha plantations.

While the investors were all welcomed by the local governments that they visited, but they failed to find land suitable with their expected criteria and size. Local governments, such as in Pinrang and Pangkep Regencies were ready to allocate degraded lands in their regions for the planned jatropha plantations. However, the investors were interested in buying or leasing fertile lands to establish their nucleus plantations. By the district heads the request was difficult to be fulfilled. Lands with such characteristics are commonly

[25] The interview was taken place on 20 September 2011 at KADIN South Sulawesi Office.

[26] This broad authority has recently been reduced by the central government through the issuance of a new local government law, the Law No. 23 Year 2014. Under this new law, the local governments at the city/district level no longer have broad autonomy as before, which they enjoyed under Law No. 22 Year 1999 and Law No. 32 Year 2004.

owned by farmers and they will not be interested to grow jatropha if the crop has no competitive advantage in compare to their existing crops, such as cacao and maize.

For the investors, securing lands for their nucleus plantations is important because they wanted to establish processing factory. Gazali said that the local governments advised them to cooperate with farmers but the advice was not favored by the investor. They felt insecure to only depend on supply from farmers. They were afraid that after establishing a processing factory, they would face problems with materials supply since farmers may not be interested to grow jatropha if the price is low or they would ask for higher price or they may sell their yields to other buyers despite seeds and fertilizers were provided by the investor. At the end, after considering their investment options, most of the investors finally cancelled their investment plans. Some investors decided to change their investment plan from jatropha to the other investment potentials such as marble mining.

Since jatropha was a new commodity, KADIN initially had no information about the actual potential of this crop. All data and information about the prospect of jatropha was provided by the investors themselves. After several years KADIN finally gathered some information from the experienced investors and farmers about the low productivity of jatropha and the absence of clear market for the yields. This information became an indication about the limited potential of this crop. According to Gazali, the government should take lead in this sector because for private investors the investment is still expensive and risky.

Aside from studying jatropha projects ran by companies, I also included data collections on the projects implemented by the government in South Sulawesi. I visited and interviewed officials the provincial estate crop office of South Sulawesi, and also at the estate crop office and the trade and industrial office in Gowa District.

In the mid of November 2011, I was contacted by a friend from SRP (*Sekolah Rakyat Petani* / Farmers Field School) Payo-payo[27] who is also a writer of Ininnawa NGO in Makassar to help reviewing his article on jatropha: *Jarak Pagar: Melanggengkan Imperialisme Atau Menegakkan Kedaulatan* (Jatropha Curcas: Sustaining Imperialism or Enforcing Sovereignty). The discussion on jatropha in the article covered the story of PT JOP. This provided me with an opportunity to enrich my information on the story of PT JOP as well as to learn about the jatropha project ran by the NGO.

The article was part of a book about the experience of Ininnawa NGO in experimenting alternative energy options (biogas and jatropha) in South and West Sulawesi.[28] In 2009-2012, SRP Payo-payo received funding from *Helsingin Yliopiston Ylioppilaskunta*, the Helsinski University Students Union from Finland to implement a rural sustainable livelihood program in South and West Sulawesi Provinces. The program contained a renewable energy component, which included a pilot project on jatropha and biogas

[27] Payo-payo is a Mandar language term for scarecrow.
[28] The Ininnawa NGO is part of the Yogyakarta based NGO – INSIST (Indonesian Society for Social Transformation).

application for rural energy in three locations: Tompobulu Village in Pangkajene Kepulauan District, Soga Village in Soppeng District and Bonne-Bonne Village in Polewali Mandari District in West Sulawesi Province.[29]

In the pilot project, SRP Payo-payo distributed fifteen jatropha stoves to be tested by the villagers. The stoves were developed by *Lembaga Pengembangan Teknologi Pedesaan* (LPTP / the Rural Technology Developer Unit) of INSIST in Solo, Central Java. The stove used the dried jatropha beans as its main fuel. The beans were collected from jatropha trees that grow wildly in the villages. The introduction of jatropha for rural energy by this pilot project was reported to be unsuccessful. The villagers considered the technology to be unpractical in comparison to their traditional practices in using firewoods and kerosene stove for cooking. To use the stove, they had to collect jatropha beans that were scarcely available in their villages. They were also reluctant to grow jatropha if it is only for energy because they prefer to use their land for other crops. To meet their needs for energy, they still relied on firewood that was abundantly available from their gardens and the surrounding forests.

In addition to researching jatropha projects in South Sulawesi, during my fieldwork I also had an opportunity to collect information on one project in Banten Province. In early January 2012, I was contacted by a businessman, Nasir Yahya Balfas from Banten Province to consult about the prospect of jatropha investment. Nasir read my published article on jatropha, *Jarak Pagar: Kritik Terhadap Klaim* and decided to contact me to get information and advice on jatropha and castor investment.[30] His brother, Ali Balfas was approached by an investor from Malaysia to establish a castor joint venture. The investor already established a company in Jakarta called Castor Indonesia Group (CIG). The Balfas had a previous failed experience in growing jatropha and found the new offer as something different.

Castor was introduced to the Balfas as a high yielding crop. The seeds were planned to be supplied from China and they were claimed as the improved seeds developed by the Chinese R&D institution. The promised yield was 3-5 kg per tree, while the planting ratio per hectares was approximately 10,000 trees. The cost of the improved variety seeds was $165 per hectares (3.1 kg of improved seeds for 10,000 trees). Indonesia is considered as the best place to grow castor because of the tropical climate. In China, this improved castor variety was said to require seven months to reach harvest. A shorter period was expected to realize in Indonesia. The expected yield per hectares was between 30 to 52 tons.

The investor offered them three options of cooperation. The first was the cash investment option, where the Balfas provides cash capital to run the joint venture. The second, option

[29] The reports on the experience of SRP Payo-payo in implementing the renewable energy pilot project can be found in the following link: http://blog.insist.or.id/payopayo/archives/490 - accessed on 13 May 2013).

[30] In the early months of my research, I wrote a short article on jatropha, 'Tanaman Jarak: Kritik Terhadap Klaim' or 'Jatropha: Critics towards Claims', that was published in the February 2011 edition of the on-line magazine of the Indonesian Scholars Association in the Netherlands. This article apparently helped me in engaging with several readers in Indonesia who had interest in jatropha topic. Some were challenging my article, but I also received responses that supported my analysis.

was the Balfas to lease their land to the investor and receive land lease income. The third option was the Balfas to contribute land and to provide warehousing, while the Malaysian partner provided the seeds and pay for the entire production costs. The Balfas would receive management fee of $ 20 per hectares per month and five percent of total sales (the total sales value was estimated $300 per ton). The produced castor seeds would be processed to become lubricant oil and to be marketed in China and Europe.

After negotiating for approximately 3 months, the Balfas finally selected the second option.[31] They agreed to lease a hundred hectares of their land in Pandeglang to the investor. The total lease value was one billion rupiah for a period of five years. The Balfas family was approached by the investor because of their control of vast area of land and their strong local influence in the region. The family has a long experience in plantation and agriculture business, including in tobacco cultivation and a cooperation with PT Perhutani in teak and sengon cultivation.

This case serves as an example of the shifting of investors interest from jatropha to castor. I use this case to observe the business negotiation process between investor and local partner in this sector to know the available business model options and the reason why the local partner (in this case the Balfas) decided to engage in the business. Apparently, their previous failure in jatropha business had discouraged the Balfas to engage as a business partner in the castor venture. This decision was also affected by the absence of sufficient information on castor business prospect. The Balfas decided to play safe by only leasing their land to the investor.

In the middle of my first fieldwork period, after spending several months to collect random case studies, I decided to focus on the Moncongloe Bulu Village for my village level fieldwork. In that period, I visited the village several times to meet some informants and to do initial observations. A more in-depth research activity in this village was conducted in my second fieldwork period, April-September 2012 where I conducted an observation on the experiences of farmers with jatropha and cassava. In the observation I conducted interviews and also involved in the everyday conversation of the villagers not only about the two crops but also their daily life issues, the social relationship in the village, and the on-going urban expansion in their village. For the research in Moncongloe on the comparison of jatropha and cassava, I also conducted several interviews with a cassava processing company, PT EN3 to get a comprehensive picture about the industry and the company strategy in involving farmers in their production.

Apart from the fieldwork in Moncongloe, I also collected some supporting documentation regarding the history and the updates of the village. Since the first fieldwork period in 2011, I have been aware about the interesting historical background of Moncongloe based on the initial information from my informant who told me that the village used to be a detention camp for communist prisoners. From this information, I then searched

[31] I started to communicate with Nasir since January 2012 and was informed about the decision in March 2012. He also shared with me a template of the land lease contract between his brother, Ali and the CIG.

for further information, which then led me to meet a local historian, Taufik, who has published a book on the history of detention camp in Moncongloe. The book appears not only to provide a story about the prisoners but also on the comprehensive history of agrarian change in Moncongloe during the period of 1960s to 1980s. This interesting background has become one key consideration for me in deciding to conduct fieldwork in Moncongloe. To complement the historical information, I also collected some documents on the urban expansion activities, which I gathered from my network in the government and also from newspaper clippings.

Another important element in my data collection is the collection of secondary data to complement the primary data and to guide my research analysis. The exploration of secondary data in my research was focusing on three types of literature: firstly, literature on South Sulawesi in relation to the regional history, people and agricultural development; secondly, literature on the history of jatropha in Indonesia, and lastly, the contemporary academic literature on jatropha and biofuels, agrarian change, political economy and Indonesian politics. The secondary data collection was mostly done in every visit I had to Leiden, where I searched the data in the collections of Leiden University Main Library, KITLV (*Koninklijk Instituut voor Taal-, Land- en Volkenkunde* / Royal Netherlands Institute of Southeast Asian and Caribbean Studies), East Asian Library, Law School Library and FSW (*Faculteit der Sociale Wetenschappen* / Faculty of Social Sciences). For the contemporary literature on jatropha, I significantly benefitted from the dynamic knowledge sharing within the JARAK Team where much new information, including our own team analysis was shared either in the series of JARAK workshops, published journals and in our internal project reports.

1.4.4 Research Limitation

It should be noted that at the time when I conducted my fieldwork, all of the studied projects were already terminated. Therefore, my research was actually studying the history and reconstruction of these projects. The main challenges were the difficulty to find key respondents from these projects as well as the supporting documentation. In certain projects, especially those implemented by the government and the state-owned company, I experienced some problems in finding respondents who were directly involved in managing the projects since those persons were already moved to the other positions or offices. In this situation, several times I only managed to interview the replacement staff, who knew little about the actual stories. This problem was also further exaggerated by the absence of supporting documentation of the projects.

To ensure the information reliability and accuracy, I always conducted information verification by cross-checking statements between informants as well as with the available documentation (newspaper clippings, website information, and project document when available) For the case studies that involve disputes between the respondents – where personal sentiments were strong due to past disappointments – I carefully examined and analyzed the given information and selectively used the information in this dissertation.

Finally, in this research I use both real names and pseudonyms for various reasons. For case studies that are considered to be sensitive, I decided to protect the anonymity of my informants. I also changed names of institutions and people to avoid certain risks and to meet the research ethics standards.

1.5 Outline

This dissertation is arranged in seven chapters. Chapter 1 serves as the introductory chapter to present the background of the research, research questions, conceptual framework, research methodology and the outline of the thesis.

Chapter 2 discusses the history of jatropha in Indonesia with specific focus on the reconstruction of the actual history of the cultivation and the use of jatropha in Indonesia. This chapter argues that there has been a common misidentification of jatropha and castor that creates misleading perceptions and claims on the history of jatropha. The history reconstruction is conducted through literature research over various available sources: books, journals, and internet sources on the cultivation and application of both jatropha and castor starting from the Dutch colonial period to the Japanese colonial period in Indonesia.

Chapter 3 presents a discussion on the jatropha hype in Indonesia to provide the national context of this research. This chapter deals with the questions of *How has jatropha curcas been introduced and promoted as feedstock for modern biofuel production in Indonesia? What explains the current failure of Jatropha in Indonesia? Who were the key actors and what were their roles?* The discussion in this chapter covers the background of jatropha hype in Indonesia and the roles of key actors during the hype period: governments, scientists, state-owned companies, private investors, NGOs and farmers, by focusing on their backgrounds, activities and results.

Chapter 4 will discuss the regional context of the study. In this chapter I present an overview of the profile of the agriculture in South Sulawesi. This chapter explains the local factors that contribute to the agricultural development in South Sulawesi to provide a regional background in understanding why and how would jatropha cultivation fit into the social and agricultural context of South Sulawesi.

Chapter 5 presents the discussion on the list of jatropha projects covered in my research. This chapter examined twelve jatropha projects that were implemented in South Sulawesi in the period of 2006 to 2011. The analysis examined the local factors that shaped the rise and fall of jatropha in South Sulawesi, the key drivers and motivations, and the strategies adopted by the actors.

Chapter 6 presents the discussion of my field research in Moncongloe as the selected research site focus. This chapter will delve into the experience of farmers with jatropha introduction. This chapter presents a discussion on how farmers deal with the introduction of jatropha under the on-going process of deagrarianization in Moncongloe. The presented

case study will show how the process of deagrarianization affects the introduction of two biofuel crops (jatropha and cassava) with two different results. This chapter also includes an analysis of actors in the supply chains with a special focus on the patron-client pattern in relation to the role of middlemen or brokers in the supply chain of jatropha and cassava. The analysis reveals the existence of two different types of middlemen: commercial and non-commercial intermediaries with two different results on the farmers' participation in the cultivation of jatropha and cassava.

Chapter 7 is the concluding chapter. This chapter presents the main findings of the research while revisiting its main arguments and drawing theoretical reflections on the topic. It also presents the contribution of the research to the existing academic discussions on jatropha both empirically and theoretically.

2 Reconstructing Jatropha history in Indonesia

2.1 Introduction

The fact that agriculture is such a multi-faceted activity means that a great many disciplines and sources must necessarily be involved in the reconstruction of its past It may be observed that students of agriculture hailing from different disciplines have never communicated adequately with each other. The botanists, for instance, have generally known little of prehistory and history, and the historians have returned this slight with interest (Hill 2004: 19)

Jatropha Curcas is a perennial succulent shrub native to Central America. The name jatropha comes from the Greek *iatros,* meaning doctor, and *thrope,* meaning food, which alludes its applications in traditional and folk medicines. Although it has medicinal properties, jatropha is toxic to animals and human. Jatropha has already existed in Indonesia since the period of settlement by the Dutch and Portugese (Siang 2009) Throughout Indonesia jatropha curcas is fairly widely distributed and consist of around 400 ecotypes. The rich variety of jatropha curcas in Indonesia is highly determined by the local environment condition, such as the climate and soil. Most of the local ecotypes are known for low in productivity and oil content (Jongschaap *et al.* 2007, USAID 2007: 23).

The first intensive cultivation of jatropha in Indonesia is claimed to exist during the occupation of Japanese administration in 1942-1945 which was aiming to use jatropha oil as fuel for their military engines due to fuel shortage during the World War II. Some reports and journals, such as Koizumi (2011) writes that jatropha curcas based biodiesel was developed by army related petroleum refiners for tank fuel and lamps. This claim or story line can be commonly found in a paragraph of the introduction section of many references on jatropha in Indonesia (see for examples: Hambali *et al*. 2006 Prihandana 2006 and Tim Jarak Pagar RNI 2006). However, little attention and effort was dedicated to verify this claim and to reconstruct the history of jatropha in Indonesia. This chapter will specifically contribute to address the absence of a clear historical reconstruction of jatropha in Indonesia. This chapter addresses the following questions: *Have the cultivation and application of jatropha curcas as biofuel been taken place since the Japanese administration period in Indonesia? If not, what was the actual history of biofuel crop cultivation and application at that period of time? How does the existing popular claim on*

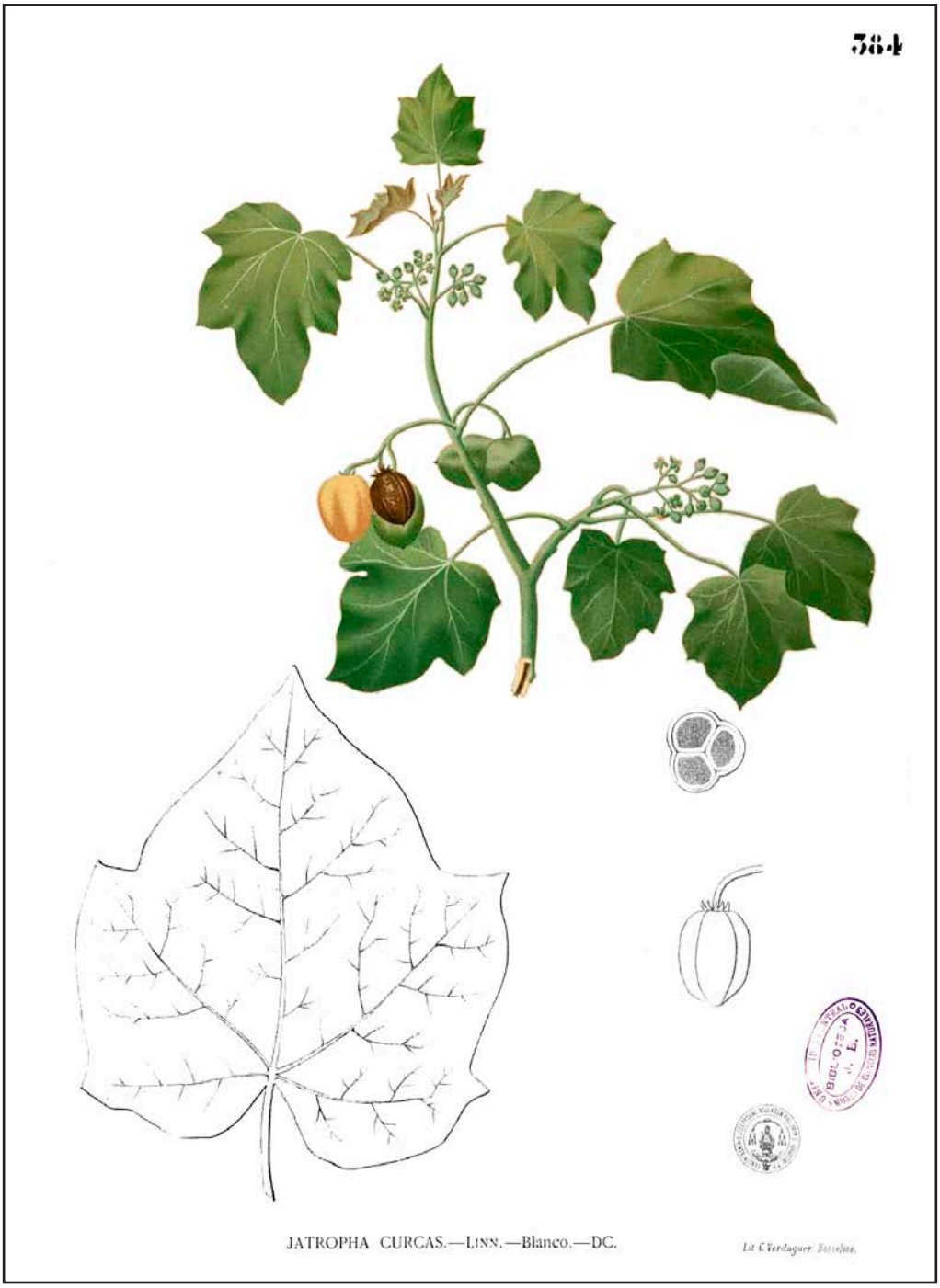


Figure 2.1 The sketch of Jatropha Curcas L.
(Source: http://upload.wikimedia.org/wikipedia/commons/7/79/Jatropha_curcas_Blanco2.384.png)

jatropha history link to the creation of jatropha hype? The answers to these questions are essential to understand why until today little experiences, knowledge and technologies are available on the ground for both jatropha cultivation and oil processing either at the farm level and industrial scale.

One main caveat in studying the history of jatropha is the common misidentification of jatropha as castor plant, either written or verbally, where both plants are commonly addressed using similar names: *jarak* and castor. It is noted that prior the jatropha hype, most literature refer castor plant as *jarak,* and the two names were used interchangeably. Furthermore, in many places in Indonesia the two plants are addressed as *jarak* by the local people despite of their significant differences. Jatropha curcas and castor are both oil producing plants from the same family of *Euphorbiaceae* (the spurge family) Jatropha is of the genus *Jatropha curcas L*. (or the Barbados or Physic nut) whereas castor plant is of the genus *Ricinus communis L.* (USAID 2007: 19, Jongschaap *et al.* 2007). In terms of plant characteristic, jatropha is a perennial plant while castor is an annual plant. Historically, castor plant is more popular as oil producing plant and the oil has been traded for centuries and used for lubricant oil and medicines.

By referring to the common misidentification that creates misleading perceptions and claims on the history of jatropha, the discussion in this chapter will cover the presentation on the history of castor cultivation, trade and applications in Indonesia as an important part of the reconstruction. The applied methodology in the history reconstruction was focused on an extensive literature research over various available sources: books, journals, and internet sources on Japanese colonial period in Indonesia and Southeast Asia during the World War II regarding their alternative fuel policy, as well as sources that discuss or mention about jatropha and castor in even earlier period of Dutch colonial with specific keywords search of jatropha, *jarak*, *djarak*, castor and alternative fuel.

2.2 *Jarak* in the Dutch Colonial Period

One of the earliest written documentation on jatropha in the Dutch colonial time is a book entitled *Wenken en Raadgevingen Betreffende het Gebruik van Indische Planten, Vruchten etc*., which was written by J.M.C. Kloppenburg-Versteegh in 1911. This is a recipe book as well as a plant atlas on indigenous medical herbs that were widely used by Indo-Europeans as well as Europeans in Java in the shortage of professional western health care. In this book, *jarak pagar* (written as *djarak pager*) was described by the author as a plant which was widely used in Java for hedges, and that the seeds, leaves and tree sap were used as rigorous laxative, and antiseptic (Kloppenburg-Versteegh 1978 as cited in Vel 2011)

There are not many explicit historical records on jatropha during the Dutch Colonial period. The available records, as mentioned above, suggest that jatropha was planted mostly to be used for traditional medicines. Yet, no records on its cultivation, trade and other applications. This is very different from the records on castor plant, which in many references is explicitly called as *jarak.* Literature sourced from the colonial and

contemporary publications on the economy and agriculture during the colonial time provides sufficient information on the cultivation, trade and applications of castor or *jarak* in that period.

Since the Dutch period, castor has been traded for its oil. The oil was primarily used as engine lubricant and was also popularly used for both traditional and modern medicines (Kloppenburg-Versteegh 1907). Liesbeth Hesselink in her book on Healers on the Colonial Market writes that castor oil was a very popular medicine to be prescribed by the Dutch doctors in Indonesia (then was Dutch East Indies) and was widely accepted by the natives (Hesselink 2011: 44 and 283). Aside from being used as lubricant and medicines, castor was also used as fertilizer material. A publication by Peter Boomgaard (1999: 59) notes that castor cake that remained after pressing *jarak* (the castor-oil plant) for oil was used by farmers in Cirebon, West Java as an organic fertilizer material for their tobacco plants in 1834.

The economic value of castor as a cash crop had made this crop to become one of the cash crops recommended by the Dutch Agricultural Extension Service (*Landbouwvoorlichtingsdienst* / LVD) (Heersink 1995: 211). Castor was commonly planted as a rotation crop. N. P. van den Berg in his 1894 article on *China en Java* published in *De Economist* journal states that castor became an alternative rotation crop for Javanese farmers in the eighteenth century, aside from maize, taro and other annual crops, to be planted after paddy during the two years of fallow period (Van den Berg 1894: 574).

In terms of trading, castor was already traded since the eighteenth century. Fernando (1996: 96) writes that the traders in Pekalongan were travelling to gather peanut, soy bean, tobacco, indigo, castor oil, textiles and batiks by bartering cotton, fish paste, leather, oil and coconut brought in from other areas. He also notes that in 1842 from Kediri alone 49 tons of castor was exported (*ibid*: 113). Another publication by Peter Carey suggests that at that period of time, castor was a significant commodity for the local economy in Java and subject to colonial tax (Carey 1986: 126). Until the beginning of the nineteenth century, prior the Japanese occupation, the island of Java had been exporting castor with annual volume of 10,000 tons and 90% of the export was for Japanese market (Kurosawa 1993: 36). In Japan, the oil extracted from the beans was used for lubricating airplanes, trains, automobiles, and precision machines (Post *et al.* 2010: 294).

2.3 *Jarak* in the Japanese Colonial Period

It is said that castor oil was used during the Japanese occupation here (1942-1945). But it is not clear whether they used it as lubricant oil that was processed from *Ricinus communis* or it was used as fuel, processed from *Jatropha curcas*. The problem is there are no written records either in Indonesia or Japan about the type and quality of the oil and what it was used for (Robert Manurung - Jakarta Post, 6 August 2006)

The investigation of *jarak* stories in the Japanese colonial period in Indonesia (1942-1945) was very crucial since the contemporary narratives on *jarak* history were basing their

Figure 2.2 The sketch of Ricinus Communis L. (Source: http://nl.wikipedia.org/wiki/Wonderolie#mediaviewer/Bestand:Ricinus_communis_-_K%C3%B6hler%E2%80%93s_Medizinal-Pflanzen-257.jpg)

historical claim on this period. The major claim that will be verified in this section is the claim that jatropha curcas (*jarak pagar*) was massively cultivated under the instruction of the Japanese military administration to address the diesel fuel shortage during the war period.

The verification on which oil producing crop that was officially instructed to be massively cultivated in Indonesia and its application was sourced from the literature on the Japanese occupation period in Indonesia and Southeast Asia. During their occupation period, the Japan military administration introduced and intensified the cultivation of new crops to address the shortage of food, fibers, and oil. Rice was the main food crop, cotton and jute were the main fibers, and coconut oil, palm oil, and castor oil were used as cooking oil, fuel, lubricant, and making soap and other products (Post *et al.*2010: 256).

Because of the war, the Japan military administration decided to increase the production target of castor seeds from 10,000 tons up to 40,000 tons in 1943 and later on 60,000 tons in 1944, which was implemented through massive campaigns and mobilization (Kurosawa 1993: 36).[32] To meet the target, on February 9, 1943 the large-scale compulsory planting of castor bean was begun (Post *et al.*2010: xx). The Japanese military administration gave orders for all grounds and wasteland to be planted with castor seeds. People, both in the rural and urban were mobilized and forced to cultivate castor.[33] The Japanese utilized social organizations such as the *Tonarigumi* (neighborhood association), *Seinendan* (paramilitary organization), and *Fujinkai* (wives association), to mobilize unpaid labor. Seeds were distributed with specific targets of land size to be planted by people in every area under the supervision of extension officers. The task of planting the seeds on wasteland was given to schoolchildren (*Kinrōhōshi* or volunteer work by students)[34], where each school was allocated its own piece of land and the one, which produced the most seeds won a prize. How much castor oil this campaign yielded is unknown (De Jong 2002: 236).

In rural areas, castor was cultivated in productive agriculture lands together with food crops. Castor was usually planted after the rice harvest in March mixed with the dry season crops. To meet the target, castor was also planted in many other places, such as along the roadsides, riverbanks and home gardens. The seeds were bought and collected by the appointed collectors and became an additional income source for farmers. However, due to the shortage of supply, the military administration forbid people to use the seeds for their own needs (Kurosawa 1993: 36). The Japanese totally ignored the need of the civilian population for paraffin needed for cooking and lighting which was very scarcely available since all fuels were only available for purposes allowed by the Japanese administration (De Jong 2002: 236). Until the end of Japanese occupation in Indonesia,

[32] Instructions by military administration were circulated for the mobilization of people to cultivate *jarak*, such as *Makloemat Keizabucho Semarang tentang Tanaman Jarak* in 1942 and *Kediri Shi Makloemat* in 1944. Two Japanese companies: Takenokoshi Shoji and Senda Shokai were given authority to collect *jarak* seeds (Kurosawa 1993: 62).

[33] The *Kediri Shi Makloemat* in 1944 instructed the town dwellers to plant half of their home gardens with castor and another half with food crops (Kurosawa 1993: 36).

[34] School classes in Java, Sumatra, Bali and elsewhere were also made to perform unpaid menial work such as planting trees, cotton, castor beans and other crops or carrying rice to collection centers. In November 1944, some 200,000 people carried out *kinrōhōshi* (Post et al. 2010:530).

Figure 2.3 Japanese administration propaganda poster on castor cultivation (Source: Post et al.2010: 246).

the administration data suggest that there were1200 hectares of agricultural area planted with castor in Java by 1944, which produced 1081 tons of castor seeds from the expected quota of 3000 tons (Post *et al.*2010: 227).

The large-scale project to grow the castor plant and other non-edible crops had caused disastrous effects on the local economy in Java since it undermined food cultivation and neglect the cultivation of existing cash crops, such as tea, coffee, sugarcane and tobacco. The attempt to increase production of food, fibers, and oil proved self defeating because these items competed with one another for land and labor (Post *et al.* 2010: 256). This was late realized by the administration before they started a massive campaign to increase rice production in Java not only for their own consumption but also to address the economic crisis (Sato 2006: 240-241). The general condition of Indonesians was worsening at that time after the Japanese administration imposed the forced labor (*romusha*) policy and also launched a campaign to deliver rice and other food materials to the government with certain quota to each village, and followed by a restriction of trading and transporting of rice and other agricultural produce over administrative boundaries (Post *et al. 2010*: 101). This period of time is remembered in the Indonesian history for the extreme hardships, especially for the stories on the slavery, crisis and starvation.

Another useful publication with complete reference on Japanese alternative fuel policy during the war is an article written by Francis K. Danquah on the state of the Philippines industrial crops in the World War II. In the article, Danquah specifically used the term castor for the oil plant, where he writes that due to oil shortages, the Japan military administration decided to exploit the Philippines castor beans that grew wild along rivers, highways and railways throughout the islands, and then later on also decided to cultivate the plant. The decision was driven by the claim at that time that castor oil was an adequate substitute for petroleum, as well as an excellent source of high-grade lubricant for machinery and aviation fuel. In order to attract farmers to plant castor, the Japanese administration distributed free castor seeds to farmers along with incentives of scarce commodities, such as soap, matches and cigarettes. This persuasive strategy was also accompanied with government instruction to each family to grow at least twenty five castor plants in their yards. Despite such enthusiastic efforts, the castor oil project failed to address the oil crisis due to low yield (Danquah 2005: 80-81).

The description presented in Danquah's article is a useful reference in studying the alternative fuel policy by Japanese military in Indonesia at that time, especially regarding the exploitation strategy. There are similarities of story lines on the exploitation strategy on both voluntary and forced castor cultivation in Indonesia. After the Japanese occupation ended, farmers immediately abandoned their castor farms and shifted back to the food and cash crops cultivation. Yet, castor is continued to be grown in several places in Indonesia after independence as an industrial crop.[35] Most of the yields are absorbed by PT Kimia Farma, a state-owned pharmaceutical enterprise, to be used as medicine and cosmetics ingredients.[36]

When jatropha hype struck Indonesia in 2006, the cultivation of jatropha was very different from the previous castor cultivation period. In contrast to the forced cultivation system of castor, the cultivation of jatropha was conducted voluntarily with a strong profit orientation. Farmers were willing to invest in this crop by buying expensive seeds and allocating their productive lands for the cultivation of this crop. Furthermore, many also joined various cooperation schemes or business models offered by the investors.

2.4 Was jatropha cultivated during the Japanese period in Indonesia?

Based on the literature review presented above on the historical records of Japanese alternative fuel policy in Indonesia and the other Southeast Asian countries, two important facts can be concluded for the question posted at the beginning of this chapter. Firstly, it is very clear that it was not jatropha curcas but castor plant (*ricinus communis* or

[35] As an industrial crop, castor also received attention from the Agriculture Department. For example, in 1968, The Industrial Crop Research Center (Lembaga Penelitian Tanaman Industri / LPTI) in Bogor issued a manual on castor cultivation (Petundjuk untuk Bertanam: Pedoman Singkat Tjara Bertanam Djarak).

[36] PT Kimia Farma in its Semarang factory specially processes the production of castor oil, vegetable oils and cosmetics (talc) (http://en.wikipedia.org/wiki/Kimia_Farma - accessed on 12 May 2013).

Figure 2.4 Women and buckets of the harvested castor fruits with castor trees as the background (Source: Marilah Menanam Djarak! Book, circa 1943)

jarak kepyar) that became the focus of the Japanese military administration. This can be concluded not only from the texts but also the visual archives – see Figure 2.3 and 2.4 – showing castor trees (*ricinus communis*) in both pictures. Yet, despite this fact, by referring to folk stories on the existence of *jatropha curcas* and castor in their locations, it is believed that both plants were exploited to meet the targeted collection quotas. Jatropha

seems to be cultivated in a traditional way as hedges and many seeds were also collected from the existing wild trees.

It is important to note that in Indonesia, the concept of plants for hedges does not necessarily mean that they only function as hedges. Traditionally in rural Indonesia, hedges become the spot where the people grow traditional medicinal plants (*tanaman obat keluarga*) as well as plants that can be used as fodder for their livestock, such as *lamtoro* (*Leucaena leucocephala*). Therefore, it is very likely that jatropha is planted not for its function as hedges but because of its traditional uses for medicine and fuel. It seems that jatropha is planted in small numbers in combination with other useful plants in the fence area. This also explains why jatropha in Indonesia is not planted as dense as it is planted elsewhere, such as in Africa (see the practice in Kenya in Hunsberger 2012) to function as hedges. The recent introduction of jatropha for hedges is suggested to have negative implication on the local practice. Milieudefensie (2012: 20) suggests that jatropha as hedges has replaced the fodder plants and forced women to spend longer time to collect fodder for their livestock.

Secondly, the studied literature also clearly suggests that the exploited oil was used to address the scarcity of fossil based lubricant and not as diesel fuel replacement. In terms of fossil fuels substitution during the war, it is suggested that the Japanese military administration was experimenting on the exploitation of a number of vegetable oil

Figure 2.5 The application of legume trees as hedges in which is common in the rural area in Indonesia (Photo: Henky Widjaja, 2011).

options, especially sugarcane, soybean, coconut (copra), castor and pili nut (*canarium ovatum*) (Kurosawa 1993, Knothe 2001, Danquah 2005). From this list of options, however, by referring to the technology at that time, only some that can become relatively reliable substitutes.[37] There was no success recorded on the use of substitutes for diesel fuel. A range of options, such as castor and coconut oil, was not able to be processed further than as lubricating oil only. It is assumed that the failure was caused by the hasty experimentations driven by the exigencies of the war and the fragmentary data at that time (Knothe 2001: 103).[38]

After the World War II, research projects on the application of plant oil for biodiesel, which also include jatropha, have been continued until now. Positive results have also been reported in various published, and unpublished, research papers at least since 1950 (USAID 2007: 26). However, even until now a final formula for the production of reliable jatropha biodiesel, especially for the degumming and deacidification is still under development to make it compatible for all diesel engines and can be produced at economical production cost (USAID 2007, GFA 2008).

2.5 Conclusion

This chapter has presented a discussion on the history of jatropha curcas with a specific aim to verify the existing popular claims on the history of jatropha cultivation and application during the colonial years, especially in the Japanese colonial period. The verification shows the absence of records to support the claims that jatropha had been widely cultivated and applied as biodiesel during the Japanese occupation period. The studied publications clearly indicate that it was castor, instead of jatropha, that was cultivated under the mandatory instruction of the Japanese colonial administration. Furthermore, the literature points out that the cultivation of castor in that period was aimed at addressing the shortage of fossil based lubricant and not as diesel fuel replacement in the war period.

This chapter concludes that until the starting of jatropha hype in the 2000s, jatropha was mostly grown in the wild or planted in small population for its traditional use as herbal medicines and lighting fuel. This conclusion explains why there is so little knowledge of farmers about the cultivation technique and the actual yield result that can be expected from the plant. The limited knowledge on jatropha at the farmers level has contributed to the existing failure of jatropha. Achten *et al.* (2014: 3214) point out that local knowledge

[37] Danquah points out that 90% of 250,000 tons sugarcane in the Philippines was processed into ethanol fuel with a mixture of 5% gasoline and 95% alcohol. Yet, vehicles that operated on such fuel only reached 60% of their normal capacity in terms of speed and range because of its relatively lower octane content (Danquah 2005: 78).

[38] While since 1900, Rudolf Diesel, the inventor of diesel engine, had tested the application of peanut oil to run his diesel engine, the development of vegetable oils application for diesel fuel was still very basic during the war period. Researches on vegetable based diesel fuel were accelerated during the war to meet the fossil fuel shortage emergency but they were very sporadic. Work on vegetable oils as diesel fuel was again ceased after the war when petroleum- based diesel fuel became available again plentifully at low cost (Knothe 2001: 103 and 105).

on an emerging crop is necessary to enhance activities around new species. In case of native species, local knowledge on these species is generally available. In introducing new tree species to new areas, capacity is necessary to handle the introduction and development (infrastructure, knowledge, *and so forth*) of these species and their products.

The limited knowledge on jatropha has caused farmers to fall easily into the trap of overwhelming promises and claims on jatropha potentials at the time of hype. Afiff (2014: 1688) writes that although a substantial number of people in Indonesia retained a collective memory that associated the term of *jarak pagar* with the Japanese wartime occupation, very few Indonesians actually have clear knowledge about the plant.

According to Seligman *et al.* (2013: 128-129), episodic memory for specific prior events, including information about who was present, what occurred, and what was felt, appears to be a fundamentally constructive process. Each time an event is remembered, past episodes are reconstructed anew and in most cases a little bit differently than the last time. Why memory functions in such fallible way is because it provides details needed to construct prospective simulations of future events. This situation has allowed the creation of false storylines about jatropha, including localizing its profile by 'inserting' the plant in the local history to increase the familiarity of the crop to the locals, as if it has been part of their agriculture for long time; and also to create a vision based on the unclear past memory about the application of jatropha that the plant can solve immediate present problem of energy crisis. This type of storyline is very much unchecked and taken for granted. Therefore, it is strategic both in gathering support for jatropha as a promising solution to energy crisis and in mobilizing people to grow the plant.

In the parallel discussion on the story of castor, the given discussion shows that along with the long history of castor cultivation, trade, and applications, the existence of proven markets for various high value products from castor has become a current key advantage of castor in comparison with jatropha. Therefore, it is important to note that only when the marketable jatropha based derivative products are materialized, then jatropha can become a lucrative commodity crop for farmers.

3 Jatropha hype and actors in Indonesia

Chapter 2 has presented the reconstruction of jatropha history in Indonesia. The time frame of the discussion is the years before the jatropha hype struck Indonesia. In this chapter, the focus will be the story of the jatropha hype experience in Indonesia. The discussion covers the period of 1990s, when the initial research activities on jatropha were taken place, until the years of hype between 2006-2010.

The discussion in this chapter will explore the question on *What explained the emergence of jatropha projects in Indonesia?* This chapter serves as an overview of the jatropha hype in Indonesia and the roles of key actors during the hype period by delineating their backgrounds, activities and results.

3.1 Jatropha Hype in Indonesia

Jatropha became a focus of attention when a team of ITB (Institut Teknologi Bandung / the Bandung Institute of Technology) scientists started to study the possibility of extracting oil from *jatropha curcas* seeds which were found abundantly in the arid areas of West Java with financial support from the Indonesian government in 1994. However, following the economic crisis in 1998, the government stopped providing funds, saying that the research was not relevant to conditions in Indonesia at the time.[39] The research was then continued to be funded by University of Groningen from the Netherlands.[40] Later on, this research initiative also received a support from the New Energy and Industrial Development Organization (NEDO) of Japan in 2004 for the testing of pure jatropha oil application in stationary engines. In 2006, the results of the research were publicly introduced through the Jatropha Expedition from Atambua, Timor to Jakarta, which was very successful in promoting and convincing the public about the potential of jatropha. The event received enormous support and sponsorships from the automotive industry, universities and research institutes both national and international and received special coverage by mass

[39] Source: Robert Manurung: Inventor of Renewable Green Fuel (the Jakarta Post, August 06 2006) Available at: http://ppigroningen.nl/robert-manurung-inventor-of-renewable-green-fuel/ - Accessed on 3 January 2013.

[40] Source: University of Groningen Alumnus Dr Robert Manurung and the Jatropha Plant. Available at http://www.rug.nl/news-and-events/newsletters/international/2010/interviewmanurung - Accessed on 3 January 2013)

media, including the National Geographic Indonesia, a reputable international scientific magazine, creating an undisputable convincing image of jatropha as a future biofuel that was very potential to be cultivated in Indonesia (Amir *et al.* 2008: 123).[41] The success of this expedition was then followed by waves of research and publications promoting jatropha as a promising biofuel plant suitable for all soil conditions with very high yield potentials, ranging from 500 kg to 10 tons per hectares (see for example Hambali *et al.* 2006: 28, Prihandana 2006: 105 and Tim Jarak Pagar RNI 2006: 23).

In 2006, the Government of Indonesia issued the national biofuels development blueprint, which provided a promising future for biofuels sector in the country. This blueprint set up a very ambitious plan to replace up to ten percent of national fossil fuel consumption with biofuels by 2010 and also to create employment for 3.5 million people by the same year on 5.25 million hectares of unused land (Priyanto 2008). Further, this blueprint was used as a basis to issue various supporting regulations and policies to boost the development of this sector with specific focuses on the provision of incentives and market guarantee. A special credit program for biofuels called Credit for Biofuels Development and Plantation Revitalization (*Kredit Pengembangan Energi Nabati dan Revitalisasi Perkebunan* or KPEN-RP) was launched by the central bank, Bank Indonesia to support biofuels development, mainly oil palm.[42] To secure the market for this sector, the government through Pertamina set a target to have five percent of biofuel content and to purchase biofuels production from producers with subsidy provision to cover the production costs against the subsidized fossil fuels prices (Dillon *et al.* 2008: 1).[43]

In the blueprint and the subsequent regulations, specific attention was given to *jatropha curcas* as the most preferable biofuel option. Jatropha was endorsed by the government as the most suitable plant for biofuel production not only for the product but also for the claim that it can contribute to wasteland rehabilitation and income generation in marginal areas. Overwhelming figures of total lands suitable for jatropha cultivation under this qualification were presented in reports and presentations of academics and government officials and became a main attraction for many investors – public, private and NGOs – to start their jatropha ventures in various regions in Indonesia.[44] A 2008 report on a global market study on jatropha by the Global Exchange for Social Investment suggests that there were around 75,671 hectares that had been covered by the surveyed twelve jatropha projects in Indonesia at that time. The report also provides a further projection that eight projects will further expand their area up to 7,036,951 hectares in 2015 (GEXSI 2008: 150). These twelve projects were only a small part of the total number of jatropha investment

[41] See the complete story of the Jatropha Expedition 2006 on http://jatropha-expedition.blogspot.com/ (Accessed on 3 January 2013)

[42] See the details of this program on http:// bi.go.id/web/id/UMKMBI/Kredit+Perbankan/Skim+Kredit/#KPEN - accessed on 23 May 2012.

[43] Since 2006, PT Pertamina had sold B5 (Biosolar with a five percent biodiesel blend) at 228 gas stations in Jakarta, Surabaya and Bali and E5 (Biopertamax with a five percent bioethanol blend) at 36 gas stations in Jakarta, Surabaya, Malang and Bali. A ten percent blend was available at a few stations in Jakarta and Semarang. Bio-premium (a E5 mix with premium gasoline) was available at only one gas station in Malang (Schott 2009: 49-50)

[44] Such as the claim of 49 million hectares land suitable for jatropha presented by Anny Mulyani, F. Agus and David Allelorung in their 2006 publication on the available lands potential for jatropha curcas development in Indonesia.

Figure 3.1 President Yudhoyono received the Jatropha Expedition 2006 Team after they completed their 3,000 kilometre trip from Atambua to Jakarta at the Bina Graha, Presidential Palace in Jakarta on 20 July 2006 (Source: http://jatropha-expedition.blogspot.com/2006/07/presiden-minyak-jarak-bisa.html) Henky Widjaja, 2011).

projects in Indonesia at that time, which were estimated around hundreds. They consist of investments and projects by various actors: governments, universities, state-owned enterprises, private sector, and NGOs; and cover projects from upstream to downstream: nurseries, plantations, oil productions, equipment and machineries (e.g. pressing machines and stoves), as well as the production of other jatropha based products.

Yet, despite the existence of positive optimisms and supporting regulations, the biofuels sector faces a serious downfall. Hendroko (2009) suggests that the fall was caused by two key factors: first, the increase of crude palm oil (CPO) price after 2006 which was significant in comparison with the buying price by PT Pertamina for oil palm based biodiesel. The significance price difference makes palm oil producers prefer to sell their oil as CPO rather than as biodiesel. The second factor was the fall of fossil fuel prices, which affects the reduction of biofuels buying prices by PT Pertamina since it bases its biodiesel prices standard on the fluctuations of fossil fuel prices according to the Mean Oil Platts Singapore index.[45]

[45] Mean Oil Platts Singapore or MOPS is a measure of fuel pricing pricing in Singapore. It refers to the mean price of oil traded through Singapore as per the data from Platts, a commodity information and trading company (Source: http://en.wikipedia.org/wiki/Mean_of_Platts_Singapore - accessed on 23 May 2012).

Both factors show the fragility of biofuels as a growing sector.[46] The first factor suggests the lack of incentives by the government at that time to enable biofuels to become competitive against other products produced by the same biofuel feedstock, such as palm oil. Dillon *et al.* noted that in 2006 many agricultural commodity prices were relatively low while the energy prices were skyrocketing. This made biofuels production an attractive proposition. However, the soaring agricultural commodity prices in the following years has made biofuels production to become unprofitable (Dillon *et al.* 2008: 1). In specific for palm oil, aside from the lack of government incentives against the soaring commodity prices, the palm oil based biofuel received pressure from the European Union Renewable Energy Directive, which disqualifies it for the EU biofuels incentives provision. The disqualification happens since the directive considers that palm oil based biofuel only results in a 19% reduction in carbon emissions – below the 35% threshold required to receive trade benefits.[47]

The second factor, the declining of fossil fuel prices, causes a significant drop on the interest of investors in biofuels sector. For many investors, the soaring of fossil fuel prices above USD 100 per barrel in 2006 and the continuous fuel subsidy cuts by government were promising a lucrative niche to fill in with biofuels at competitive prices. However, the fossil fuel price drop since 2008 had made difficult for biofuels to offer competitive prices since the investment costs for this infant sector were expensive, especially for the technologies and feedstock. The situation became more difficult because the government still maintained significant fossil fuels subsidy for domestic market that caused biofuels remained expensive in comparison with the subsidized fossil fuels.

Furthermore, PT Pertamina was not consistent with its own commitment on the blending content. In 2007, PT Pertamina dropped its biodiesel blending content from 5% as stipulated by the government to 2.5%. The blending percentage was once dropped to 1% in 2008 when Pertamina claimed to suffer mounting losses from its biofuel blends, as the government required it to sell biofuels at the same price as subsidized petroleum fuels but did not provide additional subsidies to cover the higher cost of biofuels (Dillon *et al.* 2008: 2).[48] In 2012, the blending percentage was lifted again to 7.5% following the National Energy Policy to reduce fossil fuel import.[49] The fluctuation of the blending percentage has limited the domestic market absorption for biofuels since the state electricity company, PT PLN, which is another potential market for biofuels, refuses to buy biofuels at market prices.[50]

In Indonesia, PT PLN along with PT Pertamina was regarded as the main market for biofuel

[46] Growing or infant sector refers to commodity in the initial development stage, and need more supports for research, development and commercialization (Royal Tropical Institute 2011: 14).

[47] Source: http://thejakartaglobe.com/business/eu-ambassador-to-indonesia-and-brunei-defends-lack-of-incentives-for-palm-oil-fuels/374791 - accessed on 23 May 2012.

[48] See also: http://uk.reuters.com/article/2008/04/29/indonesia-biodiesel-idUKSP22234020080429 - accessed on 23 May 2012.

[49] Source: http://indonesia.go.id/in/kementerian/kementerian/kementerian-energi-dan-sumber-daya-mineral/335-provinsi-lampung-energi/10520-pertamina-naikkan-campuran-biodiesel-jadi-75&limitstart=1250?start=30 - accessed on 12 July 2013.

[50] Source: http://bisnis.vivanews.com/news/read/6549-pln__biofuel_harus_rendah_dari_harga_bbm - accessed on 23 May 2012.

products. They were expected to provide continuous demand for feedstock from the national biofuels producers. PT PLN had conducted several tests of biodiesel application since 2007. The first test was conducted at the PLTD (*Pembangkit Listrik Tenaga Diesel /* Diesel Power Plant) Talang Padang in Lampung by using the oil palm based biodiesel. That time PT PLN was interested to use the biodiesel because of the price of palm oil fell below the price of diesel fuel. However, the plan to continue the use of biodiesel was later cancelled after the price of palm oil soared again, exceeding the price of diesel fuel.[51]

Not different from the above explanation on the failure causes for biofuels sector to flourish, the discussions and explanation on the downfall of jatropha sector in Indonesia were also around the low real yields, the absence of viable market and bad pricing for both seeds and oil, as well as insufficient incentives. According to Tjeuw (2017: 16 and 144), the downfall of jatropha was caused by a combination of market pull (blending targets, subsidies, land allocation, and incentives to investors) and technology push factors (plant breeding, oil processing and value adding) that were not sufficiently well prepared or developed, and implemented within the framework and guidelines necessary for realistic commercial development. Essentially these factors were either absent or weakly implemented and there were many mismatches in timing and aligning of push and pull factors. Combined with the lack of any long-term commitment or legal framework to protect industry participants, confidence in jatropha eroded.

One point of view to explain the lack of long-term commitment to support jatropha in Indonesia is that to some extent the development of jatropha based biodiesel was treated as a government's 'lighthouse' project or commonly known as *proyek mercusuar* in the context of the developmentalist state. A 'lighthouse' project is a highly prestigious project, which is established to create a national identity, cast a national pride and assert national sovereignty (Amir 2004: 108). It is associated as a symbol of modernity and development and in some cases the symbolic power of these projects is so great that it lead to regional competition, where as regional authorities are competing to pursue such a project to show that their regions are also enjoying the benefits of national development (George Aditjondro 1998: 33 as cited in Barker 2005: 709). In the practice of the developmentalist state, every positive credit of such project is addressed to the leader or state official. Joshua Barker (2005: 709) describes that 'every new development, from the paving of a village road to the construction of a new airport, would involve elaborate groundbreaking and inauguration ceremonies in which officials overseeing the project would be given center stage. There was also a consistent strategy […] to identify development projects with its own political leadership.'

The weakness of 'lighthouse' project lies on the practice of a strong technocracy view, where technology is considered a machine that brings social changes in society. However, in its implementation, only those with technical knowledge determine how technology is developed while banning public participation. This idea totally ignores the understanding of how technology and society mutually interact (Amir 2004: 108). Therefore, people affected

[51] Source: http://www.pln.co.id/eng/?p=3093 - accessed on 30 September 2014.

by such project did not always subscribe to the symbolic logic put forward in the project (Barker 2005: 710). Furthermore, as a personalized achievement, a 'lighthouse' project has a risk to be unsustainable. The regime associated with the project will be very careful with any sign of failure and will immediately end or withdraw from such project if the failure sign emerges in order to protect their image. Also, the personalized achievement will make a 'lighthouse' project to lose support once a leadership change happens, since the new leader will be keen to create his or her own project (Simandjuntak 2014: 3797).

Soesilo Bambang Yudhoyono, the sixth president of the Republic of Indonesia (serving two terms from 2004-2014), who issued the national biofuels development blueprint, has been unfamous for his several failed attempts to look for potential 'lighthouse' projects (see Box 3.1 In Search of 'Lighthouse' Projects). When President Yudhoyono came to power in 2004, he encountered an immediate dilemma about the considerable burden of fuel subsidy to the state budget. The problem became more complex when the world fossil fuel price rose. He urgently had to prioritize the cutting of fuel subsidy and the search of alternative energy in his government agenda. President Yudhoyono was approached by a group of scientists led by Robert Manurung, a leading jatropha researcher who convinced him about the potential of jatropha (see 3.3.2 Scientists) Manurung's idea of cultivating jatropha for energy purposes appealed to President Yudhoyono. Manurung's rhetorical claims on the social and economic benefits for the poor that could be generated from jatropha served the interests of Yudhoyono's administration (Amir *et al.* 2008: 122).

Figure 3.2 A demonstration plot of jatropha curcas managed by Yayasan Puri Cikeas in Bogor (Source: PT Vale indonesia Tbk)

Figure 3.3 President Yudhoyono at the launching of Blue Energy convoy to the 2007 UNFCCC in Bali at his private residence in Puri Cikeas, Bogor (Source: http://www.presidenri.go.id/imageGalleryD.php/5775.jpg)

After learning about biofuel potential in creating jobs, Yudhoyono convened a special cabinet meeting on 1-2 July 2006 in Losari, Magelang, Central Java, to draw up a conceptual approach and to consolidate commitment of relevant stakeholders to developing biofuel. In that meeting, he proposed a new policy, which he refers to as the 'Post-Crisis New Deal' that contains a threefold objective: to boost economic growth, to create employment, and to reduce poverty in rural areas, all achieved through one integrated program. He described the 'New Deal' as a host of short-term programs that would have direct impact on poverty and on rural-urban inequality. The approach is known as the Losari Concept (named after the meeting venue). Since the new program came directly from the country's most powerful man, all the stakeholders agreed to support the biofuel development as an important energy source. The plan resulted from the meeting stated that Indonesia intended to meet ten percent of transport fuel usage with biofuels by 2010. In relation to biodiesel, the Department of Mineral and Energy Resources (DESDM) estimated that Indonesia would consume around 15 billion litres of diesel in the domestic (non industry) transport sector by 2010. If ten percent of this comprised biodiesel, around 1.5 billion litres of the biodiesel would be needed. The concept envisaged producing biodiesel predominantly from jatropha oil, cassava, sugarcane, and palm oil (Dillon *et al.* 2008: 15, Fatimah 2017: 36).

Jatropha development immediately became the flagship of President Yudhoyono in the national biofuels development framework and materialized in various legislations and a national wide program called DME (*Desa Mandiri Energy* or Energy Self-sufficient Village). A foundation or *yayasan* associated with President Yudhoyono named *Yayasan Puri*

3.1 - In Search of 'Lighthouse' Projects

When President Yudhoyono started his administration in 2004, he was encountered by the facts that the country was facing a huge budget deficit due to spending on subsidies, especially fuel subsidy. Indonesia was also exposed to food insecurity and the rise of poverty level. Yudhoyono who was unfamously associated with excessive personal image building (*pencitraan*) during this two terms had been very keen to look for the breakthroughs or innovations that can address the problems faced by the nation and also can give him a positive credit. Many of the projects were linked to a foundation, called *Gerakan Indonesia Bersatu* (United Indonesia Movement) named after the same name of Yudhoyono's administration cabinet. The foundation is managed by Yudhoyono inner circle consisting of Yudhoyono's personal aides, party members, and some ministers, where the President becomes the chair of the advisory board. The leading figure in this foundation was Heru Lelono, once a President's personal aide for Autonomy and Regional Government Affairs.[1]

At least, three times in his first presidential term (2004-2009), President Yudhoyono experienced a failed 'lighthouse' project. The first experience was the case of *Nutrisi Saputra* super fertilizer in 2006. The super fertilizer was introduced by a team of IPB researcher led by Umar Hasan Saputra with a claim that the fertilizer can boost the rice production from four ton to nine ton per hectares and was a breakthrough in addressing soil infertility at affordable price for farmers. The Saputra research team was sponsored by Ciputra, a national businessman, who also mediated the team to meet the president. Impressed by the presentation, President Yudhoyono invited the team to introduce the innovation to his ministers and governors. He was convinced that the fertilizer would help him to achieve his administration goal in boosting the national rice production. Immediately, this fertilizer became popular. The team was flooded with purchasing orders from provincial governments. However, still in the same year, the weaknesses of the product were uncovered. The Agriculture Department revealed that the fertilizer did not have permit for commercial production. Furthermore, a test by the Department found out that the fertilizer only contained one out of the minimum sixteen ingredients required for a standard fertilizer product. This fertilizer was finally banned from distribution and the production was stopped.[2]

The second case was the sensational and scandalous 'blue energy' hoax. In 2007, an engineer named Joko Susilo became popular when he announced his invention of *banyugeni* or blue energy – the production of fuel from water. President Yudhoyono who was eager for alternative energy immediately offered support for the claimed invention and he himself named the invention as blue energy. Yudhoyono appointed Heru Lelono to head the blue energy project. A research center was built in Cikeas, Bogor near Yudhoyono private residence and a budget of ten billion rupiah was allocated for the project. More sensationally, President Yudhoyono also exhibited the blue energy at the 2007 United Nations Climate Change Conference in Bali. The exhibition was preceeded with a convoy of cars from Jakarta to Bali using the fuel. A separated blue energy project by Joko was also established at the Universitas Muhamadiyah Yogyakarta in collaboration with the Regional Energy Development Research Center of the university. The hoax was finally revealed upon an investigation by scientist from *Universitas Gajah Mada* and BPPT (Agency for Assessment and Application of Technology) who pointed out that Joko failed to provide scientific evidence about the reliability of his innovation claim.

Joko was declared as a fake scientist since he had no credible research background and his research claims were unsubstantiated. He was also proven to make a false claim on his academic title since he is not a graduate of Universitas Gajah Mada as he claimed in his curriculum vitae.

After the hoax revealed, President Yudhoyono was immediately put under a serious pressure by the parliament to explain this scandal. 'It has become a scandal, probably an international scandal that has embarrassed the country because 'fuel' resulting from the Blue Energy project was exhibited at the Bali Climate Change Conference,' said legislator Alvin Lie of the National Mandate Party. President Yudhoyono through his spokeperson, Andi Mallarangeng provided his explanation that he was not aware that Blue Energy was a hoax. Andi said that 'The President is always open-minded about inventions by people. Many have come to him to give presentations on their inventions.'[3] Furthermore, Heru Lelono, the person in charge of this project, denied that the President provided state facilities and budget for this hoax project. Heru claimed that the budget came from Heru's personal investment in this project.[4]

In the same year after the reveal of Blue Energy hoax, another hoax happened again. The president was persuaded to announce the invention of a super rice variety called Super Toy HL-2. This variety was invented by Tuyung Supriyadi of the Centre for Food, Energy and Water Studies, a local NGO with affiliation to PT Sarana Harapan Indopangan managed by Heru Lelono. Super Toy variety was claimed as a super variety that can yield to 14 ton per hectares or around triple the average improved rice varieties. On 17 April 2008 President Yudhoyono was invited to attend the symbolic harvest of the variety in Grabag Village, Purworejo, Central Java where he officialy announced about the new rice variety that will contribute to increase the national food security. However, in the same harvest period, there were many reports on the failure of this variety causing losses and disappointment for farmers. The scandal became wider since the seeds had been nationally distributed through the Agriculture Ministry. An investigation by the rice researchers revealed that the claimed super variety was actually only an ordinary variety of the local *Rojolele* rice.[5]

Following these series of scandal, the President was criticized for not being able to screen and selective in responding to offers of innovation. Political observers have criticized the presidential staff for allowing people such as Joko Susilo to secure meetings with the President without prior proper screening. 'The president should strengthen his office's capabilities to screen information from the outside, as it is very dangerous to establish national policies based on inaccurate input. In this case, he could set up an office for scientific and technological affairs,' Kusnanto Anggoro from the Center of Strategic and International Studies said.[6]

[1] Source: http://cetak.kompas.com/read/xml/2008/06/12/01394718/kisah.tujuh.staf.khusu - accessed on 23 May 2014.
[2] Source: http://foragri.wordpress.com/2012/05/28/nasib-nutrisi-saputra/ - accessed on 23 May 2014.
[3] Source: http://www.thejakartapost.com/news/2008/05/31/house-demands-sby-account-039blue-energy039-mystery.html - accessed on 23 May 2014.
[4] Source: http://lipsus.kompas.com/grammyawards/read/2008/09/05/15131651/Soal.Supertoy..Heru.Lelono.Bicara - accessed on 23 May 2014.
[5] Source: http://putuwardana.blogspot.nl/2008/09/menelusuri-padi-super-toy-yang-bikin.html - accessed on 23 May 2014.
[6] Source: http://www.thejakartapost.com/news/2008/05/30/sby-faces-questions-over-039blue-energy039-hoax.html - accessed on 23 May 2014.

Cikeas (Puri Cikeas is a name of Yudhoyono private residence in Bogor) was also reported to involve in the promotion of jatropha curcas.[52] However, following the global failure of jatropha, the Yudhoyono administration also immediately deattached itself from jatropha. The failure of the jatropha program in Indonesia was blamed on the globally recognized factors but none of the scientists or government was open to take the responsibility. Government supports to jatropha were officially ended almost at the same time as the declining of global interest in jatropha in 2010.

One interesting development at the end of jatropha hype was the shifting of investors' interest from jatropha (back) to the castor plant by targeting the same production areas for jatropha, notably in the provinces of Central Java, East Java, NTB (Nusa Tenggara Barat / West Nusa Tenggara) and NTT (Nusa Tenggara Timur / East Nusa Tenggara).[53] According to an industrial feasibility report on castor potential in NTB issued by the Japan Consulting Institute in 2010, castor became a promising investment due to the increased of market demand which was triggered by the decrease of supply from major castor producing countries like China and India and the increased demand from industries for castor oil to be used in the production of high value products.[54] Different from jatropha, the investments in castor were not intended for the production of biodiesel but for a more complex range of bio-chemical products aside from the conventional use as lubricant, such as cosmetics, medicines, printing ink, plasticizer, medicines, and biopolymer products (polyurethane and nylon made from *sebacic acid* and *glycerol* produced from castor oil). The existence of high value product alternatives for castor enabled the investors to offer competitive prices to farmers since the investors were not influenced by the fluctuation of fuel prices or dependent on the availability of biofuel subsidies as in the case of jatropha (Japan Consulting Institute 2010).

Castor is an example of a flex crop, where each of its products has a clear market which presents flexibility for investors to either simulatenously focus on multiple products or to switch their product focus in responding to market signals. Jatropha, so far, still does not have this flexibility advantage. There is neither a market for its biodiesel potential nor for its other byproducts. However, even when the markets for jatropha byproducts exist, jatropha can still not be classified as a flex crop. Hunsberger *et al.* (2016: 240) argue that if economic success relies on having not one, but two or more value chains operating simultaneously, then what looks like diversification may in fact reflect a codependence that does not increase investors' freedom to switch between end products.

[52] The foundation was led by Jero Wacik. He once served as Minister of Culture and Tourism since (2004 -2011) before appointed as Minister of Energy and Mineral Resources (2011-2014). The jatropha project at Yayasan Puri Cikeas was managed by Dr. Ir. Elisa Hambali. Further discussion on Yayasan Puri Cikeas involvement in jatropha promotion will be presented in Chapter 6 on the case of PT Vale Indonesia Tbk.

[53] See for example: http://pontianakbiomass.wordpress.com/2011/10/20/ntb-berpeluang-jadi-produsen-castor-oil-dan-biomassa/ - accessed on 12 March 2012) and http://finance.detik.com/read/2009/03/23/112133/1103601/6/kimia-farma-investasi-kebun-jarak - accessed on 12 March 2012.

[54] China has banned the export of castor due to the increased demand of domestic industries for castor beans and the significant decrease of lands allocated for castor farming in China where more lands have been allocated for food crop production. China is now prioritizing import from other countries to meet their demand for castor, which triggers a strong competition with other importing countries, such as Japan (Japan Consulting Institute 2010).

3.2 Key Actors in Indonesian Jatropha Activities

As previously mentioned, jatropha activities in Indonesia consisted of investments and projects by various actors: governments, scientists, state-owned enterprises, private sector, NGOs and farmers. This section explores the main actors and their activities in jatropha sector in Indonesia to present the variety of actors and activities during the hype period. Focus is specifically given on the backgrounds, activities and results.

3.2.1 Governments

After the issuance of the National Biofuels Development Blueprint in 2006, a series of regulations and policies were enacted by the national government to accelerate the development of biofuels in Indonesia. The regulations and policies were directed primarily to boost the investment and market for biofuels. To attract investors, the government issued regulations on interest rate and tax reduction incentives accompanied with the issuance of a new investment law in 2007, which allows foreign investors to acquire land for an initial period of 60 years as well as the transfer of licensing authority of plantations up to 10,000 hectares to the sub-national level to ease the licensing bureaucracy. The government also provided price subsidies and obligatory blending regulations as well as the mandatory use of biofuels in industrial sectors to ensure the existence of domestic market for biofuel products (Dillon *et al.* 2008, Schott 2009).

Specially for jatropha curcas, the national government listed jatropha as the top priority in the biofuel development plan. Jatropha had become a focus of attention in the national policy even prior the issuance of the National Biofuels Development Blueprint. On 12 October 2005, a joint declaration on combating poverty and addressing fuel crisis through the rehabilitation and replanting of ten million hectares of critical land using biofuel crops was signed by cabinet ministers, state-owned companies, universities and mass organizations.[55] This declaration agreed to focus on jatropha curcas as a key fuel producing crop to be planted on ten million hectares of degraded lands in Indonesia in order to address environmental and energy crises and to boost economy through employment creation and income promotion in marginal areas.

In February 2007, President Yudhoyono launched the Energy Self Sufficient Village Program (*Desa Mandiri Energi* or DME), a national campaign aimed at tapping local energy sources of biofuel and non-biofuel - geothermal, micro hydropower, solar, wind,

[55] The Declaration was signed by the Coordinating Minister for Social Welfare Dr. Alwi Shihab, the Head of National Planning Agency Sri Mulyani Indrawati, the Social Affairs Minister Bachtiar Chamsah, the Home Affairs Minister M. Ma'ruf, the Agriculture Minister Anton Apriantono, the Public Work Minister Djoko Kirmanto, the State Minister for Cooperatives and SMEs Suryadarma Ali, the State Minister for Research and Technology Kusmayanto Kadiman, the Head of *Asosiasi Pemerintahan Provinsi Seluruh Indonesia* Sutiyoso, the Head of *Badan Kerjasama Kabupaten Seluruh Indonesia* Azikin Solthan, the General Director of PT PLN Eddi Widiono, the Head of *Himpunan Kerukunan Tani Indonesia* Prabowo Subianto, the Head of *Masyarakat Energi Hijau Indonesia* Al Hilal Hamdi, Managing Director of Peace Eco-securities Indonesia Agus Pratama Sari, General Director of Artha Ventura Parman Nataatmadja, the Rector of ITB Joko Santoso, and the Rector of *Institute Pertanian Bogor* M. Chozin. (Source: http://oldkesra.menkokesra.go.id/content/view/216/338/ - accessed on 11 November 2011).

and coal liquefaction - to meet energy needs of local households and small businesses. The DME Program was coordinated by the Coordinating Ministry for Economic Affairs and was executed by various ministries, such as the Ministry of Home Affairs, Ministry of Less Developed Regions Development Acceleration, Ministry of Agriculture, Ministry of Energy and Mineral Resources, and Ministry of Forestry. In this program, jatropha became a central focus where around 400 million jatropha saplings and seedlings were planted across the country from 2005-2008.[56]

Piloted in Grobogan District of Central Java, jatropha was promoted as a promising oil producing cash crop with a prospective market demand. That time the president himself promised the provision of a 10 billion rupiah grant – raised from three state-owned companies: PT Pertamina, PT Perusahaan Gas Negara (the state-owned gas enterprise), and PT Rajawali Nusantara Indonesia (the state-owned sugar enterprise) – and a market guarantee by a joint venture of PT Energi Hijau Lestari and PT Rajawali Nusantara Indonesia. However, none of the delivered promises was ever being materialized since no significant funding was directly provided to farmers and there was no purchasing of seeds at the time of harvest. Circumstances become even more confusing for the farmers when the government explained that the DME program was meant to create conditions in which villages can have their own sources of energy by using local resources instead of relying on fossil fuel. Despite good intentions, this different objective has perplexed the farmers who had put maximum efforts in cultivating jatropha producing jatropha seeds supposedly to be purchased by private and state corporations but at the end they were urged to use jatropha seeds for themselves instead of making profits (Amir *et al.* 2008: 127-128).

The unrealized promises and the uncertain future of jatropha had caused farmers to suffer serious financial losses. It was reported that farmers in Grobogan took bank loans to finance their individual jatropha investments and many converted thousand hectares of productive land, mostly rice fields, to jatropha farmland. The unexpected ending of DME Program had caused serious financial losses and also a traumatic experience for them with jatropha.[57]

In addition to the DME Program, at the time of hype, jatropha became a popular program to be implemented sporadically by various ministries, namely Ministry of Agriculture, Ministry of Minerals and Energy, Ministry of Forestry, Ministry of Industry, Ministry of Cooperatives and SMEs with various different objectives under almost similar activities, mainly short-term (one or two fiscal years) projects focusing on jatropha cultivation campaign, nurseries establishment, seedlings provision and pressing machines distribution without any sustainable follow ups on processing and market. Flows of funding were allocated in uncoordinated ways causing overlapping of programs and creating confusions at the implementation level.

[56] The 10 billion rupiah grant consisted of 9.9 billion rupiah contribution by PT Pertamina and 50 million rupiah each by PT RNI and PT PGN. The grant was spent on the construction of a biodiesel factory in Toroh Sub-district of Grobogan (4 billion rupiah), the provision of seedlings (3.7 billion rupiah) and farmers training (2.1 billion rupiah). The promise to buy the harvest was cancelled since PT RNI did not continue their plan to use jatropha biodiesel in their factories. Source: Menyulut Harapan yang Terpuruk (http://cetak.kompas.com/read/2011/03/18/02344825/menyulut.harapan.yang.terpuruk - accessed on 22 March 2011).

[57] Source: http://www.ipsnews.net/2012/04/indonesian-farmers-burned-in-biofuel-drive/ - accessed on 17 May 2012.

Furthermore, at the subnational level, both provincial and district governments were also allocating local budgets for the introduction of jatropha in their regions. Some local governments were very active in inviting investors to develop jatropha potential in their region, such as in Gorontalo Province where the government promised the allocation of 40 thousands hectares land for jatropha as well as working capital from local budget for joint venture with the interested investors (Prihandana 2006: 110). The allocation of local budgets by some local governments for jatropha activities, however, was also indicated to be misused for corruption. A case of local budget corruption was reported to occur in Muko-Muko District of Bengkulu, where billions of local budget allocated for an integrated jatropha development area in Muko-Muko were misused by local officials.[58]

Government support for jatropha development was slowly decreased after the massive failures of various jatropha activities in Indonesia. Focus and interest were shifted to the other promising energy resources, including the increasing emphasis on the development of oil palm as the conventional biodiesel crop. In spite of that, efforts to develop other potential crops are still continued following the new interests of investors and scientists.[59]

3.2.2 Scientists

Scientists, as individuals or in groups, are known as the key promoters of jatropha. The last decade has been the hype period of researches on jatropha biofuel potential. A variety of research was administered, ranging from the works of the natural sciences group – especially the plants and engineering sciences – to the works of social sciences group to support and promote jatropha as the best biodiesel alternative. Various claims were produced to justify the viability of jatropha, both technically and socially. According to Nielsen *et al.* (2013:9) an increasing number of articles has been published since the early 2000s. By referring to the record of Worldcat.org, approximately 1,042 publications were produced, up from only 42 in 2000.

In Indonesia, the biofuel research and development had taken place since the early 1980s pioneered by the scientists from the ITB and BPTP (*Badan Pengkajian dan Penerapan Teknologi /* Agency for Technology Assessment and Application) In 1981, the Government of Indonesia launched the General Energy Policy aimed at the promotion of biofuel research and development by public research institutes. One product of this Policy was the

[58] The Muko-Muko jatropha project was once promoted as a national model for an integrated jatropha development area by the Agriculture Ministry. This project was co-funded by the Agriculture Ministry, Muko-Muko District Government and Bengkulu Provincial Government. The corruption case was found in the allocation of 300 million rupiah provincial budget to the project through illegal budgeting mechanism. Furthermore, after several years of implementation since 2006, the local parliament in 2010 questioned the absence of credible progress report of the project, including the contribution of the project to local income.
Source: http://bengkulueksspress.com/usut-kerugian-proyek-jarak-rp-8,3-miliar/ - accessed on 28 August 2013.

[59] This included the support to develop *Kemiri Sunan* (*Aleurites Trisperma*) by the Ministry of Agriculture and Ministry of Energy and Minerals since 2010. *Kemiri Sunan* was promoted as a crop with abundant potentials in the same way as jatropha curcas. Source: http://esdm.go.id/berita/migas/40-migas/5394-kemiri-sunan-alternatif-pengganti-bbm.html - accessed on 12 July 2013.

establishment of B2TP (*Balai Besar Teknologi Pati* / Center of Starch Technology) to develop research on bio-ethanol products. In the early 1990s, Pertamina, the state own petroleum company, in partnership with Lemigas, the Agency for Oil and Gas, introduced Indonesia's first commercial biodiesel product called B30 (a mix-fuel product composed by 30% biofuel and 70% fossil fuel). However, due to its inability to compete with the cheaper subsidized fossil based diesel fuel and the lack of focus and commitment by the government and Pertamina at that time, this product only lasted for several years (Fatimah and Yuliar 2009).

Following the global trend in the research on alternative fuels due to the increasing scarcity of fossil fuels since the beginning of the new millennium, similar research in Indonesia had also increasingly attracted attention and interest from many national research institutions. In 2002, a national forum for biodiesel called Forum Biodiesel Indonesia was established to accelerate the information exchange among biodiesel stakeholders and to promote biodiesel development. This forum was led by Dr. Tatang H. Soerawidjaja, a professor of chemical engineering technology who was heading the Center for Research on Energy at ITB and also a forerunner in the research on jatropha (Affif 2014: 1690). The forum members comprise of scientists from universities and research institutes, automotive industry associations, palm oil association, engineering industries, biodiesel producers, relevant government offices (Ministry of Transportation, Ministry of Energy and Mineral Resources, Ministry of Agriculture) and several non-governmental organizations (Wirawan and Tambunan 2006).

As mentioned earlier, a specific research on jatropha was initiated in 1994 by a team of ITB scientists. The results of this research which was successfully showcased in the 2006 Jatropha Expedition has led to the widespread implementation of other jatropha and biofuels research and development activities by various research institutions from universities, research centers, ministries and state-owned enterprises which consisted of research on plant sciences, agronomy, processing technologies, biofuels application tests and biofuels material enrichment.[60] Many of these research activities were implemented in collaboration and sponsorship of other universities and research centers from abroad, companies and local governments (Hambali 2006, Prihandana 2006 and Amir et al. 2008).

Scientists have become central actors in the jatropha hype creation in Indonesia not only for their convincing result claims on jatropha potentials but also for their power of networking and lobbying in accessing the government and the other key players (Afiff 2014, Simandjuntak 2014). This is in line with the view of Carol Hunsberger (2012: 17), who points out that when knowledge becomes connected to political, financial and/or social power (for example, by becoming the official view of a government or donor organization), its power to achieve associated objectives is greatly amplified.

An example of this was the success of a leading jatropha scientist from the Institut Teknologi

[60] According to Hambali (2006), research institutions involved in jatropha and biofuels R&D activities consisted of ITB, IPB, ITS, UPN Veteran, BATAN, BPTP, Litbang Ketenagalistrikan PT PLN, DJLPE DESDM, Puslitbangbun Departemen Pertanian, Lemigas, and LIPI.

Bandung, Professor Robert Manurung in promoting jatropha to the top decision makers in Indonesia using his extensive networks of alumni who held strategic positions at the government cabinet and national parliament. Professor Manurung was able to present his strong social rhetoric on the powerful social and economic impact of jatropha curcas in addressing a complex problem faced by the government regarding multiple crises of economy, environment and energy (Amir *et al.* 2008, Fatimah and Yuliar 2009, Afiff 2014). His success was an empirical evidence of what Bruno Latour – a pioneer of the Actor-Network Theory – has coined that scientific research would stay in the laboratory forever unless a network of actors is built to put research at work in society (Amir *et al.* 2008: 121).

Despite the positive objectives behind the extensive promotion of jatropha by the scientists, lessons from the hype itself, as also happened worldwide, suggest that most of the research claims were premature and not yet supported by scientific evidence (Jongschaap *et al.* 2007, Achten *et al.* 2010, Baker and Ebrahim 2012b). The over optimistic claims on jatropha superior characteristics, high yield potential, and suitability as a cheap alternative to fossil fuel have served as misleading spectacle since none of these claims was proven in the actual implementation.

Critics have suggested that the rise of jatropha in Indonesia was mainly political, where the over optimistic claims presented by scientists appealed the political interests of the government to find an instant solution for the complex problem faced that time (Amir *et al.* 2008). Another view indicated that the pursuance of personal interests by the scientists through their alliances with the government, politicians, and industry along with the apparent competition among the scientists has contributed to the creation and perpetuation of premature claims (Fatimah and Yuliar 2009). This indication was also suggested by Vel and Nugrohowardhani (2012: 32) who write that despite the absence of reliable well-researched information and guarantees of performance in areas other than the original habitat, jatropha was promoted through a variety of political networks where the positive discourse was translated into policy and budget.

As what happened elsewhere (see for example Hunsberger 2010 and 2012 on jatropha in Kenya), many jatropha scientists in Indonesia have significantly benefited from the creation of over-optimistic claims. Some used the claims to attract funding for their research projects, while others used them to create market opportunities for their jatropha related inventions. During the years of the hype, using the overwhelming projection of jatropha yields, some engineering scientists became manufacturers of pressing machines and cooking stoves, supplying projects run by the government.[61]

At the end of the hype, major changes happened within research activities on jatropha in Indonesia. Along with the significant focus and actors shifting to the other biofuel potentials, the existing jatropha research activities have been geared to revisit and revise

[61] For example, a scientist from Brawijaya University in Malang developed a jatropha stove and succeeded to sell 12,000 units in 2007. These stoves became useless due to the lack availability of jatropha seeds as the fuel material. Source: Sulitnya Mencari Si Jatropha (http:// tempo.co/hg/iptek/2010/08/12/brk,20100812-270876,id.html - accessed on 12 May 2011).

the previous claims. Research works are put back on the focus on the development of improved jatropha varieties and other basic research about the crop.

3.3.3 State-owned enterprises

State-owned enterprises (SOEs) are one of the key actors in the jatropha promotion and development in Indonesia. Prior the issuance of the national biofuel blueprint, two state-owned enterprises: PT Rekayasa Industri (PT Rekin) and PT Rajawali Nusantara Indonesia (PT RNI) had become the forerunners in jatropha development by initiating collaborations with the national research institutions and local governments. PT Rekayasa Indonesia established a cooperation with ITB to cultivate 30 thousands jatropha trees in NTB Province. PT Rajawali Nusantara Indonesia developed a very ambitious plan on jatropha development by initiating jatropha cultivations in several locations of its sugar factories to meet its ambitious plan to replace its annual 10 million liter diesel fuel consumption with jatropha fuel (Prihandana 2006).

In the 2006 National Biofuel Blueprint, the government gives a mandate to a group of state-owned enterprises to take the leading roles in the development of jatropha curcas by providing supports in terms of financing, planting, processing/fabrication, distribution and consumption (stand-by buyers) (see Figure 4.3 State-owned enterprises alliance in jatropha based biofuel development).

Using the similar support scheme, a group of state-owned enterprises comprised of PTPN (the state-owned plantation enterprise), PT RNI, PT Rekayasa Industri, PT PGN (the state-owned gas company), Perum Perhutani (the state-owned forestry enterprise) and PT Pertamina were also assigned to support the pilot project of the DME Program in Grobogan District, Central Java. In the scheme, PTPN, Perum Perhutani and PT RNI provided lands to be cultivated with jatropha by farmer groups in addition to the lands owned by farmers, while PT RNI and PT Rekin will involve in the seeds purchasing and oil processing with PT RNI as the main buyer of the produced jatropha fuel. Other SOEs, such as PT Pertamina and PT PGN provided grants to finance the activities (The Business Watch Indonesia 2007). However, as mentioned in the earlier section, this well designed pilot project did not last long. Farmers lost their interest in jatropha when they found that the real yield as well as the offered prices were too low for them to earn a profit. Furthermore, many of the plans and promises did not work out, especially when PT RNI cancelled their planning to purchase and use jatropha as the main substitute of diesel fuel in their factories.

Aside from their mandate based roles, several SOEs involved in jatropha activities through their corporate social responsibility (CSR) programs. Unfortunately jatropha activities under the CSR Programs were only implemented for short period and in most cases they were carelessly managed. For example, in 2006 PT PLN initiated a jatropha cultivation program in East Kupang, NTT Province. A pilot garden was established and seedlings were distributed to surrounding farmers together with socialization about the potentials and the promising future of jatropha. However, after the distribution of seedlings and the socialization, there were no further activities by PT PLN, including technical assistance provision to the farmers (Inisiatif Newsletter 2008).

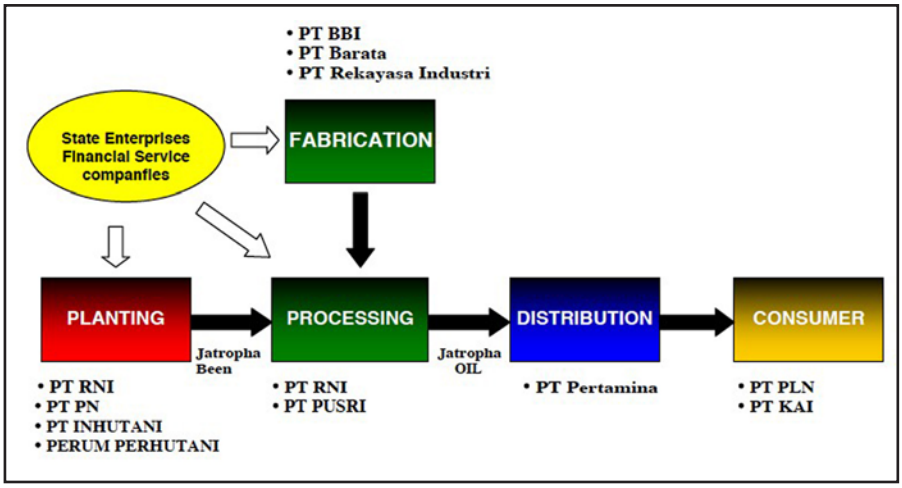


Figure 3.4 State-owned enterprises alliance in jatropha based biofuel development (Source: The Business Watch Indonesia 2007)

Another type of involvement of SOEs in jatropha activities was through business cooperation with private sector. An example of the cooperation is a joint venture of Perum Perhutani with PT Jatoil Waterland (a joint venture of Waterland International – the Netherlands and Jatenergy Ltd – Australia), which has been established since 2009. In the cooperation, Perum Perhutani provides exclusive permit to PT Waterland to use 100,000 hectares of forest lands in Central Java for jatropha cultivation for a period of 25 years under a land leasing and profit sharing agreement (30% for Perum Perhutani and 70% for PT Jatoil Waterland).[62]

This joint venture, however, received much criticism for the negative impacts that it has caused on farmers and the environment. An investigative report by Milieu Defensie and WALHI (2012) suggested that the joint venture has put farmers under pressure. Most farmers are the sharecroppers of Perum Perhutani forest land and the joint venture has forced them to allocate half of the land to cultivate jatropha and other crops for PT Jatoil Waterland under the applied intercropping model. Farmers claimed significant income losses since the paid prices for jatropha seeds and their labor were too low as well as the incidents of food insecurity due to the conversion of many wood, fodder and food resources into jatropha cultivation. The conversion of forest into jatropha gardens has also affected the forest since jatropha trees compete with acacia and teak trees in the forest area. This joint venture is currently part of the small remaining jatropha investments in Indonesia with very limited activities left on the ground. There is very limited information on the progress and achievements of this joint venture. Milieu Defensie in its report

[62] Source: JAT Energy Announcement on 7 January 2013: Jatropha Operations to Generate Positive Cash Flows http://.asx.com.au/asxpdf/20130107/pdf/42c9lzbwzvvxfb.pdf - accessed on 10 June 2013.

mentions that in September 2011, the venture had sold 200 tons of crude jatropha oil at USD 1,000 per ton to Nestle Oil for further delivery to Lufthansa (Milieu Defensie 2013: 17).[63] Perum Perhutani has been demanded to evaluate and to cancel the exclusive permit to PT Waterland due to its negative impacts and the unclear benefit for Perum Perhutani themselves. The joint venture was criticized to only benefit PT Jatoil Waterland where the exclusive permit is used for land procurement (Nurlaila *et al.* 2013: 81), which was important for the company's investment portfolio in attracting investors.

3.3.4 Private sector

The private sector involvement in jatropha activities in Indonesia began since the early of the 2000s along with the starting of global interest in jatropha curcas.[64] The skyrocketing of fossil fuel prices, the rise of jatropha popularity in stock market and the availability of subsidies as well as policy supports both at international and national levels were the main drivers for the many private jatropha investments in Indonesia.

At the time of the hype, companies investing in jatropha were not merely companies with pure background and intention to develop and produce jatropha biodiesel and its diversified products. Many companies operating at that time appeared to be investment companies that aim to attract funding from investors by selling the dreams and spectacle on jatropha. These companies built their portfolios by establishing pilot projects as their showcases to their potential investors and also by presenting promotion webpages and audiovisual advertisements, which overwhelmingly promise the prospects of future profit and claim the positive image of their investments as green investments which contribute to local poverty reduction and environmental improvement thus entitle to various incentives and subsidies, such as carbon credit, that become additional promising profit for the investors.[65]

One main attraction for investors to establish their operations in Indonesia was the availability of lands for their investment. Access to land is very important for an investment portfolio to attract funding and the land itself is a tradable asset. Million hectares of land were declared available for jatropha and other biofuels development by the government. In addition to this, the government also has eased the procedure to lease land up to 95 years in order to attract more investors by issuing the Investment Law No. 25 Year 2007.[66] At the local level, the searching for land can be very easy where the national agencies, such as the National Investment Board (*Badan Nasional Penanaman Modal*/BNPM) can play an active role in intermediating investors to the regions and the local governments help by socializing

[63] 200 tons is equal to 235,301 liters (1 ton = 7.4 barrel = 1,177 liters) or approximately 705 tons of jatropha seeds (1 kg seeds contains 30% oil).

[64] The initial private sector involvements were mostly through collaboration with researchers and the state-owned enterprises by sponsoring the initial jatropha research and test (for example the involvement of automotive industries in the 2006 Jatropha Expedition) and taking part in the implementation of the DME program.

[65] See for example the advertisement of Aston Lloyds on jatropha investment opportunities in Indonesia at http://vimeo.com/12483344 - accessed on 17 June 2013 and promo video of PT Jatoil Waterland on their profit sharing arrangement with Perum Perhutani at https://youtube.com/watch?v=BTnx4i2Dpsw&feature=player_embedded - accessed on 17 June 2013.

[66] This law article was then cancelled after a judicial review by the Constitutional Court on 25 March 2008.

the investment plans and assisting the negotiation of land acquisition with the local people (Vel and Nugrohowardhani 2012: 26). Attracting investors is always becoming an interest for local governments, since the investment is expected to increase the local revenues as well as to benefit the personal interests of the local elites (Vel 2008a). The growing demand for land is met partly by the sale of state land and the granting of concessions by governments, and partly by sales and lease by private individuals, including rural dwellers.

The easy process in accessing land for jatropha investment, however, has been used by some investors to acquire lands for non-jatropha purposes. These investors have used jatropha as their vehicle to acquire land use permit from the government or to get government's support in acquiring lands from the local people, although at the end they use the lands for other purposes using the long-term concession and leasing rights that they have acquired.[67]

At present, most jatropha private investments in Indonesia were stopped due to the unproven crop potentials of jatropha and the uncertainties surrounding the market and subsidies. Globally, investors claimed the absence of feasible business model to develop a reliable supply chain of raw materials (Baker and Ebrahim 2012b: 1) and the high production costs of jatropha biodiesel that makes it not competitive against the price of subsidized diesel fuel in the absence of sufficient subsidies and protection (Business Watch Indonesia 2007, USAID 2007, GFA 2008). Many jatropha investments failed to be materialized beyond the committed plans and mostly stopped at the earliest stage of scoping studies, Memorandum of Understanding (MoU) and pilot projects (GFA 2008). Investors decided to withdraw their investment plans following the negative feasibility reports as well as the negative results of their pilot projects on the real jatropha potentials, which led to the failure to attract capital investment into the venture. Only certain investments were able to accumulate profits, especially those targeting specific market niche available during the hype, such as nursery companies selling seeds and manufacturers of jatropha related items (pressing machines and stoves).

Aside from the commercial reasons, several companies from the mining industry were involved in jatropha development activities in order to meet the specific biofuel consumption target as regulated by the national government.[68] However, at that time jatropha development was not aimed specific for biodiesel production since it was only part of the companies' corporate social responsibility scheme, where jatropha development was mainly used for the reforestation (ex-mining area rehabilitation)

[67] An example of this is a joint venture investment by Clean Biofuel International Pte Ltd from Singapore with its Indonesian partner, PT Inti Global Laksana. In 2007, this joint venture received a concession of approximately 55,000 hectares of forest land in Pohuwatu District, Gorontalo Province to develop an integrated biofuel development zone. While the initial plan was to develop jatropha plantation for biofuel production, the actual activity was forest clearing for oil palm plantation. Source: Ringkasan Proyek Zona Biofuel Gorontalo (http://c4d-info.org/biofuelseminar_papers/Biofuel%20Zone-indonesia-for%20presentation%20-%20Bahasa.ppt - accessed on 23 February 2011).

[68] Presidential Decree No. 5 Year 2006, Presidential Instruction No. 1 Year 2006 and The Regulation of Energy, Mineral and Mining Resources Minister No. 32 Year 2008.

program.[69] Despite positive test results in applying jatropha biodiesel in vehicles and engines (B10 or ten percent content), the jatropha programs in these companies were discontinued due to the low productivity of jatropha. At present, mining companies use crude palm oil (CPO) as their main biodiesel source.[70]

3.3.5 NGOs

There were not many NGOs driven jatropha development projects in Indonesia during the period of hype. This is very different from what happened in other countries (such as in Kenya, see Hunsberger 2012) where NGOs became the key promoter of jatropha. There are two possible reasons of this situation. First, by referring to the characteristic of NGOs that are still strongly dependent on funding from external sources to establish their projects (Hunsberger 2012, Aspinall 2013), the lack of sponsorship was probably the main cause. Even though, jatropha was very popular and received much attention, including budget allocations from the government, most of the activities or projects were either implemented directly by the government through the ministries or channeled to the SOEs, universities and research centers, leaving little chance for NGOs to get involved.

In terms of funding from donors, despite the fact that Indonesia received significant allocation of funding for the Clean Development Mechanism (CDM), jatropha failed to meet the criteria for CDM grants. According to GFA's jatropha feasibility report, jatropha does not fulfill Indonesia's definition of forest, as it was not likely to reach a single minimum tree height value of five meters (among other criteria) in order to be illegible for the CDM under the reforestation scheme. In Indonesia, there is disagreement over whether jatropha is a tree or a crop. Foresters consider jatropha a crop or a plantation crop at best, while agronomists consider it a tree. The disagreement occurs because jatropha has a range of phenotypes; shrub-like, multi-stemmed growth habits with height < 5 m, and tree-like, single-stemmed growth habits with height > 5 m (Sunil *et al.* 2013 as cited in Tjeuw 2017: 41). In addition to this, jatropha is also considered to have a low productivity to meet the minimum standard of 15,000 tons of CO2 per year (GFA 2008: 36-37). Against this background, most CDM projects were not targeting jatropha development and preferred to focus on other alternative energy sources that was meeting the criteria of CDM program (such as wind, solar and micro-hydro power).

Aside from the CDM program, other potential schemes from donors such as the agribusiness development programs also did not provide a significant focus on

[69] See for example the jatropha development at PT Berau Coal Energy, Tbk in Kalimantan at http://pub.bhaktiganesha.or.id/itb77/files/Biofuel%20papers/Program%20reboisasi%20Jarak%20pagar%20di%20Berau%20Coal.pdf - accessed on 22 June 2013.

[70] Since July 2012, 25 major mining companies were required to consume at least 2% of biodiesel of their total fuel consumption (source: http://reuters.com/article/2012/04/27/us-indonesia-mining-biodiesel-idUSBRE83Q04Q20120427 - accessed on 14 May 2013). By September 2013, this standard has been increased to 5% and will be gradually increased up to 25% by 2025 to meet government's biodiesel target (source: http://hardianto.com/implementasi-penggunaan-bahan-bakar-nabati-pada-perusahaan-pertambangan-kk-pkp2b/ - accessed on 22 June 2013).

jatropha development. Two major agribusiness development programs, USAID-AMARTA (Agribusiness Market Support Activity) and AusAID-SADI (Smallholder Agribusiness Development Initiative) that were operating at the time of hype (2006-2010) in Indonesia, did not include jatropha as a key commodity to be supported. The two programs were focusing on commodities with clear market prospects and value chains, hence therefore an infant commodity such as jatropha was not considered to be prospective. The AMARTA program once implemented a small-scale jatropha project in Flores. In this project, AMARTA provided 100,000 seedlings to 700 farmers and was planning to use jatropha for lighting fuel, production of jatropha soap and jatropha briquettes and jatropha-biodiesel for small diesel power plant to generate energy for lightning and local welding industry (AMARTA 2008). However, this project was decided to be discontinued following the policy of AMARTA to focus on the high value commodities only.[71]

The most prominent jatropha development activity by an NGO in Indonesia was the project run by Yayasan Dian Desa in collaboration with APEX (Asian People Exchange – a Japanese NGO) with the funding from the Japanese Embassy in Indonesia. This project was implemented in Sikka District, Flores, East Nusa Tenggara from 2008-2011 with total grant of USD 485,436.[72] In this project, Yayasan Dian Desa (YDD) established jatropha nursery and distributed 500,000 seedlings in 40 villages in Sikka. YDD also operated PUSPHA (*Pusat Teknologi Tepat Guna Jatropha* or Appropriate Technology Center for Jatropha), which procured and processed jatropha seeds into biodiesel and also used the seedcake as organic fertilizer and gasification material for their power plant. YDD targeted poor fishermen and PT PLN in Sikka as their potential biodiesel buyers. In August 2010, YDD signed an MoU with PT PLN in Sikka on the agreement of PT PLN to buy the jatropha biodiesel from YDD to fuel their diesel power plants.[73] Yet, in spite of this positive achievement, YDD was still facing a problem in getting sufficient jatropha seeds for their biodiesel factory due to the decreasing interest of farmers to grow jatropha. The limited duration of funding for their jatropha project made it difficult to continue the introduction of jatropha in Sikka.

The second reason why there was so little NGO involvement in jatropha activities was the increasing criticism against jatropha following the immediate failures of jatropha activities both in Indonesia and globally as well as the growing concerns on the negative impacts of either jatropha and biofuel development towards food security, environment and land ownership. Many NGOs in Indonesia took part in voicing the concerns and criticism on the negative impacts of biofuels development, including jatropha.

[71] Based on e-mail discussion per 19 May 2010 with William Levine, the head of AMARTA Program. In his e-mail, he stated: 'Our program in biofuels was terminated by USAID rather early in the life of the AMARTA Project. USAID decided that it wanted us to focus specifically on cacao, coffee, and high value horticulture.'

[72] Source: http://antaranews.com/berita/217890/jepang-bantu-ntt-dengan-jarak-pagar and http://regional.kompas.com/read/2009/09/17/22094789/proyek.penanaman.jarak.pagar.di.sikka.dilanjutkan - accessed on 19 August 2010.

[73] Source: http://antaranews.com/berita/217906/mou-pln-yayasan-dian-desa-beli-minyak-jarak - accessed on 22 September 2010.

In July 2007, FSTI (*Federasi Serikat Tani Indonesia* /The Indonesian Peasants Union Federation) issued the 41st Edition of their Bulletin *Pembaruan Tani* (Agrarian Reform) with central topic on 'Agrofuel: The Second Agrarian Involution.' This edition criticized the National Energy Policy that encouraged biofuels development in Indonesia at the expense of peasants. FSTI claimed that the biofuels development increased land competition between the peasants and the big corporations. People sovereignty over their land was put at risk after the issuance of the 2007 Investment Law allowing 95 years land concession for big corporations, especially for biofuels production (Pembaruan Tani 2007).

In NTT, a newsletter *Inisiatif* published by a local NGO, PIKUL (*Penguatan Institusi dan Kapasitas Lokal* / Local Capacity and Institution Strengthening) in its first edition in January 2008 writes a full coverage of jatropha activities failures in NTT and the negative impacts on the poor people. The newsletter writes explicitly about the unproven advantages of jatropha as promised by the government and investors. Furthermore, the newsletter also critically argued that farmers have become victims of government's ambition to develop jatropha as a cheap biofuel alternative for the benefit of big investors and international market. The newsletter criticized the absence of a fair business model for farmers in the existing schemes and also the tendency that the biodiesel production was intended for international market instead of addressing the local and domestic energy crisis.

In 2012, a national NGO, WALHI (*Wahana Lingkungan Hidup Indonesia*) together with the Milieu Defensie from the Netherlands published an investigative report on the trend and consequences of rapid development of aviation biofuels on local people involved in jatropha cultivation in Central Java. The report claimed that the on-going trend to source and use biofuels for aviation industry in Europe has driven the massive expansion of foreign biofuels investors in developing countries, such as Indonesia, in search of land suitable for their biofuels crops cultivation at the expense of local people. Based on their investigation on the jatropha investment by PT Jatoil Waterland and Perum Perhutani in Grobogan District, Central Java, WALHI and Milieu Defensie concluded that jatropha is not the answer for the growing demand for aviation fuel. They argued that jatropha investment in Grobogan has caused negative impacts on the local economy, the food security and the environment. Based on their investigation, they demanded the airline industry not to use biofuel that was produced with either a direct or indirect contribution to local impoverishment and environmental destruction. They recommended the industry to withdraw their biofuels targets and to replace them with a more reliable and actual emission reduction targets. Furthermore, they also demanded PT Jatoil Waterland and Perum Perhutani to stop further expansion of their cultivation area and to compensate the affected farmers for their losses as well as the restoration of the environment that had been affected by their investment.

3.3.6 Farmers

Farmers' involvement in jatropha activities was strongly driven by the interest of profit making. Overwhelmingly promoted as 'a money tree', jatropha had attracted farmers to invest in this crop by buying expensive seeds and allocating their productive lands for the cultivation of this crop. Furthermore, many were also joining various cooperation schemes offered by the investors.

However, the absence of prior experience in cultivating jatropha as a cash crop has made farmers to easily fall into the trap of overwhelming claims and empty promises. Many farmers became the victims of seeds sellers who sold low quality seeds and seedlings, which were claimed to have superior quality. PIKUL (2008) writes that driven by the overwhelming profit projection made by the government, many farmers in NTT were willing to buy expensive seeds and seedlings with an expectation for a big profit. In addition to that, they also invested in labor and the other agro-input costs. Their expectation turned to be a big disappointment when they found that the investment costs appeared to exceed the given projection while the real yields as well as the selling prices were very low. Many farmers even converted their existing crops to jatropha, either voluntarily or coerced, when jatropha became a top priority crop of the local governments. The case of rice fields conversion to jatropha gardens in Grobogan, as discussed earlier, was a well known example of the crop conversion among many other similar cases that occurred during the hype years. A case of coerced conversion was reported in Central Sumba District in NTT, where the community cashew gardens were converted to jatropha plantation under the instruction of the local agricultural office, who sent big tractors to clear the existing cashew tree and obliged farmers to cultivate jatropha without proper guidance and assistances (Vel 2008a). The attractiveness of the jatropha prospect had also encouraged many farmers to engage in various forms of production systems or business models, which linked them with investors, traders, seed breeders, scientists, mediator organizations and markets. Vermeulen and Cotula (2010a: 3) define business models as the way in which a company structures its resources, partnerships and costumer relationships in order to create and capture value. FAO (2010: 79) identifies six production systems for jatropha based on the scale, ownership and objective: plantation, plantation on wasteland areas, outgrower schemes, plantation plus outgrower schemes, smallholder production and livestock barrier hedges. The application of these six business models were varied and very much dependent on the strategy of the specific jatropha activities.[74]

The 2008 survey by GEXSI on jatropha projects in Indonesia suggests that 20% adopted outgrower model[75] and 80% adopted the combination of outgrower and plantation

[74] According to Balkema and Romijn (2011: 2) the existence of various business models for jatropha cultivation is influenced by the wide range of objectives behind each models, namely the commercial-profit oriented objectives, social-community development objectives, and academic-research objectives. So far, none of the models is able to demonstrate viability for sustainable jatropha production either for social or commercial purpose.

[75] Outgrower system is a form of contract farming, which refers to a system where a central processing or exporting unit purchases the harvests of independent farmers and the terms of the purchase are arranged in advance through contracts (Baumann 2000).

models[76] for their mode of production (GEXSI 2008: 149).[77] The outgrower model has been a prioritized business model by the Indonesian Government in the context of biofuel development as a strategy to involve and empower smallholders in biofuels development activities for poverty reduction and income generation purposes.[78] Government credit scheme for biofuels development, such as KPEN-RP requires companies to establish partnership with smallholders through farmer groups or cooperatives as the mandatory condition for credit channeling.

While the overwhelming promises on the profitability of jatropha were suggested as the initial driver for farmers to be interested in this crop, German *et al.* (2011: 12) note that the promise of loans, market guarantee, and company proceeds for 'community development' were apparently becoming the prominent factors in encouraging farmers' participation. Thus income from the sale of seeds became of secondary importance. An interesting finding by Skutsch *et al.* (2011: 7) in their case study of jatropha outgrower scheme in Mexico suggests that the observed farmers joined the scheme not on the basis of the likely profit they would make on selling the seeds, but simply because the subsidies provided were such that they would more or less break even compared with maize production in the two initial years.

In the Indonesian context, the situation was almost similar. Many joined the outgrower scheme after being offered various incentives, such as free seeds or seedlings, agro-inputs, and cash payment for planting jatropha, market guarantee, and employment opportunities. Such attractive offers may lure farmers into unfavorable long-term agreements where they were required to use their lands as collaterals with promises of short-term returns that are hard to turn down. Many farmers finally found themselves to be trapped in long-term contracts – with consequence of losing rights to control and use their lands – since the contracts have effect of transferring the right to make production decisions to companies for the period the contract in effect. This is the similar risk experienced by farmers who lease their lands to investors for employment or partnership promises which turned out to be false promises (see for example the Tanamodu case in Vel 2008a, 2008b and 2009).

[76] Plantation system refers to a form of vertical integration where a company controls the various stages of the value chain, from production to processing through to distribution (Vermeulen and Cotula 2010a: 19).

[77] Hawkins and Chen in their 2011 jatropha report, 'Plant with A Bad Name', point out that outgrower has become the dominant cultivation model for jatropha today in comparison with the plantation model. They explained that the current status of jatropha as 'a not yet commercially proven crop' has become a reason for investors to select the outgrower model in order to reduce risks of financial loss when the project failed. Under the outgrower model, many of the costs and risks (high labor cost, low yield risk and market failure) are transferred to farmers (Hawkins and Chen 2011: 36-37). Having this as the background, outgrower farmers tend to be exposed to the risks of unfair business practice, especially because many of the inherent risks of this venture were not properly disclosed to them prior their participation in the scheme. The uncertainty of jatropha venture and the false information by companies increase the risk for farmers to become potential prey for unfaithful investors.

[78] Since mid-1970s, a series of Presidential Decrees and other regulations have established institutionalized contract farming or outgrower systems as the preferred and in some cases the only permitted form of production in many branches of commercial agro-production (White 1996: 9). These include the recent Law No. 41 Year 2009 on Sustainable Farming and Agricultural Minister Regulation No. 26 Year 2007 on Plantation Operational Permit, which serve as legal basis for outgrower system enforcement in both food and cash crops production.

Another business model which is commonly used in jatropha development and often combined with the outgrower scheme is the cooperative model. Cooperative has been the leading organization socio-economic unit in mobilizing farmers in growing jatropha in many countries, either as the mediator between farmers and jatropha investor's outgrower scheme, such as in Kenya (GTZ 2009), or the extended arm of government in executing government's biofuel projects, such as the Energy Self Sufficient Village Program in Indonesia (Amir *et al*. 2008). Cooperatives roles in jatropha development consist of roles in campaigning jatropha prospects, recruiting farmers and their groups, channeling working capital and agro-inputs and training provision, buying seeds and initial oil processing for crude jatropha oil, as well as the production of jatropha by-products, such as soap and fertilizer (Amir *et al.* 2008, GTZ 2009). However, the experience of cooperatives in jatropha sector also suggests that cooperatives were used in many cases as the extended arms of companies in mobilizing and exploiting farmers (Milieudefensie 2012: 22 and Pikul 2008: 13).

In addition to the various production system options, the jatropha farming strategy itself also evolves from monocropping to intercropping, either as a strategy to persuade farmers to engage or as a strategy to reduce the risk of investment for both sides. The other adjustments include the promotion of byproducts of jatropha, such as jatropha soaps and jatropha press cake for fertilizer to increase the economic attractiveness of the crop. Also, the market target of fuel produced from jatropha has been downscaled from international and national market targets – as what they were in the initial years of the hype – to target local markets, including for self-consumption of people in addressing local fuel crisis. The local use of jatropha for energy is also considered more effective than shipping it to distant markets that has an adverse effect on its carbon balance (Schott 2009: 163). Yet, as discussed earlier in the case of DME, the shifting of production strategy from market oriented to the application of the fuel for their own consumption had caused big disappointment among the farmers since their main intention to grow jatropha was to earn money and to make a profit.

The disappointment becomes bigger when they realized that even in the commercial setting, the profit that can be earned was too little to cover their actual production costs. Ever since its introduction, jatropha has been introduced as a cheap alternative for the domestic subsidized diesel fuel. The government backed by the scientists made a very low industrial scale production cost calculation, approximately Rp. 3,342 per liter biodiesel and sold at Rp. 4,000 in comparison with Rp. 4,300 per liter subsidized diesel fuel in 2006 based on an over optimistic projection of seeds yield per hectares (up to ten tons) (Hambali *et al.* 2006: 119). This unrealistic calculation then had resulted in the determination of a very low buying price of jatropha seeds at the farmer level: Rp. 500 – Rp. 1000 per kg causing a significant drop of farmers' interest in jatropha.[79] In relation

[79] PIKUL (2008) notes that even when jatropha biodiesel production is oriented to international market, which pays better prices, it does not make any difference in the margin received by farmers since as outgrowers they are tied by the predetermined contract prices. Furthermore in most cases outgrowers do not have any knowledge on the marketing of the final product.

to this, the Business Watch Indonesia (2007: 26) wrote that how much the energy producing villages or local farmers benefit from the biofuel sector will depend very much on the profit margin set at every stage along the supply chain. Farmers have always been the weakest party in the distribution chain of agricultural products, and their experience in jatropha sector was an example of this case.

3.3 Conclusion

In this chapter I have presented an elaborated discussion on the jatropha hype in Indonesia. This chapter concluded that the emergence of jatropha projects was driven by the following key factors. The first factor was the soaring of the international fossil fuel prices and the continuous increase of domestic fuel subsidy cuts that created a lucrative niche market for biofuels to fill in at competitive prices. In Indonesia, the domestic market potential for biofuels became more apparent after the issuance of the new national biofuels mandate targeting for ten percent of total energy needs to be met by biofuels in 2010. This mandate was followed with market guarantee schemes promised by several state-owned companies.

At that time, jatropha was introduced worldwide as a 'wonder crop' for the claim that it is a low maintenance crop suitable to most climatic and soil conditions with an ability to withstand drought. By its supporters, jatropha was claimed to have the potential to produce biodiesel in a way that supposedly addresses concerns related to land use change, competition with food production, and the social and ecological impacts of large plantations. In other words, on paper, jatropha appears to qualify as an environmentally sustainable and socially just energy crop (Hunsberger 2012: 3).

The second factor was the availability of international funding and capital investments for green fuel programs and the availability of various national subsidies for biofuels sector under the national biofuels development blueprint, such as interest rate and infrastructure subsidies, tax reduction as well as the research and development funding. All these incentives became the major non-market drivers for the rise of interests in biofuels development, especially jatropha.

The third factor was the existence of key actors and their networks who enabled jatropha to assume its privileged position during the hype period. In the context of Indonesia, scientists (especially those from the biofuels research groups in ITB) have become the central actors in the jatropha hype creation in Indonesia. They played a central role in the creation of the idea of jatropha as a miracle energy crop and in the translation of the ideas into policies and business proposals in search of government's budget allocation and private capital investments for a wide range of jatropha projects. Meanwhile, the government became the locomotive for the other actors in the national scale implementation of jatropha projects via the issuance of the biofuels development blueprint and its supporting policies and regulations, the allocation of budgets for the government's led jatropha projects in various formats, the provision of market guarantee

through the role of the state-owned companies, and the issuance of biofuel consumption mandates to be met by the private companies. As the result, various actors, ranging from governments, universities, state-owned enterprises, private sector, and NGOs involved in a wide array of jatropha-related projects from upstream to downstream: researches, nurseries, plantations, oil productions, equipment and machineries (e.g. pressing machines and stoves), as well as the production of other jatropha based products).

The fourth key factor that explains the emergence of jatropha projects in Indonesia was the availability of lands for jatropha investment. As part of the national biofuels development blueprint, the government declared the availability millions hectares of land for jatropha and other biofuels development. The government also simplified the procedure to lease land up to 95 years in order to attract more investors. The land demand for biofuels development, including for jatropha, was met partly by the sale and the granting of concessions of state lands by the government, and partly by sales and lease by private individuals.

In the discussion on the jatropha hype experience, this chapter points out how jatropha development in Indonesia was to a very large extent built on the spectacular positive claims and promises. The spectacle, unfortunately, had become the main foundation for the provision of governments' support towards jatropha, which led to the short life of the given government support. Yet, it is also important to note that aside from the spectacle, the failure of jatropha in Indonesia was also caused by the inconsistency of governments' supports in terms of conflicting policies and regulations as presented in the chapter discussion. It seems that in spite of the existence of the (ambitious) biofuels development blueprint, the government is still not able to commit to its own alternative energy policy as what has been the problem for many years.

The weak commitment of the government was a consequence of the fact that the policies to support jatropha at that time were based on selective rhetorical claims to suit political agendas, rather than on scientific evidence. As noted by Tjeuw (2017: 29), jatropha hype was essentially driven by government objectives rather than any specific demand for biodiesel. Using the concept of 'lighthouse project', I explained that to some extent the national government's initiative to promote jatropha as an alternative biofuel was related to the personal image building objective of Soesilo Bambang Yudhoyono, then was the president of Republic of Indonesia. Yudhoyono was in need to find breakthroughs that can address the problems of huge budget deficit due to spending on fuel subsidy, food insecurity and the rise of poverty level. At the same time the breakthroughs should also benefit his personal image.

The interests of Yudhoyono's administration was convincingly addressed by the rhetorical claims of Robert Manurung on the potential of jatropha to address most of the problems faced by Indonesia. Yet, the reality that jatropha was still in the early stages of both the farming technology and biodiesel production had made all the claims to be immature and failed to be materialized. And as the nature of any 'lighthouse'

project that a regime associated with the project will be very sensitive with any sign of failure in order to protect their image, the immediate withdraw of Yudhoyono's support to jatropha was not a surprise.

The discussion shows how the optimistic discourses have been used and maintained by many actors for their own interests. A core argument in the discussion points out that spectacle was created and maintained through a variety of networks to influence policies and many resulted in form of budget provision for a wide range of jatropha projects. For many actors, the projects apparently served as an end goal of their interests in jatropha instead of the production of biofuel itself. This hypothesis will guide the discussion in Chapter 5 on Jatropha Projects in South Sulawesi to address the question on the motivations and drivers for the implementation of various jatropha projects in South Sulawesi.

4 Agriculture and people in South Sulawesi

This research focuses on the discussion and analysis of the experiences of jatropha projects in South Sulawesi in the period of 2006-2011 by focusing on the specific socio, political, cultural and economic contexts of South Sulawesi. By context, I refer to the definition by Roy Dilley as a device by which meaning and understanding of events, objects, texts, conditions, and so forth, can be revealed or deepened and that allows for (better) explanation and interpretation (Dilley 1999 as cited in Persoon 2014). A context should be constructed on the basis of meaningful or causal relations with the topic of research. This implies that territorial boundaries, or particular historical events, would not by definition relevant in describing or analyzing a certain phenomenon. Their relevance has to be revealed by a portrayal that people, events or political, historical conditions have demonstrable impact on the topic of research (Persoon 2014).[80] Adopting such definition implies that this research explores the relevant contextual factors (history, people, systems and events) that present impacts on the rise and fall of jatropha projects in South Sulawesi.

This chapter aims to provide a background of the social and agricultural context of South Sulawesi. From its agricultural profile, South Sulawesi is known as a key production area of both food and high value export agricultural commodities in the eastern part of Indonesia. It is noted that while jatropha in specific was promoted and prioritized as a crop suitable for marginal areas, the findings in my research, as will be presented in Chapter 5, show that jatropha had been introduced into the commercial agricultural setting of South Sulawesi at a significant scale through various projects in the period of 2006-2011. The existence of various jatropha projects in South Sulawesi in those years has raised a question on why jatropha as an entirely new sector with no established players, untested product and market, and unproven business plans was able to become a hype in South Sulawesi.

Literature explaining the success of South Sulawesi in cash crop agriculture has been strongly associating the success with the specific characteristics of its people concerning their culture, system and practices. The two main ethnic groups of South Sulawesi – Bugis and Makassar – are known for their centuries long engagement in the commercial agricultural development and trade activities, not only in their homeland but also

[80] In this elaborated description of context, Gerard Persoon refers to the method of relevant context construction by Andrew P. Vayda (1983).

elsewhere around the Indonesian archipelago through their massive diaspora. They are specifically characterized as 'economic minded entrepreneurs' (Pelras 1996), and well known for their 'fluidity and economic opportunism both as individual and family groups in operating as producers and entrepreneurs' (Acciaioli 1998: 82). These descriptions suggest their openness towards new opportunities built upon their complex ethnic and familial networking, and therefore serve as an interesting background to study how these specific characteristics shaped the rise and fall of jatropha in South Sulawesi.

In the following sections I will first present an introduction to South Sulawesi Province by presenting its brief profile a short review of the commercial agricultural development history in this province. After that I will delve into the discussion on specific factors explaining the successful development of commercial agricultural development in this province, where I focus on the nexus between the social networks, business models and land access factors. A section on the conclusion will be presented at the end of this chapter.

4.1 South Sulawesi at a Glance

4.1.1 Geography

South Sulawesi Province is located on the southwest peninsula of Sulawesi Island. It was initially established as the province of South and Southeast Sulawesi that also covered the southeast peninsula based on the Law No. 47 of 1960. In 1964, the national government passed Law No. 13 of 1964 to split the territory into two provinces: the South and Southeast Sulawesi. Forty years later, another new province: the West Sulawesi Province was established from the split of four South Sulawesi Province's districts based on Law No. 26 of 2004.[81] The current South Sulawesi administration consists of twenty one regencies or districts (*kabupaten*) and three independent cities with Makassar as the provincial capital.

4.1.2 People

The population size of South Sulawesi in 2010 was 8,032,551.[82] South Sulawesi harbors four major population groups, distinguished as ethnic and language groups: Bugis, Makassar, Toraja and Luwu. The Bugis and Makassar form the largest groups. The Bugis are the largest ethnic group in Sulawesi. They inhabit the middle part of the southern peninsula of Sulawesi. The Makassar are the second largest ethnic group in South Sulawesi. They mainly inhabit the coastal and inland southern part of South Sulawesi. While the Toraja and Luwu live in the mountainous and coastal northeast region of South Sulawesi respectively.

[81] The four districts: Mamuju, North Mamuju, Majene and Polewali Mandar are the regions where the Mandar ethnic group become majority. Since they were originally parts of South Sulawesi, many similarities were shared with the Bugis and Makassar of South Sulawesi.

[82] The 2010 population census according to http://en.wikipedia.org/wiki/South_Sulawesi (accessed on 11 January 2014).

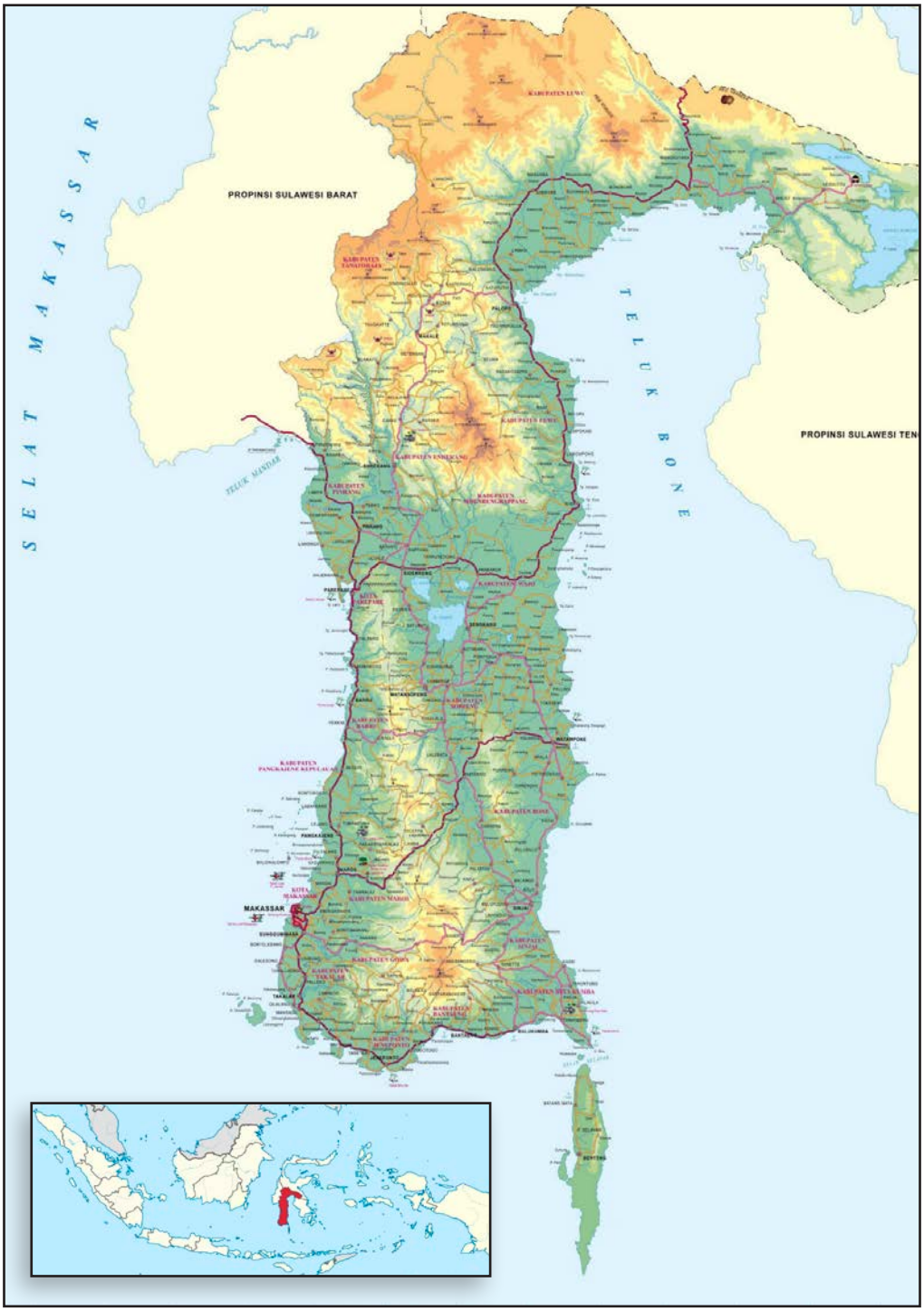


Figure 4.1. South Sulawesi Map (Source: www.wikimedia.org)

The Bugis and Makassar have long been praised for their commercial spirit and are historically known as very skilled seafarers (Acciaioli 1998, Heersink 1995, Lineton 1975, Pelras 1996, Sutherland 2000). The two ethnic groups are often being considered as representatives of the ethnic groups in South Sulawesi (also the Mandar of now West Sulawesi).[83] There is much diversity within these main ethnic groups, as well as marked similarities between them in language, history and socio-cultural characteristics.[84] Meanwhile, differences are also noted among these ethnic groups, especially between the Bugis, Makassar, and Luwu towards the Toraja. The adherence to different religions has become a significant characteristic between the three ethnic groups and the Toraja. Islam has been the main religion for the Bugis, Makassar and Luwu since the period of Islamization in Sulawesi in the 16th century, while majority of the Toraja remained animists before the Christianization by the Dutch administration took place in 18th century (Roth 2003: 37).[85]

Aside from the four main ethnic groups, several minority groups also exist in South Sulawesi. One of them are the Chinese who constitute a population of appoximately 30 thousand people.[86] The majority of this ethnic group lives in Makassar with smaller populations residing in the main town of the other districts. The Chinese in South Sulawesi, as elsewhere in Indonesia, play significant roles in the economy of the province. In South Sulawesi, the Chinese have a long history of both cooperation and competition with the Bugis and Makassar. Each group has already established its own distinct position which enable them to sustain a cooperation between each other than to have a fierce competition. The Bugis and Makassar are well known for their intermediating role in filling the niche between the producers of raw materials and the wholesale traders (the Chinese traders), and in many cases the Chinese traders also become the providers of working capitals to the Bugis and Makassar middlemen. Meanwhile, for the export activity the portion is shared almost equal between the two groups (Makaliwe, 1969, Heersink 1995, Ruf and Yoddang 1999, Sutherland 2000).

[83] For a practical reason, many literatures on South Sulawesi are referring to Bugis-Makassar although the discussions probably also include other ethnics. Example of this is Christian Pelras, who in his famous book 'The Bugis' wrote about the legendary seafaring activities of the Bugis. While the book might create impression that the Bugis are the sailors, actually he clearly distinguishes the role of sailors for the Mandar and the role of traders for the Bugis (Alimuddin, 200x).

[84] It is believed that all kingdoms in South Sulawesi are the heirs and descendants of *to manurung* – divine beings sent from heaven in the distant past to assume power over mortals (Henley 2008: 279) In addition to this, local folk story also believes that South Sulawesi kingdoms had their origin from Sangalla Kingdom in Toraja. The history of South Sulawesi also records that the kingdoms were tied together either by wars or kinships. With this common historical background, although each ethnic group has their own culture and languages, they still share many similarities concerning some key cultural elements, especially the complex hierarchy of feudalistic patron-client system.

[85] Dik Roth notes that 'the relationships between these groups become colored by a dichotomization in terms of a contrast between 'pagan' and 'primitive' upland Toraja and Islamized and civilized inhabitants of the Bugis lowland, and later of Christian Toraja and Islamic Bugis. As a consequence of intensive slave trade between the highland of (current) Tana Toraja and the Bugis lowland (and also Luwu), the relationship between highland and lowland has long been conceptualized as one of exploitation of the Toraja population by Bugis traders' (Roth 2003: 38).

[86] The population estimation comes from 2006 data (source: http://justice.gov/eoir/vll/country/canada_coi/indonesia/IDN103410.E.pdf, accessed on 18 January 2014).

4.1.3 Key Commodities

For centuries, Makassar, the capital of South Sulawesi has been a center of trading in the Eastern Indonesia for intra-Indonesian and international markets. Key commodities exported from Makassar are of various agricultural, forestry, fishery and mining products. The commodities produced by local producers for export markets in South Sulawesi are changing over time in response to the market trends. For example, in 2011 there were six local agricultural commodities on the list of key export commodities: arabica coffee, robusta coffee, cacao, tapioca, rubber, and sugarcane molasses (see Table 4.1. The Export Value and Volume of South Sulawesi Key Commodities in 2011).[87] In comparison with the export data from 1968, there has been a major change in terms of type and volume of the key export commodities.[88] The 1968 export data (Makaliwe 1969: 20) list ten key export agricultural commodities of South Sulawesi in 1968: maize, coffee, copra, peanut, candlenut, cassava, cotton (*kapok*), tobacco, rubber, and sugarcane molasses. Five commodities were absent in the 2011 BPS list due to the sharp decrease of production: copra, cotton (*kapok*), peanut, tobacco and candlenut.

Some of these commodities were once the leading export products from South Sulawesi, especially copra that was once an export *primadona* for at least one century (Heersink 1994 and 1995). Among the current list of key agricultural commodities of South Sulawesi, cacao is a totally new commodity. It was introduced in early of 1970s and immediately experienced a rapid increase of export figure from zero in 1976 to 250,000 ton in 1996, the boom year of cacao (Ruf and Yoddang 1999). Until today, cacao is still a main agricultural commodity in South Sulawesi despite the sharp decrease of its production to 51,973,608 kg (2011 export figure, BPS Sulawesi Selatan 2012).

The continuous changing of commodities in South Sulawesi has been closely associated with the cultural profile of the people. The Bugis and Makassar are typically characterized as skilled, entrepreneurial, opportunistic and dynamic, in the sense that they are likely to switch to other commodities if they believe a higher income can be obtained (CSP 2013: 46). Acciaioli (1998: 84) notes that while such tendencies to shift the concentration of one's efforts in reaction to market trends is not unique to the Bugis and Makassar in Indonesia, perhaps the frequency of such shifts, the degree of readiness to change occupations in response to local opportunities and general market trends may be a bit more intense, evidenced in a greater readiness and frequency in changing strategies for seeking a livelihood, among the Bugis and Makassar than some other groups.

Despite the rapid change of type and volume of key agricultural commodities for the export market, South Sulawesi experiences a stable increase of key food crops production.

[87] Wheat bran is not included since it is a by-product of the imported wheat processed by the flour factory, PT Berdikari Sari Utama Flour Mills in Makassar.

[88] Makaliwe (1969: 17) suggests that until 1964, South and Southeast Sulawesi were still united as one province and became a cause of difficulty in comparing the statistical data of South Sulawesi before and after that year, for no separate statistics for South Sulawesi were generally available before 1964.

Table 4.1 The Export Value and Volume of South Sulawesi Key Commodities in 2011

No.	Commodity	Volume in kg	Value in US$
1.	Arabica coffee	1,444,938	9,504,209
2.	Robusta coffee	252,000	814,630
3.	Fresh shrimp	4,174,115	1,513,152,808
4.	Tapioca	28,079,204	7,605,818
5.	Cacao	51,973,608	156,576,796
6.	Fresh fish	2,505,856	17,580,253
7.	Live fish	-	-
8.	Flying fish roe	517,303	16,044,407
9.	Shark fin	26,600	4,256
10.	Sea cucumber	68,341	380,724
11.	Live crab	180,051	3,686,171
12.	Cashew	557,546	458,648
13.	Agathis	1,521,213	1,181,490
14.	Processed timber	9,700,741	16,097,327
15.	Plywood	2,578,543	3,213,461
16.	Finished timber products	222,076	276,653
17	Finished rattan products	311,570	353,247
18.	Rubber	6,511,770	31,720,551
19.	Wheat bran	76,857,281	15,967,629
20.	Sugarcane molasses	30,610,866	3,599,391
21.	Nickel	67,915,600	1,242,620,558
		286,009,221	**3,040,839,028**

Source: BPS Sulawesi Selatan 2012

The production of rice and maize has increased steadily from 1,301,800 ton and 266,300 ton respectively in 1968 (Makaliwe 1969: 20) to 5,003,011 ton and 1,515,329 ton in 2012 (BPS 2014: 10). Both rice and maize are used for domestic consumption in South Sulawesi and also for both international and inter-island trading. South Sulawesi is currently the fourth largest rice producer in Indonesia and the first largest of the nation's rice bowls outside of Java (BPS 2014). The largest rice production area is located in the regencies of Bone, Soppeng, Wajo, Sidrap, Pinrang and Luwu (known collectively as Bosowasipilu).

Research on the contemporary commodity booms in South Sulawesi shows a strong link between the successful rice production with the subsequent successful development of cash crops, such as cacao, coffee and vanilla. In principle, the profit from rice production provides initial capital for the farmers to invest in the other cash crop, especially in purchasing land and agro inputs, such as seeds and fertilizers. Cash crops farmers were also suggested to benefit from the involuntary helpful policies such as fertilizer subsidies that were conceived for rice but were used for their cash crops, such as cacao (Ruf 2004). Besides that, other rice production related policies, especially the transmigration program was also described as an advantage for the cash crop development in South Sulawesi since the program provided abundant supply of labor to be recruited for cash crops cultivation

as well as increase the numbers of cash crops adopters. Furthermore, the surplus rice production provides food security and a safe environment for farmers to develop cash crops since they could buy cheap rice while focusing their land for cash crops cultivation. In fact, many farmers shift to cash crops by referring to the cash crop to rice ratio, where as long as the ratio of the cash crop selling price is above the purhase price of rice they will opt to cultivate cash crops (Burkard 2007, Ruf 1997, Ruf and Yoddang 1999).

Aside from the rational reasons explained above on why and how South Sulawesi farmers response to new crops, it has been also very common that the acceptances and shiftings to new crops (including also new varieties) by farmers in South Sulawesi were caused by the availability of lucrative incentives although minus certainty of productivity, market and price. In this situation, access to incentives becomes the main priority for farmers instead of the yields and profits. The decisions to shift immediately to new crops were based on the availability of lucrative incentives available in the new crops introduction. Meanwhile, there were also several introductions of new crops using coercion for farmers mobilization. The coercion was taken form of government discriminatory policies in providing access to agro-inputs incentives and extension services, direct intimidation by security forces, or using the influence of local elites – especially the landlords – in determining crops to be grown by their sharecroppers.[89] Examples of these two causes include the introductions of transgenic cotton, rubber, maize, peanut, rice, and sugarcane. In both causes, the factors of sporadic and rampant commodity development under commodity prioritization and zoning by government and also development aid programs played a central role, which in many cases were in tandem with the interests of agro-industries and agro-inputs providers.

4.2 The Brief History of Commercial Agricultural commodities in South Sulawesi

As discussed above, the history of commercial agricultural commodities in South Sulawesi has been repeatedly marked by the introduction and development of new crops both for subsistence and commercial uses. The first crop grown for subsistence and later on developed for commercial trade was rice. Rice as the main agricultural commodity in South Sulawesi is suggested to have existed in the region since AD 500 and even 2000 BC. In that period of time, rice was a dry field crop grown as a delicacy for feasts on special occasions. The shifting to intensive wet rice cultivation was estimated to have started since c. 1300 onwards (Bulbeck and Caldwell 2008: 1). The shifting to wet rice cultivation allowed the expansion of population as well as the power of the kingdoms. The Chronicle of Bone (the Bugis historical texts) describes the centrally directed expansion of rice fields and the military conquest of neighboring settlements for the rice cultivation expansion.[90] The intensive

[89] Example of the intervention by landlords can be seen in the introduction of transgenic cotton in Bulukumba as described in the research of Ininnawa Team, 'Persepsi Petani Bulukumba Terhadap Kapas Transgenik', available at: http://www.panyingkul.com/view.php?id=242&jenis=risetkita.

[90] Pranadji (2006: 5) wrote that the political conflicts and even wars between the kings in South Sulawesi were driven by their ambitions to control the rice surplus regions hence the control will enable them to gain control over the interisland trade and to expand their territories.

cultivation of rice appears as a response to the increase of trade between South Sulawesi kingdoms with both regional and international traders. Initially rice surplus was sold to Malay and Javanese traders who had earlier developed and dominated interisland trade, and later on was expanded to international trade following the increasing role of Makassar port under the Gowa Kingdom after the fall of Malacca to the Portugese (Ammarel 2002: 54). At that time, rice was used as a currency for the imported goods, such as Indian printed textiles and Chinese ceramics (Bulbeck and Caldwell 2008: 16).

Aside from rice, historical records also suggest the existence of other cash crops development in South Sulawesi in the pre-colonial period. For example, Christiaan Heersink in his study on the coconut history in Selayar Island of South Sulawesi writes that prior to the Dutch colonial period, the Selayar farmers had already grown cotton as a cash crop to produce the famous Selayarese textiles, *Lipa* (also well known as *Saleijersche Kleedjes*), that was exported to various islands in the eastern Indonesia and the Philippines. Linked to the textile production, the Selayar farmers also grew indigo shrub (*Indigofera Tinctoria*) and *mengkudu* tree (*Morinda Citrifolia*) as high value natural coloring materials. Another important cash crop of Selayar in that period was coconut, that was traded as a principal export commodity along with the textiles, raw cotton and other products within the archipelago and to the Chinese market.[91] One important note on the agricultural commodities developed in this period is that their development was not merely driven by the market factors. Most commodities were developed in association with the cultural values in their productions and applications by referring to the social status and ranks (especially for the textiles types and coloring applications), and the cultural use (coconut tree functions as a traditional bride wealth or *sunrang*) (Heersink 1995: 27 and 38-39).

In the colonial period, the introduction of cash crops cultivation in South Sulawesi at that period was started by the Dutch colonial administration. The lifting of restriction for the spice trade after the era of the VOC had shifted the colonial interests to the development of plantations (Weber *et al. 2003*: 403). Aiming to monopolize and to gain income from cash crops taxation, the Dutch introduced key cash crops, namely coffee, sugarcane, cotton, and coconut (Poelinggomang 2002: 81). Acciaioli (1998: 83) writes that by the 1840s farmers in northern Sinjai and southern Bone started to grow coffee, which was competitive with Javanese coffee. The coffee cultivation further spread to the northern regions, including Enrekang, Toraja and Luwu. Boomgaard (1999) notes that tobacco was also cultivated in South Sulawesi since 1800s.

The development of agriculture during the Dutch colonial period was tempered by many important events. Between 1830-1877, the colonial government implemented the forced

[91] Aside from these agriculture products, South Sulawesi in those years had been known for its role in the high value marine products trading, such as *teripang* (sea cucumber) for Chinese market. Despite the significant of these commodities, records on the trade received limited attention by the Dutch administration in the later period. It is probably because the colonial records focused specifically on the typical products for European market and paid scant attention to economic fields beyond this perspective (Heersink 1995: 10)

cultivation system (*cultuur stelsel*) which was largely limited to the island of Java by focusing on main cash crops at that time: coffee, tea, indigo, sugar and tobacco. Under this system, the Dutch compelled farmers to grow the main cash crops, while the harvest was presented to the Dutch as land taxes. This system was proven as a gold mine for the Dutch since the first payment in 1831 was already sufficient to cover the VOC debts (Rossabi 1999: 32, *Weber et al. 2003*: 403). In addition to the forced cultivation, in 1852 the government also enacted the head tax of five guilders per adult, which was an enormous burden for the people. The enforcement of the taxation signified the introduction of official currency to replace the traditional currencies, such as rice and linen (Mai 1987: 16).

At the end of the 19th century, the Dutch colonial administration introduced many changes to optimize the efficiency of their administration. Some new offices took over the coordination of special areas of administration, including agriculture and forestry. In the same period, the Ethical Policy, a momentous event in the Dutch colonial history in the archipelago was started and lasted until the occupation of the Japanese in 1942. The policy was based on the critical awareness on the ethical obligation and moral responsibility of the colonial government to return the wealth that the Dutch had received to the people of the East Indies. The policy consisted of three focuses: irrigation, transmigration and education. For agriculture, the new offices and the Ethical Policy had significantly affected the implementation of the colonial policy in the production of cash crops. With the new office of agriculture, the colonial government was able to administer agricultural research, education and extension for cash crops. Large-scale and complex irrigation was established to promote the yields of rice.[92] The office introduced the intercropping system of maize and rice to get a large output of the land. Mobilization of farmers towards cash crops was also conducted by the offices, such as the requirement of each rural household in Sulawesi to grow 50 coconut trees as the influence of the copra price boom (Weber *et al. 2003*: 413- 416) and the instruction to grow candlenut as cash crop and as reforestation trees in the devastated forest at Mount Lompobattang, South Sulawesi by the forestry office (Koji 2000: 13).

For the people in South Sulawesi, the introduction of cash crops by the Dutch colonial government signified the end of centrality of rice and subsistence farming in their agriculture. It was both the attractiveness of prices and the obligation to pay taxes to the colonial government that stimulated farmers shifting to cash crops. Rice cultivation required relatively much time and efforts while its income was relatively small compared with cash crops (Mai 1987: 17).

The massive spread of cash crops cultivation was also made possible by the improved access to land. The emigration of many Bugis and Makassar people due to the Makassar War and the subsequent conflicts provided surplus of land to be operated by those who

[92] In South Sulawesi, the modern irrigation system was initiated in 1930s. It was implemented at the same time with the starting of 'colonization' program (Dutch transmigration program) for the population surplus from Java and Bali. This program was concentrated in the region of Luwu since the region was sparsely populated. The new rural settlements were focusing on irrigated rice production, making use the experience of Javanese and Balinese rice farmers, including the specific knowledge of Balinese on the traditional *subak* irrigation system. Subak is a specific Balinese irrigation system, which is influenced by their cultural and religious norms and practices (Roth 2003).

stayed back home either in terms of ownership or sharecropping (Lineton 1975: 199). The improved access to land also happened due to the decline of the influence and control of the nobilities over lands after the enactment of the Agrarian Law 1870. A large part of the regalia and privileged lands owned by the nobilities was converted to government land. Furthermore, they were also obliged to pay *landrente* to the colonial public treasury. This forced them to maximize income from the land by cultivating cash crops through sharecropping arrangement with farmers (Pelras 2000: 416). The enactment of the Law provided wider access to farmers to claim ownership over land in compare to the previous period. Around 1930s, there had been many farmers who owned rice fields under the *landrejen bezitrecht* (full ownership) (Mustara 1993:53). Further land reform in 1960, when the Indonesian Agrarian Law No. 5 Year 1960 was enacted, can be considered as the ultimate ending of massive land possession by the nobilities. The Law limited individual land ownership up to 10 ha for irrigated land and 20 ha for non-irrigated land. The nobilities were forced to sell their surplus land or to divide it, mainly among family members (Pelras 2000: 417).

Agricultural development in South Sulawesi in the independent state of Indonesia experiences a rapid progress starting from the New Order era since 1968.[93] The green revolution in Indonesia with the introduction of high-producing rice varieties and the construction of irrigation infrastructures was also experienced in South Sulawesi under the *Lappoase* (rice barn) program in the mid 1980s. This program was implemented together with the national government program of *Supra Insus,*[94] which was geared towards the acceleration of rice production in the Indonesian rice production centers (Sawit and Manwan 1991).

The national government has also been very supportive in inducing the development of cash crops in South Sulawesi through the PRPTE (*Peremajaan, Rehabilitasi dan Peningkatan Tanaman Ekspor* or the rehabilitation and improvement of export crops) Program since the beginning of 1980s covering crops such as coffee and cacao (Durand 1995: 323) and also through the public reforestation project (*Proyek Hutan Rakyat*) that introduced the concept of agroforestry in many districts in South Sulawesi (Ruf and Yoddang 2004a: 104). The focus on cash crops production has been also intensified by various provincial government programs, namely the *Triprogram Sulawesi Selatan* (Three Central Programs of South Sulawesi) in the 1980s which consisted of the programs of mind set change, commodity zoning and harvesting-processing-marketing. This program was continued in 1990s through

[93] Through out the 1950s until 1963, South Sulawesi experienced the Darul Islam rebellion and it was the period when the economic development of the province suffered from stagnancy (Makaliwe 1969: 17).

[94] *Supra Insus* or the Special Rice Intensification Program was launched in 1987. It was the extension of the earlier rice intensification programs: *Bimas (Bimbingan Massal* or the Mass Guidance Extension Program - aimed to convert farmers from traditional to modern rice technology by providing them with production credit with a view to increasing both rice production and farm incomes), *Inmas* (*Intensifikasi Massal* or the Mass Intensification Program - a mass guidance program but based on a self financing) and *Insus* (*Intensifikasi Khusus* or Special Intensification - similar with the Bimas Program, farmers were provided with technical advice by field extension workers, who made specific recommendations on fertilizer application and helped in the selection of good quality seeds. Other components of Insus were the formation of farmer groups and synchronized planting) *Supra Insus* consisted of improved strategies of the previous *Insus* Program, especially the provision of KUT (*Kredit Usaha Tani* or the subsidized farm enterprise credit program) and the development of KUD (*Koperasi Unit Desa* or Village Unit Cooperative) (Sawit and Manwan 1991).

the Grateks-2 (*Gerakan Peningkatan Ekspor Dua Kali Lipat or* the Movement to double the Export Capacity) Program. These agricultural commodities oriented programs were later on succeeded by the *Gerbang Emas* (*Gerakan Pembangunan Ekonomi Masyarakat* or the Community Economic Development Movement) Program in 2004, a more comprehensive development program that incorporated a rural development focus into the commodity zoning policy. The *Gerbang Emas* Program was then continued by a new program, *Getar Bangdes* (*Gerakan Terpadu Pembangunan Pedesaan* or the Integrated Movement for Rural Development) Program starting from 2011.

4.3 The Nexus between Social Networks, Business Model and Land Access in the South Sulawesi Commercial Agricultural development

There were many relevant aspects in the background of the introduction of the cash crops as shown in the previous section on the history of introduction and development of cash crops in South Sulawesi. Some crops were introduced purely because of the market opportunity, but some others were introduced for specific purposes, such as mobilization during wartime, poverty alleviation and reforestation purpose. Despite these various backgrounds, the ultimate driver for the further adoption and development of any cash crop was always the market or price. Yet, some scholars who studied the cycles of boom and bust of agricultural commodities in South Sulawesi notice the existence of non-price factors that were determinant in the success of commodity boom in this province. For example, in the case of cacao boom, Ruf (1995: 35) underlines that while price cycles are both the cause and effect of supply cycles, the absence of environmental and institutional factors will cause the rise in price to fail in creating an immediate supply response. In a further elaboration of this statement, Ruf *et al.* (1995: 365) note that 'the Sulawesi cacao boom […] has resulted from the unique combination of physical (alluvial soils and limited dry season), human (Bugis societies) and political environments'.

In order to understand why and how the combination of the non-price factors become preconditions for the success of commodity boom in South Sulawesi, this section will specifically discuss about the nexus of social networks, business model and land access in the development of commercial agriculture in the province.

4.3.1 Social Networks

In this section, I will focus the discussion on social networks on three aspects that have become central features of the Bugis-Makassar networks: kinship, patronage and diaspora. Kinship is a form of social capital, which relates to membership of a group and represents a durable network (Tidey 2012: 17) built upon the familial factor as well as similarity in origin, such as ethnicity and religion (Acciaioli 1987: 5). The traditional kinship system of the people in South Sulawesi is characterized by a hierarchical relationship based on social status and organized through patron-client ties, which represent not only reciprocal relationships but also encompasses a wide gamut of services by which 'protection' is

dispensed to followers and 'loyalty' displayed to leaders and closely tied to the contexts of politics and power (Acciaioli 1989: 169).[95]

The patron-client system among the Bugis and Makassar has experienced a series of transformations influenced by different political contexts: the ancient kingdoms period, the colonial period and the modern Indonesian period. There is a significant decline of the nobility's political and economic roles due to the abolition of their inherited positions in the government, the limitation of their ownership and control over lands and the rise of new elites as new patrons. Yet, until today the system is still dominant in all aspects of social life of the people, whether in the economic or in the ideological fields, among farmers and fishermen, in trade and in navigation, in the countryside and in the cities (Pelras 2000: 400 and 416). The Bugis and Makassar have been known as people who always try to preserve their social hierarchy, ethnic solidarity and ethnicity pride among other cultural heritage, including language, customs, and traditional festivals. These cultural elements are still strongly appreciated regardless of the intensity of modernization, which to a certain extent, brings about a decrease in appreciation for such entities (Said 2004: 14).

The patron-client system had a significant influence in forming the basis of the Bugis and Makassar economy, especially in agriculture. The significant influence is related to the control and ownership of land by the patrons since the period of the kingdoms. Historically, during the period of kingdoms, the commoners only had a limited access to land since most land was owned and controlled by the nobilities and the recognized traditional upper class as a group of patrons. Most access to land for agriculture activities by the commoners was made possible under the patron-client relationship (Acciaioli 1989: 169).[96]

The politics of land were essential in the patron-client system of the Bugis and Makassar kingdoms. Since land was not a scarce resource for the rulers at that time, the wealth of a patron consisted not in his landed estates but in the people under his authority (Lineton 1975: 176). Pelras (2000: 419-420) notes that the patron-client relationship is practiced upon the exchange of wealth and services and there is a link between political power and control over land. In order to ensure his followers would always be ready to follow him and to obey his will, a patron would protect his followers and also ensure the welfare of the followers including by using his landed

[95] The patrons have to protect their followers against violent acts by other overlords or rivals, and misfortune in general. In return to the given protections, the clients render all kinds of services to their patrons in the economic sphere and support him in realizing his political aims. The patron needs this support because the power of all individuals and the legitimacy of social position are constantly being tested by competitors. Failure or success in this relentless contest causes expansion or contraction in the size of the clientele, which finally determines the rise or fall of the patron families (Heersink 1994: 51).

[96] According to Chabot (in this article I refer to the English version of his book, "Vermantschap, Stand en Sexe in Zuid Celebes"), the patronage and clientship in the Bugis and Makassar culture – which he calls as the follower system – encompasses the whole network of relations established between a lord or a master (*karaeng*) and a number of subordinates, which by the *karaeng* are called as "his children" (*anaqna*) or "his men" (*taunna*) While the subordinates are controlled by their superiors, both sides in this relationship need each other.

assets and his agricultural surplus.[97] Under the patron-client system, a patron provides access to lands - which were mostly rice fields (*sawah*) - to his followers either by giving access to operate under the traditional sharecropping arrangement known as *tesseng* or by giving lands as gifts for their loyalty. Another way to engage the followers into the operational use of lands was to summon them to work in the rice fields in return for the provision of meals, which can amount to twenty percent of the harvest value. Many landowners regard the harvest season as an opportunity for charitable deeds and also for gaining influence and popularity.

The control and mobilization of manpower under this dyadic relationship for economic activities have eased the patrons when the Dutch government abolished the slavery system in South Sulawesi in 1860, since they were able to maintain their efficient labor system under the patron-client system (Heersink 1994: 51).[98] Pelras (2000: 416) writes that the noble lords who were the prominent patrons at that time benefited from many unpaid services. They did not have to work their own lands since they can summon their followers for collective work sessions to do the ploughing, planting, harvesting and other agricultural tasks.

The other key component of social networks among the Bugis and Makassar is their diaspora. The diaspora of Bugis and Makassar has been induced by many factors, such as internal wars, Dutch colonial impositions, climate changes, varying demands and patterns of regional and world trade (Lineton, 1975, Acciaioli 1989). Lineton (1975: 174) notes that the movement of people outside South Sulawesi as traders and settlers is reinforced by the ideology of the society, which affords high prestige to those who have travelled across the sea to seek their fortunes.[99] Acciaioli (1989: 31) explains that while the social structure in South Sulawesi is very hierarchical, an upward mobility process is possible through personal achievements. Yet, many are confronted by the economic and social realities of a narrowing 'opportunity structure' in their homeland of South Sulawesi and have to migrate to pursue their individual achievement.

Historically, the migration from South Sulawesi was frequently led by a prince or those with a nobility background. The leader was typically surrounded by a large circle of

[97] Pelras (2000: 37) notes that there were several types of land under their control: *tana arajang* (regalia land – lands which belonged to the kingdom or to the lordship and were leased to farmers), *tana pamasse* (bestowed land – lands that had been conquered in war and the loaned back by the victorious ruler to their original owners at a rent to twenty percent of the harvest), *tana ongko* (privileged land – fallow land or wooded areas under the direct jurisdiction of the ruler. These lands could be cleared with the permission of the ruler who received land rent of ten percent, and their use can be handed down to the descendants of the clearer. However, if the land is let fallow again it would revert to the ruler.), and *tana panganreang* (farming land – usually entrusted to farmers based on a sharecropping agreement). Along with the income from their lands, the rulers also received tax from the farmers under their direct rule. This payment was called *bua tana* (fruit of the land).

[98] Lineton (1975: 192) mentions 1906 as the year when the Dutch abolished the slavery system that affected the control over the slave class (*ata*) by the nobilities. The unofficial dependence of people from this class upon their patrons was gradually faded away after the independence of Indonesia. The dramatic changes in the authority and power of the patrons have reduced their ability to support large numbers of servants and followers.

[99] This ideology is also known as the ethos of enterprise in which individual achievement proves the measure of a person's worth (Acciaioli 1989: 31).

kinsmen and followers as well as slaves (Lineton 1975: 175). In the contemporary migration, the same pattern of migration leadership still exists where the followers are mostly those who share the same kinship relationship (Acciaioli 1987: 5).[100]

In their migration, the Bugis-Makassar utilized the overseas connections they had to open new trade centers and settlements. They went to open formerly unexploited economic niches by clearing new agricultural lands, developing fisheries and establishing new business (Ammarell 2002: 54). There are certain common features of the *rantau* (lands abroad) in which the Bugis settled: they were coastal areas, with easy access by boat: they were fertile and well-watered, eminently suited to the cultivation of coconuts, which became the chief Bugis cash-crop, they were sparsely settled or unpopulated and thus quickly assumed the aspect of purely Bugis districts, in which many of the features of Bugis society in Sulawesi could be recreated (Lineton 1975: 196).[101]

The migration of Bugis-Makassar to Kalimantan, Malay Peninsula, Sumatera, and the eastern islands was a well-organized continuing process for centuries where they clear the available forests for their agricultural activities and settlements (Vayda and Sahur 1985: 93). The migration presents a chain migration model, where the flow was concentrated on newly opened areas – whereby one or more settlers in a new land encourage relatives and friends from their home village to join them and the relationship was maintained in a commercial manner. Only when the available land was already in short supply then the flow stops and moves to other destinations (Ammarell 2002: 60).

The first wave of migrants was focusing on the trade sector in their new settlements, but later on driven by the growing market demand in Europe for various agricultural commodities they began to exploit cash crops (Acciaioli 1989: 31). The cultivation of commercial crops became more intensive when the Suez Canal was officially opened in 1869 and the steam boats were invented which increased the accessibility of Asia from

[100] Acciaioli from his observation on the Bugis migration in Lindu, Central Sulawesi writes that members of these migrant contingents view themselves as sharing common bonds on different bases. For some, ties of kinship are primary as a basis of solidarity, for others common origin in a particular district (*kabupaten*) or sub-district (*kecamatan*) provides a foundation of mutual support. Whereas some may assert a particular ethnic identity as the defining criterion of their group, others owe a shared allegiance to a particular leader. The unity of groups at this sub-ethnic level of contingents is evident not only in the organization of migration itself, but also in the subsequent structure of neighborhoods in the village. The claims and activities of members of these different contingents are informed by the ideology of *bangsa*, as members proclaim their identities as *To Wajo', To Sidrap, To Bone* and others (Acciaioli 1987: 5).

[101] The last mentioned feature suggests the unique characteristic of Bugis-Makassar migrants who always live in self-government colonies and very depend on their patron-client system in expanding their colony size. Ammarell writes that the Bugis migrants moved and settled in groups, initially made up of members of the same kin group and later attracted entourages which include non-kin, usually from the same ancestral area of South Sulawesi, as well as local people who were incorporated into patron-client and other vertical relationship. Their ability to self-govern was made possible because the first waves of migrants were usually led by individuals from the nobility group who gained respects and in many cases engaged in matrimonial alliances with the local rulers in their new settlements and finally received autonomous rights including the right of settlements and other special concessions. Thus, the Bugis-Makassar migrants were able to organize themselves in a manner that similar with the structure they have in their homeland (Ammarell 2002: 52 and 56).

Europe thus also increased demand in Europe for tropical agricultural commodities (Ammarell 2002: 57). Many Bugis-Makassar migrants were engaged in growing export crops in pursue of this opportunity, especially rubber and coconut and not in subsistence agricultural production as in South Sulawesi (Lineton 1975: 180).[102]

Many of the migrants achieved success and promoted their social status with their wealth by recruiting followers, marrying women from higher class, and making a pilgrimage to Mecca (Lineton 1975: 195). Their return to South Sulawesi in the early 20th centuries diversified the old structure of patron by forming new classes of patron through their wealth, their alliances with modernist organizations, especially the religious organization such as *Muhamadiyah,*[103] and their access to the politics and the new form of bureaucracy to challenge the outdated aristocracy based patronage system (Pelras 2000: 417).[104]

The wide spread of Bugis-Makassar diaspora in the Indonesian archipelago and also in the neighboring countries, such as Singapore and Malaysia has provided them with an extensive web of social, political and economic networks. Many of them utilized this extensive web, especially their vast network of trade as well as knowledge and information in exploring new opportunities in their homeland in South Sulawesi and also in other places. Through the migrants, people in South Sulawesi have access to information on cash crops market trends, such as cacao where the first information and planting materials were accessed through the diaspora in Malaysia in the early 1960s (Ruf and Yoddang 1998: 227).[105] Some parts of the access to technology materials, notably the plant materials and agriculture chemicals, as well as the product market were conducted through illegal trading or smuggling activities – an activity that has been conducted by the Bugis traders for centuries (Lineton 1975: 197).

[102] In their new settlements, the Bugis-Makassar migrants billed themselves as the bringers of progress by playing role as pioneers in their new settlements. They are recognized as the ones who introduced sawah technique along with the traditional irrigation system and the commercialization of the produce in many locations where they migrated (Weber et al. 2003: 414). The migrants were also the ones who first cultivated various types of cash crops or commodities, such as pepper (Vayda and Sahur 1985), coconut (Lineton 1975, Weber et al. 2003), cacao (Ruf 1998, Burkard 2007, Li 2010) and shrimp (Vayda and Sahur 1996); and made use commercially the available commodities in their new places, such as timber (Vayda and Sahur 1985) and fresh water fish (Acciaioli 1989, 1998).

[103] Since the opening of its first branch in the provincial capital Makassar in 1926, Muhammadiyah's decisive anti-aristocratic tone and its message of upward social mobility based on merit and personal achievements made the organization an ideal vehicle for these new-wealth elites to seek more influence in the rigidly structured society of South Sulawesi (Buehler 2014: 167).

[104] In that period of time, new elites were produced by the successful migration, the booming of cash crops in South Sulawesi, the 1870 land reform and the diminishing of aristocrat's influence and role in administration. The aristocrats have to compete with commoner members of the new elites, both the political elite, comprising military men and graduates and the economic elite. For becoming patrons, their high birth was no longer enough. They have to compete with the new elites who present new attitude that put more stress on personal abilities, instruction and spirit of enterprise (Pelras 2000: 417).

[105] The early history of cacao introduction in South Sulawesi is linked to the history of *Darul Islam* rebellion (DI/TII or *Darul Islam/Tentara Islam Indonesia*) in the province from 1950s to 1960s. The leaders of this separatist movement viewed cacao as a means of funding their operations. They sent a handful of their men to Sabah, Malaysia to learn about cacao plantation and supplied planting materials from there (Ruf 1995: 28, Ruf and Yoddang 1998: 227).

The Bugis and Makassar make use of their diaspora to establish and control the trading networks through their control over almost all parts of the value chain of commodities they are involve in. For example in the cacao sector besides becoming the farmers, they also play role as the collectors and middlemen (Ruf and Yoddang 1998: 228).[106] The network also provides them with an efficient link of food crops supply and cash crops development that becomes their competitive advantage in overcoming their subsistence needs in the maximization of their land use for cash crops development either in South Sulawesi or in their migration places (Burkard 2007 and Li 2010).

At the present time, the diaspora networks have been facilitated in an official association called KKSS (*Kerukunan Keluarga Sulawesi Selatan* / the South Sulawesi Family Association), an ethnic and regionalist organization for diaspora groups from South Sulawesi. It was established in Jakarta in 1976 and has several overseas branches, including in Australia, Malaysia, Saudi Arabia and East Timor indicating the vast distribution of Bugis-Makassar diaspora. The claimed population of its member was 14 million members, which was considered to be exaggerated but can be understood due to the flexibility in the conditions for membership. KKSS leaders claim all those born in South Sulawesi as 'members'. The members consist of a remarkable range of social classes, from the smelly fishers' villages to the national corridor of power. The cross-class ties of patronage are an important sub-theme in the discourse of KKSS leaders. Influential members are expected to help out their social inferiors, and to instruct them in civility (Van Klinken 2008: 11 and 40).

Since its establishment, KKSS has been playing a key role in building and exploiting primordial solidarity for the benefits of both the elites and the ordinary members. For the elites, KKSS provides them with a significant number of members that they can rely as a base of voters and financial resources in their political activities, both in the regions where the South Sulawesi migrants are numerous as well as in the political competition at the national level (Van Klinken 2008).[107]

On the other hand, KKSS also serves as an elite lobbying facility for the members, where they can reach the elites to seek their attention by using their primordial sentiment. As both the homeland and many of the locations of the diaspora - which are located in the outer islands of Indonesia - characterized by conditions that resemble what Schulte Nordholt and Van Klinken suggest as typically less urbanized, less industrialized, and dependency on state subsidies (Schulte Nordholt and Van Klinken 2007 as cited in Van Klinken 2008: 38), a lobbying facility such as KKSS is very important in drawing the attention of the central government elites, notably those with a South Sulawesi background. KKSS facilitates the voices of the members when they ask for privilege treatments from the elites in Jakarta for a development budget allocation to their regions

[106] According to Ruf and Yoddang (1998: 228), the difference between collectors and middlemen is defined by two main criteria. Who does the operator sell to and where does he obtain his capital? A middleman usually sells his cacao to an exporter and uses his own capital and sometimes some of the exporter's capital. A collector sells to a middleman and usually receives capital from the latter. This generally means that a collector handles smaller tonnage than a middleman.

[107] For example, Jusuf Kalla, a senior politician from South Sulawesi and a two times Indonesian vice president, has been explicit in admitting on how he owed his winning to the organization (Aditjondro 2006, Van Klinken 2008).

as well as special treatments in accessing government projects. One important event of KKSS for this lobbying purpose is the annual Bugis-Makasar Traders Meeting (*Pertemuan Saudagar Bugis-Makassar*), which has been held in Makassar since 1998. This event facilitates the networking of Bugis entrepreneurs, academics, politicians and bureaucrats from all over Indonesia and even overseas. Many strategic recommendations were issued from this event with specific focus to increase government's attention to the development in South Sulawesi and the less developed regions where the members of KKSS can take part in the process. The event routinely recommends the government to invest in new projects such as building roads, setting up a new airline route or a shipping line, or domestic tourism and also asks for the spinning off state-owned companies' projects to local business (Van Klinken 2008: 50).

Aside from the KKSS, the lobbies for special attentions are also done through the Bugis-Makassar networks in the political parties, notably in the three ruling parties: *Golongan Karya, Partai Demokrasi Indonesia Perjuangan* and *Partai Demokrat*.[108] Since the period of the New Order (1968-1998) until the present time, South Sulawesi has been a strategic stronghold for *Golongan Karya* Party (*Golkar*). While it has lost its national domination since 1999, but *Golkar* remains the most organized party in South Sulawesi. The rise of *Golkar* politicians with South Sulawesi background to the apex of the national political arena, notably when B. J. Habibie became the president replacing Soeharto and Jusuf Kalla became the vice president of Soesilo Bambang Yoedhoyono, has helped to maintain *Golkar*'s dominant influence among the voters in South Sulawesi as well as in the regions where the diaspora is prominent. People in South Sulawesi tend to associate the periods of Habibie's and Kalla's terms in office with the rapid development enjoyed by the province, such as the new and impressive international Sultan Hasanuddin Airport, the north-south highway that connects Pare-Pare all the way south to Bulukumba, the construction of new power plants. Yet, many of these new projects fell into the hands of those who have personal or political closeness with the two (Aditjondro 2006: 11-12, Noor 2010:18). The connection to the key national figures, such as Habibie and Kalla has also been used to promote the career of some elites from South Sulawesi to the national political and bureaucracy arena through Habibie's and Kalla's interventions in their appointments. This primordial based favoritism has resulted in the wide criticisms against the two leaders. Furthermore, those indicated to benefit from such favoritism are frequently associated with the infamous term 'All Makassar Men' (*Semua dari Makassar*) indicating their achieved positions as the results of ethnic nepotism.[109]

[108] *Golongan Karya* was the ruling party in Indonesia during the New Order period, effectively from the national elections in 1971 to 1999. After the fall of Soeharto, who was the senior patron of *Golongan Karya*, its dominant position was replaced by Partai Demokrasi Indonesia Perjuangan (PDIP) in 1999-2004. In the 2004 election, a newly established political party, *Partai Demokrat*, replaced the position of PDIP as the ruling party for 2 consecutive elections under the patronage of Soesilo Bambang Yoedhoyono who served as the Indonesian president from 2004-2014. In the 2014 election, PDIP won the election but only 20% of the total votes. For *Golkar*, while it never wins the national election again since 2009, the party still exercises a strong influence over the ruling administration through its political coalition strategy in the parliament and its effective domination over the majority of sub-national governments (provincial and regional) leaderships.

[109] Source: Jangan Lupa JK Dipecat Gusdur Karena KKN (http://pemilu.sindonews.com/read/872752/113/jangan-lupa-jk-dipecat-gus-dur-karena-kkn - accessed on 12 August 2014).

The importance of political parties in facilitating lobbies to smooth the development process in the province as well as to ease the way of certain elites in accessing positions and power has also encouraged the flexibility of the people in following new patrons and establishing new networking with the other ruling parties aside from *Golkar*. This was reflected by the increase of support to PDIP and *Partai Demokrat* during Megawati's and Soesilo Bambang Yoedhoyono's presidential years respectively. Following the victory of these parties in the national elections, some South Sulawesi elites, notably the politicians and the businessmen migrated from *Golkar* to these parties to pursue positions within the parties as well as to gain political supports to compete in the local elections. Those who migrated are usually the former *Golkar* elites who failed in the internal party competition (Buehler 2007: 138). Meanwhile, small parties are less attractive and received less support from the people despite the possible religious or ideological sentiment factors, mainly because of the consideration that the mainstream parties are more powerful, thus the supported politicians – if elected to the office at the regional and national level – would be able to bring more economic and infrastructural development to the province (Noor 2010: 24).

In terms of agricultural development, the connections to the national policy makers through the Bugis-Makassar diaspora networking have resulted in a list of strategic projects and policies that either help to promote or address problems faced by the strategic agricultural commodities in South Sulawesi. An example is the launching of *Gernas Kakao* Program (*Gerakan Nasional Rehabilitasi Tanaman Kakao* or the Cacao Rehabilitation National Movement) in 2008, which was credited to the support of Jusuf Kalla in assisting Indonesian cacao farmers – mainly in Sulawesi – to address the decreased productivity of their cacao trees.[110] Some lobbies were also conducted to sustain the 'hands-off' approach of government on certain key commodities, such as cacao to avoid destructive marketing intervention and excessive taxation by the government.[111]

4.3.2 Business Model

The agriculture in South Sulawesi has a specific characteristic of a dominant role of smallholders. Except for the state-owned plantations (the sugar plantations owned by PT Perkebunan Nusantara XIV in Takalar and Bone), big scale private oil palm plantations in Mamuju and North Mamuju districts which are now parts of West Sulawesi, the private rubber plantation (PT London Sumatra) in Bulukumba District and several other private plantations, most of the cash crops production are in the hands of the smallholders. This is different from the situation of farmers in

[110] Source: Petani Sulbar, Mendukung Jusuf Kalla dan Jokowi (http://www.nefosnews.com/post/pemilu-2014/petani-sulbar-mendukung-jusuf-kalla-dan-jokowi - accessed on 20 August 2014).

[111] Historically, South Sulawesi cacao has been one important commodity that benefits most from the hands-off policy. According to Akiyama and Nishio (1997: 106), the South Sulawesi cacao sector enjoyed a high margin of profit during the boom years in the 90s due to this policy. Apart from the imposition on 1 April 1995 of a value added tax (VAT), until now the marketing and distribution of cacao has been relatively free of government intervention. There is no marketing board, no direct involvement by BULOG (the national food logistic agency) in marketing or importing, and none of the price controls, export quotas or exclusive trade licensing requirements that affect a wide range of agricultural commodities in Indonesia. This has contributed to efficient marketing systems for cacao, with low marketing costs. It has been proven that some government interventions during the cacao crisis, such as imposing export tax on the raw cacao beans in 2005, at the end only exacerbate problems in this sector instead of alleviating them (Ruf 1995: 47, Nielson 2007: 244).

Java who are mostly labors in the cash crop plantations. Here, the type of cash crops cultivated becomes an important determinant. Different from the cash crops cultivated in Java, such as tea and sugarcane that require immediate industrial processing due to their perishable nature, the crops cultivated in South Sulawesi, such as cacao, coffee and coconut, can be processed by the farmers themselves before being delivered to the industry either locally or overseas, hence it is not necessary for both the industry and farmers of these commodities to be integrated in one vertical production system. Furthermore, in the history of cash crop development, the estate (big plantation) activities were mainly concentrated in Java and North Sumatera where the companies monopolized the available land and were reluctant to engage the smallholders (Booth 2001: 300).

During the Dutch period, the penetration of the plantation sector (owned by western companies) into Eastern Indonesia was not significant. The role of plantations, in comparison with Java and Sumatra remained of minor importance. In 1940 there were no more than thirty four European agricultural enterprises in this region. In Eastern Indonesia cash crop production was almost completely dominated by local smallholders. South Sulawesi smallholders were very competitive against the 'rationalized' and capital intensive plantations during the late colonial period despite the legal and moral support which the colonial government gave to the plantation sector (Heersink 1995: 11).

After the independence of Indonesia, the government's policies to nationalize Dutch's plantations under the management of the government estate companies (PTPNs) and to encourage the application of contract farming by private estates, have led to the continuation of big estates dominant role in the cash crops production in Java and Sumatra. Meanwhile in South Sulawesi, where the existence of colonial estates was limited, the role of PTPNs and private estates became less significant compared to the role of smallholders in the cash crops production. Many crops, in which the production is concentrated on PTPNs or big private estates in Java and Sumatra, are produced by smallholders in South Sulawesi. For example, cacao, which is dominantly produced by PTPNs in North Sumatra and East Java, is cultivated entirely by smallholders in South Sulawesi (Nielson 2007: 234).

As smallholder is defined as a producer who relies primarily on family labor (Baumann 2000: 8), most labor on family smallholdings in South Sulawesi are naturally provided by the family members. It is usually supplemented by a limited amount of labor from outside, but often from the extended family (nephews, cousins, *etc.*) (Ruf *et al.* 1995: 350). The smallholders in South Sulawesi are also associated with the ownership of a small plot of lands In 1969 around 57% of the smallholders owned holdings of less than a half-hectares for rice fields. The percentage of smallholders who owned land was approximately 60 percent and the rest were share tenants (Makaliwe 1969: 18). While for the size of gardens for the perennial trees, the average size was two hectares per family (Ruf and Yoddang 1999: 5). These figures are still relatively the same at the present time according the 2012 statistical data (BPS Sulawesi Selatan 2012).[112]

[112] The dominant notion of smallholdings still remains that the competitiveness of smallholdings is mostly due to low consumption of inputs, especially the low or non-existent labor costs. However, these advantages are commonly also paired with a conception that smallholding yields are low in compare to the big plantations, which are considered to achieve a very high yield due to large consumption of inputs and modern technology (Ruf *et al.* 1995: 347).

The South Sulawesi smallholders are still characterized by their dominant reliance on the traditional social networks and the informal economic arrangements despite the adoption of modern agrarian arrangements, such as contract farming is now flourishing in South Sulawesi along with the process of agricultural industrialization. The influence of the traditional arrangement in the cash crops development in South Sulawesi can be traced since the process of introduction of the cash crops, both the information and materials. While many of the cash crops introductions were initiated by the government, through projects, it is suggested that the role of the projects was not different in South Sulawesi than in the other provinces. Francois Ruf in his study on the success of cacao boom argues that pre-conditions are needed for the successful introduction uptake. In South Sulawesi, the information and plant material of successful crops were often already in place before the official introduction by the government. They were supplied and disseminated through the effective pre-existing informal, local and traditional channels of the Bugis-Makassar network. Subsequent information provided by government and its extension services is only effective when there is a pre-existing base of information and plant material (Ruf 1995: 28-29).

The Bugis-Makassar smallholders who are involved in the cash crops production did not start 'from scratch' but from a base of knowledge and capability built up from their previous engagement in the other agricultural activities, especially rice production, and might also have gained other previous cash crop experiences (Ruf 1995: 40).
The cash crops smallholders in South Sulawesi have also benefited from the decades of the Green Revolution period in South Sulawesi by making use of the subsidies for rice inputs, especially fertilizers. Part of these subsidies were diverted to cash crops, such as cacao.[113] This was an indirect, unexpected effect of the food security policy and of the Green Revolution. Furthermore, most of the capital invested in the cash crop cultivation was taken from the surplus of the rice income (Ruf 2004: 248-249).

With regard to the marketing of the cash crops, the Sulawesi marketing channel or the 'Bugis System' is considered to be extremely competitive and efficient. Many of the cash crops are traded in a marketing channel, which is occupied by the Bugis traders who fill the niche between the growers and the exporter. The assumption of the role of the middleman by people of the same ethnic group as the growers is no doubt one of the reasons for the speed of many successful commodity booms. Furthermore, for certain commodities, such as cacao, the marketing sector is extremely effective, as the grower seems to receive between 80% and 90% of the export FOB (Freight on Board) price due to the high competition between the traders and the transparency of market prices (Ruf and Yoddang 1998: 234, Ruf and Yoddang 1999: 1-2).[114]

[113] During the Green Revolution years in South Sulawesi, the government subsidized the agricultural inputs for rice cultivation, especially the fertilizers to help the rice smallholders to boost their production. However, many cacao smallholders use these subsidized inputs on their trees. In 1994, the government removed almost completely the subsidies on TSP and KCL fertilizers and maintained the subsidy on urea only. This decision then doubled the costs of TSP and KCL (Ruf et al. 1995: 346). However, the relatively high cacao prices in rupiah due to the currency depreciation has increased the affordability of inputs such as fertilizers and herbicides (Ruf 2004: 237).

[114] Ruf and Yoddang describe the high competition by arguing that any price change in New York is usually transferred to the producer within 24 to 72 hours. This was already the case in 1990 when a middleman tried to reduce the price, he was forced to come back to the market price the day after, otherwise he would lose his market share. This was even more true in 1997, when the transference of price changes being closer to 24 hours (Ruf and Yoddang 1999: 1-2).

There have been some disputes on the real effectiveness of this traditional marketing channel. Nielsen (2007: 237) critically argues that the claim that the marketing system is highly competitive and efficient still needs further verification. Based on his empirical work, he points out that the price received by cacao farmers varies considerably among individuals in a particular area, and across different villages, and apparently correlates with the level of dependence on money-lending village collectors, widely referred to as *tengkulak.* While not denying the advantages of the informal financial services by the *tengkulak,* Nielsen notes the importance to recognize the shortcomings of *tengkulak-dominated* supply chains. In particular, the interlocked markets can nullify the effects of competition on prices at the farm level. While numerous village collectors may be actively buying cacao in a particular village, individual farmers are not necessarily free to sell their produce wherever they please, because of prior loans. This effect on competition brings into question a common claim made about the intense competition that exists among buyers at the grower level within the Sulawesi cacao chain. He suggests that the price information used in many analyses may have relied on prices paid at relatively accessible sites, where the

Figure 4.2. A pepper garden in the opened forest for transmigration area in Mahalona, East Luwu (Photo: Henky Widjaja, 2011)

level of dependence on *tengkulak* is lower than in more remote farming locations. As a result, the actual share of the export price received by farmers may be considerably lower than the 80-90% quoted above.

Another important characteristic of the Bugis-Makassar smallholders' advantages is their informal agricultural credit system. Different from many large plantations in Indonesia which have benefited from the subsidized plantation credit programs (Ruf *et al.* 1995: 349), the smallholders in South Sulawesi have a strong reliance on their traditional credit system since the formal rural credit system has not yet worked effectively. One of the most commonly adopted traditional credit system is the pledging or *gadai* system. The principle of *gadai* is simple, a plantation or producing trees are pledged in exchange for a cash loan. *Gadai* is commonly opted if there is a lack of labor and a need for fresh capital. The smallholders either pledge their plantation or their rice fields to obtain credit. The pledge is made for one to three years and the return of the plantation is then accompanied by loan repayment. *Gadai* is often extended with priority given to family members. The amount of cash involved in the *gadai* transaction depends on the estimated yield of the farm plot and on the current cash crop price. In practice, *gadai* also functions as an 'investment multiplier', by pledging the smallholders can earn capital to migrate or to buy more lands for their cash crops expansion. *Gadai,* therefore, is one of the institutional factors, which has a multiplier effect of expanding the number of newcomers (and new areas) to cash crop development. Supported by a reliable system, such as *gadai,* cash crops cultivation such as cacao has allowed rural families to attain previously unthinkable goals, such as fulfilling their dream to pilgrimage to Mecca. The ability to realize lifelong desires through cacao cropping acts as a further catalyst in inducing new waves of migrations (Ruf *et al.* 1995: 361, Ruf and Yoddang 1999: 5-6).[115]

The other popular credit system is *tesseng* or sharecropping. *Tesseng* is commonly applied to address the lack of labor problem. The common arrangement is that three fourth of the output goes to the owner, one fourth to the worker, and fertilizer and pesticide costs are covered by the owner (Ruf and Yoddang 1999: 5-6). *Tesseng* is favorable for both the land owner and the sharecropper because if the sharing rate is maintained, then the share-cropping contract is neutral with regard to the unexpected and sudden price changes. This protection against risks is precisely one of the reasons behind share cropping arrangements. Even if the proportion gained by the sharecropper seems low (between one

[115] Critics have also been addressed to the *gadai* system, especially on the applied high rate of interest, which can be up to 80%. The money lender can be very exploitative in determining the applied interest rate and pressing the farm gate price paid to the smallholders who need cash urgently especially in the locations far from market access (Nielsen 2007: 347). In supporting this system, Ruf *et al.* (1995: 360) argue that despite its high rate of interest, the system is considered to be proper in adhering to the Muslim faith's rules of 'interest-free' lending since it incorporates 'the compensation of labor for the maintenance of the plantation during the *gadai* period' in the interest payment. They claim that the relatively high interest rates incorporated in the credit system may be justified in terms of the valuable loan services rendered since the cash loan can be obtained instantly in the village and in a single evening. The terms of payment are also flexible. If the lender does not have funds available, he can easily extend the contract another year. Such a system imposes practically zero transaction costs and risks for both parties. In summary, *gadai* is a mechanism for turning fixed assets such as land into very liquid assets instantaneously in the absence of access to institutional credit.

sixth and one fourth) if the price of the cash crop increases by 400%, and as fertilizers and pesticides have to be bought by the owner, the revenue also increases by close to 400% (Ruf and Yoddang 1999: 16).

These two informal agriculture credit systems become the advantages of the Bugis-Makassar smallholders, especially when these systems are applied in their migration places. These systems are not recognized or still underdeveloped among the local population in their migration sites, for example among the local groups in Central Sulawesi who only apply the sharecropping arrangement in the case of wet rice fields (*bapetak*) but never in the tree crops production. In the tree crop production on the leased land, it is the tenant who fully covers the input costs. This is very different from the sharecropping of cash crops plantations among the Bugis, in which input costs as well as later the profit, are divided equally between the landowner and the tenant. Furthermore, they also have a buyback arrangement between owner and tenant. In case when the trees have begun to show yield potential but the tenant suddenly needs money for some urgent purpose, he may ask the owner to buy some of the trees back from him. The underdevelopment of these arrangements among the local people makes them very vulnerable towards investment risks and limits them to consolidate capitals and expand their investments (Burkard 2007: 9; Vayda and Sahur 1996: 18).

4.3.3 Land Access

Access to land plays a key role in a crop boom. As long as land is available, price increases always lead to a strong supply response as the copying effect taken place (Ruf and Yoddang 1999: 2). There are three types of land that are usually exploited when a crop boom exists: forest land, grassland and farmland. The exploitation of these three types of land involve either land conversion or crop conversion.

Derek Hall (2011a: 840) in his description on the characteristics of crop booms points out that the boom crop production usually takes place on frontiers. Ruf and Yoddang (1999: 16) note that if a commodity price increases, and if there is still forest land available, migrations will accelerate at the expense of tropical forests. This characteristic is confirmed in the frontier history of Bugis-Makassar crop booms, such as pepper (Vayda and Sahur 1985), coconut (Lineton 1975, Weber *et al. 2003*), and cacao (Ruf 1998; Burkard 2007, Li 2010) that exist either in their home land as well as in their diaspora places.
In South Sulawesi, the first migrations to the frontier areas were mainly the result of migrants' search for the free land. Such as the opening of forests in the Luwu region by the Torajan migrants in the 1950s, which was known as the *Lebensraum* (a German term for in search of land) movement (Roth 2003: 7). The other migration program which is essential in the acceleration of the frontier movement is the transmigration program that has started since the colonial years and still continues until now. The transmigration program does not only benefit the migrants from outside of Sulawesi but also the local migrants from South Sulawesi in terms of creating access to land. In addition to that, sometime the transmigration program also plays a substantial role in supplying labor for Bugis plantations around the transmigration locations (Ruf *et al.* 1995: 364). Meanwhile, logging

companies also frequently play a role in accelerating migration since they bring workers into a new forest region and facilitate their travel along forest tracks built for logging (Ruf 1995: 14).

Forest opening is favorable by smallholders because a forest possesses biological capital that offers 'natural environment' rents through its ecological setting, which from an agronomical point of view greatly facilitates planting and growing most tropical crops. This natural rent is known as 'forest rent' which is the difference in production costs between a ton of cash crop harvest grown on a plantation cleared after a forest area has been cleared and a ton of cash crop harvest grown on replanted fallow land or on land where an earlier plantation has been cleared. The cost differences are directly related to ecological changes or reduced agronomic benefits provided by the forest and by a long fallow. When a farmer no longer benefits from forest rent, he faces additional labor, possible declining yields, and for trees, slower growth (Ruf and Lancon 2004: 25).

The forest area is also attractive because the land costs 35-75 percent less there than it does in the plains due to the difficult road access. This lower price attracts poor migrants, who sometimes have just enough money for the trip and no more.[116] However, the land price will increase immediately once the crop boom starts and when the location is populated by migrants looking for arable land (Ruf and Yoddang 2004c: 176-178).
One crucial factor that contributes to the low price of forest land is the factor of forest land tenure uncertainty. The uncertainties about forest ownership have encouraged some well-connected farmers and civil servant to clear the forest and then sell it to new migrants. The latter do not dare to buy forest and prefer to buy cleared land (Ruf 2004: 250) (See Box 5.1 Forest Land and Imported Labor in East Luwu Pepper Boom as an illustration of the impact of crop boom on forest opening). There were also cases where the migrants just simply ignore the official tenure issue when they open forest and plant their cash crops. This is because most of the migrants are more interested in making money than becoming settled and established in the area (Durand 1995: 324).
This behavior can be seen, for example, in the case of Bugis migrants in Loa Janan, East Kalimantan for whom the absence of secure tenure was not an important issue to deter them from planting pepper in the forest as long as they were allowed to use the land since they were only planning to use the frontier land impermanently (Vayda and Sahur 1985: 102).[117] The unimportance of secure tenure, such as land title, can also occur if those who open the forest are the members of the local community. This has been observed in the case of coffee agroforestry in Sinjai by Ruf and Yoddang (2004a: 110) where the local

[116] Despite the land price in the forest area is relatively cheap, many migrants still find that the forest opening and land preparation as costly, especially the labor cost. When the migrants have limited labor capital to invest in the forest land, they will apply the bagi tanah or land sharing arrangement. In this arrangement they will hire co-worker(s) in preparing the forest land for their plantation and later on will share the plantation ownership with the co-worker(s) This arrangement provides a solution in addressing the high labor cost without requiring any cash exchange (Ruf et al. 1995: 350).

[117] However, usually when the migrants are forced to leave their gardens in the forest area, they will ask for compensation of their planted trees. This is the same thing that has been observed in many research on land use in the forest areas, such as the research by Myrna Safitri (2010: 214) in Langkawana, Lampung where she notes that the cultivators in the forest in realizing that they encroach the state forest will ask for compensation payment for their trees instead for their lands.

farmers considered the absence of land title was not a problem for them in using forest area since there were few land conflicts among them.
However, the ignorance or the flexibility of the Bugis-Makassar farmers on the official tenure rights also has its own limit. In the areas where the risk of horizontal conflict is high, such as in Papua where the indigenous Papuans are culturally deeply attached to their land and regard land as their sovereignty,[118] the Bugis farmers, who make up a large population of migrant groups in Papua, are rarely involved in commodity crops farming and prefer to live in towns and specialize in non-farm activities (Durand 1995: 334).

Regarding the exploitation of the forest for cash crops development, Ruf and Lancon (2004: 3) note that farmers in the forest areas will optimize the opening of the forest and the use of the available forest rent until maximum, and when forest is no longer available, farmers will shift to several alternatives, such recovering the depleted forest capital through practices such as tree planting and improving land and water management or looking for other alternatives.

The attractiveness of the forest area in terms of its 'forest rent' can be overcome by the grasslands located in the plain area due to the factors of 'plains rent' and 'location rent'. In many parts of Sulawesi, where alluvial soil in the plains is comparable with the 'forest rent', the advantages of the latter can be neglected, especially for farmers with sufficient resources to buy fertilizers and herbicides. With high soil fertility and easy access to the plains and also the complexity of forest policies, farmers prefer to plant on grassland in the plains rather than on forest lands in the hills. The remoteness and difficult access to some parts of forest, especially locations that are far in the hills and on difficult slopes, have made the forest rent less attractive. In this context, the 'plains rent' and 'location rent' strongly substitute the 'forest rent' (Ruf *et al.* 1995: 367, Ruf and Lancon 2004: 29, Ruf and Yoddang 2004d: 202)

The use of grassland which is typically covered by *alang-alang* (*Imperate Cylindrica*) has become a choice for the cash crop farmers in South Sulawesi due to the improvements of technology, especially the adoption of fertilizers, pesticides, and herbicides, from the previous traditional slash and burn technique. In Sulawesi, the access to agricultural chemicals, such as pesticides and herbicides has been made easy by the smuggling of these chemicals from Malaysia by the Bugis traders (Ruf 2004: 257). In addition to the agricultural chemicals, farmers have learned a new generation of integrated pest management tools as an alternative to the use of chemicals in clearing *alang-alang* (Ruf and Lancon 2004: 29). The integrated pest management introduces the application of *gamal* tree (*gliricidia sepium*) to control the spread of *alang-alang. Gamal* has been adopted since 1980s in Sulawesi which was also brought from Malaysia and is used

[118] While, in general the indigenous Papuans are willing to hand over plots to the migrants (sometimes they ask for nothing in return) but they usually continue to retain the land ownership because they rarely sell their land. This is because the Papuans are culturally deeply attached to their land (Durand 1995: 334). After the issuance of the Special Autonomy status to Papua in 2001, many land reclaiming by the indigenous Papua happened causing various land conflicts with the migrant groups. Consequently, aside from settlers living in the official transmigration areas, few non-Papuans have taken up farming activities.

4.1 - Forest Land and Imported Labor in East Luwu Pepper Boom

In September 2011, I visited PT Vale in Sorowako, East Luwu District to learn about their experience in the application of jatropha curcas in their land rehabilitation project. Aside from visiting the jatropha sites, I also used my visit to observe the on-going pepper boom at that time in East Luwu. The current price of pepper at that time was ranging between Rp. 60,000 to Rp. 80,000 per kg. I visited Towuti Sub-district, the center of pepper booming in Sorowako and East Luwu. I was taken by Idham Kurniawan, the staff of the Community Development Department of PT Vale to meet some local central figures in the pepper boom: Rudi, a director of local youth NGO KOPI (Komunitas Pemuda Towuti), H. Mustafa (former village head of Tokalimbo and known as a senior mentor of pepper farmers in Towuti), Firman (pepper farmer), and H. Larade (village head of Langkea Raya) Together with them, I had a trip to visit a pepper garden (two hectare) of H. Mustafa in Maholona Village, a newly established transmigration village at the border between East Luwu of South Sulawesi and Morowali of Central Sulawesi.

From the explanation of H. Mustafa, I learned that pepper has been cultivated in Towuti for many decades but the scale was never as big as that year. The cultivation was almost free from government support. Only recently government started to give attention to pepper by distributing seeds. But according to him, the support has little use because the recommended technique is left behind the current technique of farmers in Towuti. He says, 'We learn from our experiences, and we know better than government. Pepper farmers in Towuti have developed a new technique, which can ensure shorter period for production. The government technique requires 5 years before the vines can produce, while ours only needs 17 months. This is because they use seeds while we use stem cuttings from our selected variety.'

According to him, the seedlings from stem cuttings are provided for free to farmers in Towuti: 'We share the stem cuttings for free among us. But farmers from outside will have to buy.' The advantage of Towuti in pepper cultivation has made them to be the location of learning by the other sub-districts in East Luwu. Idham said that PT INCO facilitated visit from Wasuponda to Towuti to learn the pepper cultivation technique.

There was no exact number of total areas of pepper garden in Towuti. 'The number is increasing every day because we have new plots opened every day due to the increasing interest of farmers to invest in this commodity', said H. Larada. Not only farmers, many outsiders also shown their interest in pepper, including employees of PT INCO. Many employees use the company's investment loan facility to buy land and invest in pepper venture. However, they mostly select Towuti as their investment location because they believe that the local agro-climate and soil are suitable for the crop. Anecdotally, they call the investment as their second pension fund.

According to H. Mustafa, investors from Makassar also come to Towuti to join the boom. This creates opportunity to local farmers to offer cooperation with them. 'We offer them cooperation to plant and maintain their pepper vines until they start to produce. They only need to buy land, and we will take care the rest, including the seedlings, ironwood poles, and plant maintenance. The offer is to plant 500 vines and we guarantee in short period, approximately around 1.5 years we

will hand over the garden to the investor. The price is Rp. 80 million per hectare', he said. He told me that he had one investor, a university lecturer from Makassar, who had invested and will get his pepper plot ready by the middle of next year.

The high demand for land due to the pepper fever had encouraged farmers to open forest in their areas. On our trip to Mahalona Village, I saw new plots opened. The plots were cleared by burning the forest. When I asked about the status of the forest, they told me that the status is forest for other purposes (hutan penggunaan lainnya or HPL) and legal for land clearing as long as approved by the village authorities. After converted to pepper plots, the lands will get village certification (surat keterangan tanah or SKT) from the village head. The price of SKT lands is between Rp. 10 million to Rp. 45 million depending on the location.

Farmers also can upgrade their land status by applying for sertifikat hak milik. Government's land certification program such as Prona (Proyek Operasi Nasional Agraria or the National Land Certification Program) allows them to process the land certification in a collective way for Rp. 500,000 per certificate.

In pepper production, two major cost items are pepper poles and labor. Pepper poles are made from ironwood (locally known as kaloju wood) The price is Rp. 15,000 per pole of 3 meter length. The high demand for ironwood poles has also caused the increase of ironwood cuttings. However, different from illegal logging, the ironwood cuttings for pepper poles are considered legal. I saw trucks transporting ironwood poles without being stopped by police. 'Ironwood poles are legal because their size makes them impossible to be used for other purposes than for pepper planting', said Rudi when I asked him about this matter.

Labor cost is the other significant cost in pepper production. In Towuti, there is a communal system to help each other. A new farmer will be helped by the others, but not for free. The labor cost will be paid later when the farmer has money. The expansion of pepper plots has caused the increase of labor demand in Towuti. According to H. Mustafa, local labors, especially family labor, have been fully absorbed in the process and there is still a significant shortage of labor. Farmers, like him, decided to import labor from outside of Sorowako. The main preference is to import labor from Kupang, NTT. Labor from Kupang is preferred because they are known as hard workers and cheaper than the locals (who are paid for Rp. 750 thousands per month). There is one labor supplier in Towuti, H. Wenda, who imported labor from NTT. He transported them from Makassar port using trucks. One truck can carry 50 persons. The interested employers will pay a fee to H. Wenda (they call it a 'transportation cost') and will deduct the amount from the contract or salary of the laborer. Usually, the employer will contract the laborer for 1-2 years. Their monthly salary is Rp. 500 thousands plus consumptions and accommodation. Some employers pay a bonus for good harvest. Contracting labor is considered cheap because daily labor will cost Rp. 40,000 per day. One farmer usually hires 3-4 laborers to maintain his pepper plots, which include tasks like weeding and harvesting. Pepper harvest can be done weekly although the peak is every six months.

to improve the soil nitrogen, to serve as a canopy tree for the cultivated trees, and to become fodder material. When it is applied to control the spread of *alang-alang, gamal* functions to shading out *alang-alang* shoots (Ruf and Yoddang 2004d: 204).
Despite the availability of various technologies that enable the use of grassland for cash crop production, the choice for grassland remains low. Many farmers still prefer to exploit forest areas to the grassland. This is caused by ecological and institutional factors, such as the high cost for grass control and soil fertility improvement that limits the number of smallholders who can afford the costs for using grassland. The high cost also reduces the feasibility of sharecropping adoption in the grassland, since those who are under land sharing contracts usually do not have capital to afford herbicides. Because of the high cost factor, the poor smallholders will still prefer to encroach forest for cheap forest land and the benefit of 'forest rent'. The other crucial factor that limits the use of grassland is the dominant control over that type of land by rich farmers who are reluctant to make use of the land, even for the sharecropping arrangement, and prefer to keep the land in reserve for the future, since they still have capacity to find more land elsewhere (Ruf and Yoddang 2004d: 206-207).

The other popular alternative source of land when a crop boom emerges is the conversion of the existing farmland. This option can be taken either at the beginning of the boom as well as in a later stage when the other options are limited or not exist any more. The most common farmland conversion is from rice field to cash crop farm. Ruf *et al.* (1995: 367) note that the converted rice fields are typically limited to the rice fields that were not yet fully irrigated. Farmers are still quite reluctant to convert their irrigated rice field into a cash crop farm due to the high price of the irrigated rice fields and the social and cultural value attached to them. However, many farmers are willing to pledge their rice fields to obtain capital to buy land for their cash crop investment (Ruf 1997: 4).

When farmers decided to convert their rice field, the decision was mostly driven by the lucrative profit potential of the cash crop. Many of those who finally decided to convert or pledge their rice fields were the second wave cash crop adopters that become attracted after witnessing the success of the very first wave adopters. In several cases of cash crop development, such as in cacao, the very first wave of cash crop adopters, was made of poor farmers who did not own rice fields that become a reason for their migration to the other places in search of land (Ruf 1997: 4).

From the success stories of people who planted before them, and from what these first adopters can buy (luxurious materials such as motorcycles, and especially the religious trips to Mecca), farmers know that they can make more money by planting a cash crop than rice or maize, or whatever they used to grow before (Ruf and Yoddang 1999:16). The decision to convert a rice field into a cash crop plantation is also triggered by their consideration that the tasks involved with rice growing are more difficult than those required for perennial cash crops, such as cacao, which does not involve any terracing (Durand 1995: 324). Rice growing, especially in the irrigated rice fields absorbs most of the time and labor of the smallholders. It is very common that they are even forced to abandon their dry land plots in order to manage their irrigated rice fields (Burkard 2005: 1).

Many farmers experienced a gradual transition or conversion before they were fully involved in cash crop production. Generally, they still adopt intercropping practices of food crops with the cash crops that allow them to feed the family and to earn indispensable cash income before the cash crop can be harvested. At the time of the temporary setback, some farmers again started to grow rice or extended the acreage of paddy and maize to secure their subsistence needs and also to earn cash for their further investment in their cash crop farms. This is an example of the complementary roles of annual and perennial crops that provide the farmers with an adequate space to manuver in addressing challenges and risks in producing new crops, such as access to capital and the risk of income loss due to crop conversion (Ruf *et al.* 1995: 349, Ruf 2004: 243).
When they finally decided to convert all of their rice fields or their maize garden, the farmers based their decision on the calculation that they will be able to meet their subsistence from the profit of cultivating the cash crop (Ruf 1997: 3). Durand (1995: 325) points out that the underlying feature in the characteristics of these farmers is their willingness to take risks. They are ready to invest all of their labor and income on a single crop, despite serious potential risks such as a prolonged drop in the world market prices or the infestation of a devastating pest. In this context, the fact that some farmers are willing to try new crops is often due more to their expectations of financial success than to a real desire to diversify their production.

4.4 Conclusion

This chapter has presented the key features of agriculture and people in South Sulawesi in explaining the success of commercial agriculture and trade in this province. The presentation on the cash crop development history has shown that the current success of South Sulawesi in cash crop agriculture is directly linked with the centuries long engagement of its people, the Bugis and Makassar ethnic groups, with both subsistence and commercial agricultural development and trade activities that allow them to gain a complex set of experiences with various crops, both their markets and technologies, and also experiences in developing various options of business models suitable for those crops.

The prominent characteristics of the Bugis-Makassar as entrepreneurial, opportunistic and dynamic ethnic groups are significant in explaining the rapid change of agricultural commodities developed in South Sulawesi. As described in the cited reports and articles presented in this chapter (Ruf 1997, Acciaioli 1998, Ruf and Yoddang 1999, CSP 2013), the Bugis and Makassar ethnic groups have a tendency to react immediately to market trends and are willing to make new decision about investing all of their labor and income on a single crop, mainly due to their strong orientation for profit. This description serves as an ethnic profile analysis in addressing the question that I post in the beginning of this chapter on what explain the wide acceptance of jatropha curcas in South Sulawesi in the period of 2007-2011 despite jatropha was an entirely new crop.

The current advanced development of commercial agriculture in South Sulawesi is attributable to three factors. The first factor is the government's policies and

interventions. Ever since the kingdom period, agriculture has become the focus of the rulers' policies. The expansion of agriculture, especially rice was closely linked with the territorial expansion of the rulers in that period. Also, agriculture was already regulated to response to the market trends. In the colonial period and the current modern state of Indonesia, South Sulawesi continues as the center of commercial agricultural development in Eastern Indonesia, notably because of its strategic advantages in the region as the key trading gate, and the availability of resources, especially land and its density of population. The influential colonial policies and interventions included the enforcement of taxation, 1870 land reform, and the introduction of new cash crops along with the provision of extension services and modernization of irrigation infrastuctures. In the period of the modern state of Indonesia, South Sulawesi agriculture has benefited significantly from the Green Revolution program in the period of 1970s to 1980s, where the rice production was accelerated and various agricultural infrastructures, such as irrigation, roads, and extension services were developed and modernized. The success in achieving surplus in rice production has been regarded as the key prerequisite for the subsequent successful development of cash crops in South Sulawesi. The surplus income provides farmers initial capital for their transition or expansion to cash crops. At the same time, the surplus of rice production allows them to make a secure transition to cash crops with less risk in meeting their subsistence. Governments' interventions continue until today through various national and provincial policies and programs aimed at the acceleration or revitalization of production and improving the value adding process of the cash crops (Burkard 2007, Ruf 1997, Ruf 2004, Ruf and Yoddang 1999).

The second important factor in the successful development of cash crops in this province is the strength of social networks of the people, which also becomes their distinctive advantage in terms of capacity to access and to respond market demand. The discussion on the South Sulawesi commodity booms in this chapter shows a central role of social networks in the process of commodity booms. These social networks cover a wide range of actors not only those in the commodity value chain but also those who play roles and have influence in the politics and policy sectors that are significant in initiating and sustaining the booms. By using their social networks, they are able to create their own independent channels in accessing market information and the related technology materials, and later on establishing efficient market systems for their cash commodities without having to be dependent on government's interventions. Through their web of ethnic networks, they are also able to gain supports from the government, as well as accessing available government resources by utilizing the primordial solidarity with the government officials and politicians.

The third key factor that explains the success of the people in South Sulawesi in commercial agricultural development is the availability of access to land. The availability of land will guarantee a strong response to market signals for a crop boom to happen. The experiences of crop booms in South Sulawesi as well as in the migration places of the Bugis and Makassar suggest three types of land that are used: forest land, grassland and farmland. Forest land is always favored if available for its forest rent advantage and its lower prices. However, driven by the lucrative profit potential of the cash crop the

conversions of grassland and farmland are also common to take place, especially when the other options are limited or not exist. In terms of access, while farmers in general will opt for a secure land ownership for their cash crop investments, many of them are open to ignore the official tenure issue as long as their access to land is not threatened or if they have no plan to stay permanently.

5 Jatropha projects in South Sulawesi

This chapter presents the discussion on the list of jatropha projects in South Sulawesi covered in my research. During the period of my fieldwork in South Sulawesi in 2011-2012, I researched twelve jatropha projects, which consist of two government jatropha projects, four commercial jatropha projects, two jatropha nursery projects, one pressing-machine developer project, two corporate social-responsibility-based jatropha projects, and one university-based jatropha research project. These projects were implemented during the period of 2006-2011, and many of them had been terminated when this research was conducted.
In my research period, I also found the existence of other jatropha projects than the twelve that I researched. The information about these projects came from newspaper articles as well as from my respondents. However, due to the lack of information and the absence of contact persons that I could rely on to be able to investigate these projects, I decided to limit my focus only on the twelve projects.

The existence of significant number of jatropha projects in South Sulawesi has raised a question on why jatropha as an entirely new sector, with no established players, untested product and market, and unproven business plans, that only 'fools' rush in,[119] was able to take off in South Sulawesi in those years. This chapter explores factors explaining the implementation of the observed projects. Focus will be given to the discussion about the drivers of the projects and the motivations of the promoters while analyzing to what extent the drivers and motivations demonstrate the pursuance of non-oil objectives in these projects. This chapter will also analyze the networks of actors in the projects.

The next sections of this chapter will first present a brief discussion on the history of jatropha in South Sulawesi, a section describing the process in finding and researching jatropha projects in South Sulawesi and the presentation of the twelve jatropha projects that I researched. The chapter will be concluded with a section on the analysis of the twelve projects by focusing on the motivations and drivers and the actor networks.

[119] I borrow this term from Aldrich and Fiol 1994.

5.1 Jatropha History in South Sulawesi

In South Sulawesi jatropha is known as a wild plant. It shares the same local names with the castor plant. They are both called as *jara* and *kanjoli,* where the latter refers to their similar application for the making of a traditional torch.[120] It grows in empty plots and is sometimes planted in small population in the garden. Jatropha trees are not commonly used as living hedges in South Sulawesi. Farmers in South Sulawesi prefers to grow *gamal* (*gliricidia sepium*) trees as living hedges and use the leaves to feed their livestock. Despite the fact that jatropha is a wild plant, its traditional applications for medicine and torch fuel are familiar, especially in the rural areas. Some people from the Bugis and Makassar ethnic groups also grow jatropha in front of their houses with a belief that jatropha will protect their houses from evil spirits.

In my study, I found that the available historical records and data on *jara* or *kanjoli* in South Sulawesi mostly refer to the castor plant and not to jatropha curcas. A Dutch colonial record from 1920s suggests that castor was introduced by the Dutch Agricultural Extension Service (*Landbouwvoorlichtingsdienst* / LVD) on the Island of Selayar as an alternative cash crop to coconut – a key cash crop that was experiencing a serious down fall in those years (Heersink 1995: 211).[121] Yet, there was no record about the yields as well as the trade of castor from Selayar or South Sulawesi since it was introduced. In 2010, a meeting note from the provincial evaluation of the Energy Self Sufficient Village or DME Program in South Sulawesi[122] mentioned that castor became an invasive species in Selayar.

Two publications written by Abdul Rasyid Asba (2007 and 200x), who studied the history of Japanese occupation in South Sulawesi, became my important sources in studying the local history of jatropha especially during the Japanese period. Asba in the Catalogue of the Interview Collection on Japanese Occupation in South Sulawesi wrote that Japanese troops established a *jara* plantation in Enrekang District for *sumbu* or torch oil (Asba 2007: 78). In his other publication,[123] Asba clearly mentioned castor as the oil plant that was planted in South Sulawesi by referring to data source of South Sulawesi Archive Reg. 152 Box 27. He writes: According to the South Sulawesi Plantation Agency, in 1943, many areas in South Sulawesi were obliged by the Japanese colonial administration to execute land renovations by planting cotton and castor oil plants. For example, there were around 300 acres of castor and cotton plantations established in Sinjai District. Records also suggest the establishment of ten thousand acres of castor, cotton and mulberry plantations in other regencies such as Bone, Bulukumba, Wajo and Soppeng in the same year (Asba 200x).[124]

[120] Candle like torch from the mix of crushed jatropha or castor beans with cotton wrapped on a small wooden stick - locally called as kanjoli.

[121] A meeting brief produced from a workshop on the evaluation of the national biofuels based energy self-sufficiency village program, held in Makassar 6-7 May 2010, stated that castor became an invasive plant in Selayar after being introduced

[122] The evaluation discussion was organized by the Ministry of Agriculture on 6-7 May 2010. It evaluated the progress of jatropha and *nyamplung* based DME program in South Sulawesi.

[123] Unpublished research proposal document by Prof. Dr. A. Rasyid Asba, MA on 'Japanese Economic Developed in South Sulawesi During the War Pasific Period, 1942-1945.' Available at: http://repository.unhas.ac.id/bitstream/handle/123456789/1803/makalah%20aktivitas%20ekonomi%20Jepang.pdf?sequence=1 - accessed on 9 December 2012.

[124] The English in this quotation has been corrected for grammar.

In addition to these two publications, I also found information on the cultivation of jatropha in the past from a website article on the statement of Amin Syam in 2007, then the South Sulawesi Governor, when he delivered his speech at the launching of PT Jatro Oil Plantation. According to the website, Amin Syam said that in 1970s farmers in South Sulawesi once cultivated jatropha with abundant yields. However the company who promised to buy the yields suddenly closed the operation leaving farmers in

5.1 - Pre-hype Biofuel Project in South Sulawesi

Aside from the literature research, in my study I discovered that at least one initiative to produce biofuel from castor plant was already initiated in South Sulawesi before the period of biofuels hype started. I interviewed Paul Yen Andres, a customized machine developer who runs a workshop in Makassar.7 He has an engineering degree from the Katholieke Universiteit Leuven in Belgium in early 1980s. He spent several years living in Belgium and Germany before finally returning to Indonesia. He speaks Dutch, French and German. Both his engineering and language skills give him access to some foreign funded engineering projects.

At his workshop, Paul showed me his broken castor oil pressing machine, which he developed around 1995. He told me that the machine was almost similar with the coconut oil pressing machine with some modifications. He built the machine after he read articles on castor oil and its market prospect for lubricant. After developing the prototype and testing it using castor beans collected by becak (rickshaw) drivers – whom he asked to collect the beans from castor plants grown wild around Makassar - he took the oil sample to Total SA (a French oil company) in Jakarta. According to him, although Total was interested to buy the oil but they failed to achieve a deal since the offered price by Total was only 600 rupiah per liter. He considered the price was too low. Later on, he offered the oil to the Lufthansa (German airlines) and PT Kimia Farma (state own pharmacy company). Both companies also expressed their interest to buy castor oil from him. Kimia Farma was said to be interested in supplying castor beans from him, which they will use to produce high value pharmaceutical products. To meet the demand, he then tried to cooperate with one army station in Makassar for the cultivation. He said that using the army was a very efficient strategy since he only had to convince the commander who later one gave instructions to his soldiers to cultivate castor in their housing complex. At that time, he only supplied seeds to the army and promised them to buy the yields. However, his strategy was unsuccessful since the supply from the army was very limited. He then decided to stop his castor venture.

Years later, when he heard about the jatropha business prospect in 2006, he was interested to develop the jatropha oil pressing machine using the basis of his previous castor pressing machine with a plan to join the bidding of government's jatropha machine procurement. But then he finally cancelled his plan after knowing that the procurement process was centralized at the national level. He said that it was difficult to compete with the national level players, because they have better networks and bigger capital to participate in the bidding process.

disappointment.[125] While this story was told by a senior government official, there was no clarity on its accuracy. Not only on whether jatropha was really cultivated as claimed, but also on what plant that was actually cultivated at that time.

Based on the timeline of the twelve projects observed in my research, it is estimated that 2006 was the starting year for the rise of various jatropha projects in South Sulawesi. The hype in South Sulawesi continued until 2010. There were various projects initiated and developed in that period, and in my research I managed to study twelve projects. The next section will describe the process that I experienced in finding jatropha projects in South Sulawesi during my fieldwork.

5.2 Jatropha Projects in South Sulawesi

5.2.1 PT Jatro Oil Plantation

The operations of PT JOP were started in 2007. The venture was established by PT Bakrie Capital Indonesia, a holding company of the Bakrie & Brothers (the Bakrie Group).[126] This venture was originally planned to be established in Eastern Nusa Tenggara Province. In 2006, the Surfactant and Bioenergy Research Center of Bogor Agricultural Institute (*Institut Pertanian Bogor*) was commissioned by PT Bakrie Capital Indonesia to conduct a study on the feasibility of Eastern Nusa Tenggara and Western Nusa Tenggara Provinces for jatropha investment. Following the study, the Bakrie group conducted a site selection in Sumatera, Western Nusa Tenggara (*Nusa Tenggara Barat* or NTB) and Eastern Nusa Tenggara (*Nusa Tenggara Timur* or NTT) and had established a nursery plot in NTT.

The result of the nursery in NTT was not satisfactory. The soil quality in the pilot location was considered as not suitable for a large-scale commercial jatropha cultivation. At that time an offer came from Nurdin Halid, a close associate of the Bakrie Group owner, Nirwan Bakrie, to assist the venture to get established in South Sulawesi where better land quality and infrastructure are widely available.

The venture was initially established as PT Jarak Pagar Nusantara (PT JPN), the management and operations of the company were run by Nurdin's family. The management structure was dominated by Nurdin's siblings: Rahman Halid as the director, Abdul Waris Halid as the general manager, and the other Halids in various strategic managerial positions. In addition, a sister company: PT Jarak Pagar Sulawesi was established by another Nurdin's brother, Kadir Halid to provide logistics services to PT JPN. A year later, the company's name was changed to PT Jatro Oil Plantation. Under the new name, Bakrie assigned several staff to supervise the management.

[125] Source: http://www.merdeka.com/ekonomi/nasional/jpn-jop-buka-perkebunan-jarak-120-ribu-ha-di-sulsel-mvoveoa.html - accessed on 20 June 2013.

[126] As a biofuel company, JOP was not the only venture under the Bakrie Group operating in this sector. Another company, PT Bakrie Rekin Bio Energy – a joint venture of PT Bakrie Sumatera Plantations Tbk and a state-owned company, PT Rekayasa Industri - was also established at the same period of biofuels sector boom in Indonesia. PT Bakrie Rekin Bio Energy focuses on the production of palm oil based biodiesel.

5.2 - Jatropha for Politics

PT JOP was owned by the Bakrie Group, a prominent, politically connected business player at the national level. This venture was financed by PT Bakrie Capital Indonesia, a holding company of the Bakrie Group. The operational of the venture was assigned to a local political family in South Sulawesi, the Halid Family. Nurdin Halid, the key patron of the family, is a senior Golkar Party politician. In South Sulawesi and also in the other provinces of Eastern Indonesia, he plays an important role as a patron to many local Golkar Party politicians. In 2009, he was appointed as the special elections coordinator for Eastern Indonesia. This position provided him we the power to select and approve candidates for legislative and executive positions in the region. The Golkar Party is the best-organized political party since the New Order period. The networks of Golkar varies from the urban political elites down to the village level, as well as from farmers to the civil servants. The local leaderships, both at the provincial and district level are mostly dominated by Golkar.

One key finding from my research on PT JOP investment was that the recruitment of farmers under the outgrower scheme of PT JOP was not only used for the benefit of the venture, but was also to favor the Golkar Party. PT JOP's operational period coincided with elections at the national and sub-national level, with Nurdin Halid assigned to lead the 'winning team' for the Golkar Party in South Sulawesi. The collected data from interviews and news articles confirm that both the company resources and the outgrowers were mobilized for political purposes. One example is the 2008 South Sulawesi governor election. The company outgrowers were mobilized to support the Golkar candidate, Amin Syam.

However, the link between PT JOP and politics also exposed the venture with unintended negative consequences. For example, the venture received a negative sentiment from the government in Gowa District due to the political rivality between Amin Syam, the candidate supported by Nurdin and Syahrul Yasin Limpo, the candidate supported by the Bupati of Gowa (See also the discussion in 5.2.10 Jatropha Projects by the District Government: The Case of Gowa District).

My research findings show that the Halid family did not just use the venture solely for the benefit of the Golkar Party. Using the company resources, the Halid family came to control multiple political parties. Rahman Halid, the manager of PT JOP utilized company resources to support his campaign to become the Provincial Chairman of the Hanura Party in South Sulawesi. A local newspaper, Fajar Daily (13 May 2010) wrote that Rahman utilized a JOP event to officially declare his campaign for the provincial chairman position. Twentyone district chairmen of the Hanura Party in South Sulawesi attended the event and declared their support to Rahman. He succeeded to win the position and also appointed his brother, Waris Halid as the party secretary. The building of PT JOP was used as the provincial secretariat of the Party during his term.

Nurdin Halid is a prominent political figure in South Sulawesi. He is a senior chairman of Golkar Party at national level. As a businessman, Nurdin is known as a national cooperative figure who once led the Federation of Indonesia Rural Cooperatives (*Induk Koperasi Unit Desa* or INKUD). Using cooperative as his business vehicle, Nurdin was involved in the trade monopoly of key commodities, such as clove, sugar and rice.[127] In 2005, he was pronounced guilty of violating customs on imports of rice from Vietnam and was sentenced to two and half years. He was released in August 2006 after receiving an Indonesian Independence Day remission.

His involvement in PT JOP was due to his intimate relationship with the Bakrie family, especially in politics. He is a sidekick of Aburizal Bakrie (the former chairman of Bakrie Group) who was the national chairman of Golkar Party,[128] and Nurdin was also a close friend of Nirwan Bakrie – Aburizal's brother and his successor in chairing the Bakrie Group – who was a deputy of Nurdin at the Indonesia Soccer Association (*Persatuan Sepakbola Seluruh Indonesia* or PSSI) when Nurdin was the national chairman.

A former company executive in an interview explained that the Bakrie Group jatropha investment was finally moved to South Sulawesi after Nurdin Halid succeeded to convince Nirwan Bakrie that the venture would be more successful in South Sulawesi under his strong socio-political influence.[129] Such influence was important as new plantations involve persuading large numbers of local farmers, especially if the company adopts a so-called out-grower model by contracting individual local farmers.

PT JOP started its investment with a comprehensive business plan. The plan covered upstream activities (nurseries and planting) to downstream activities (jatropha oil production and trade). For the planting of jatropha, JOP adopted a full plasma or outgrower scheme. An outgrower scheme is a contractual partnership between growers or landholders and a company for the production of commercial products (FAO 2010: 8). By adopting the full plasma model, JOP did not have its own jatropha plantation and therefore was fully dependent on their plasma farmers for the supply of their raw materials (jatropha seeds).

For their downstream activities, notably the production and trade of jatropha oil, PT JOP planned to construct its jatropha oil processing plant in Makassar. The company was reported to procure a plot at the Biringkanaya Energy Center for the processing plant.[130]

In its business plan, PT JOP had an organization structure where in each district, there

[127] See the profile of Nurdin Halid on http://en.wikipedia.org/wiki/Nurdin_Halid (accessed on 15 March 2017).

[128] He was the national chairman of the Golkar Party from 2009 to 2014. See the profile of Aburizal Bakrie on http://en.wikipedia.org/wiki/Aburizal_Bakrie (accessed on 15 March 2017).

[129] The interview was conducted in 2014 by Marleen Dieleman who was co-authoring with me for a journal article on 'How Powerful Political Ties Appropriate Resources and How Weaker Organizations Protect Themselves: A Case Study From Indonesia.' The article was published at the Asia Pacific Journal of Management in 2018.

[130] See Proyek Kawasan Energy Centre Biringkanaya Terancam Batal (http://liputan-kota.com/2008/10/proyek-kawasan-energy-centre.html - accessed on 11 September 2011)

Figure 5.1 Rahman Halid and his management team at the opening of PT JOP nursery training in 2008 (Source: PT JOP photos collection)

would be one district office to coordinate a district nursery and plasma farmers, to procure harvests and to produce jatropha crude oil. The crude oil, later on, would be transported to Makassar for the final biofuel processing and distribution to buyers. In the company future plan, the district offices were projected to become semi-independent business entities and would adopt the cooperative model - where the plasma farmers would become members of the cooperatives. The cooperatives will play a role as commercial intermediaries between JOP and the plasma farmers and they will earn profits from intermediating the marketing of jatropha seeds to JOP and providing services to the plasma farmers.

The operations of PT JOP were mostly using local resources, where the key agronomy and plant sciences advisers were sourced from the local universities (agricultural faculties of *Hasanuddin University* and *Universitas Muslim Indonesia*) as well as the field technical staff who were the graduates of the two universities. Interestingly, none of the advisers or technical staff had previous experience in jatropha. The advisers are known to have a background as cacao experts (see 5.3.11. Jatropha Research Project at Hasanuddin University**)**. In the field, PT JOP utilized the extensive network of Halid family and Golkar Party to develop a network down to the village level. Local elites, such as the family of district heads, politics cadres, village and hamlet heads, school teachers, and many others, were recruited as field organizers, especially for the outgrowers recruitment purpose.

In a period of two years (2007-2009) extensive nursery plots and plasma were established by PT JOP in 15 districts of South Sulawesi, which were divided into two zones: south and north. The total coverage of their plasma areas was 17,040 hectare. Approximately 8,000 plasma farmers or outgrowers were recruited under a partnership contract scheme, where they were provided with various cash and in-kind incentives of approximately three million

Figure 5.2 PT JOP 2008 nursery training in Moncongloe (Source: PT JOP photos collection)

rupiah per hectares – which was considered as their debt (*dana talangan*). In return, plasma farmers were asked to submit photocopies of their land documents as proof of their participation (see Table 6.1. Distribution of plasma areas in 15 districts).[131] The contract stipulates that the given loan will be repaid in form of jatropha seeds production for five years, while the contract will be taken place for a period of 25 years. Through their extensive political and familial networks, the Halids succeeded to attract many farmers to join their outgrower scheme. However, despite an impressive statistical figure of total plasma area and the number of participating farmers as claimed in their company report, the actual total area planted with jatropha was far below the claimed figure.

Through my interviews with several former PT JOP plasma staff and farmers, I was informed that the discrepancy existed due to the careless practices in the recruitment of plasma and farmers. This happened because the company assigned their plasma staff with performance targets to collect certain total of lands with incentives of permanent employment status and a cash bonus. In addition to this, the plasma units were also pushed by the nursery units to find lands and farmers to plant the seedlings that they had prepared. Driven by the targets and pressures, they did not perform proper verification on the actual total areas suitable and committed for jatropha, other than just simply collecting copies of documents from farmers.

[131] The accepted documents included land ownership document, land tax receipt, and reference letter from village head confirming land ownership.

On the other side, farmers submitted their document copies because they were promised cash incentives for every jatropha tree they plant – Rp. 200 for planting and Rp. 300 for the first year maintenance. The ratio per hectares was 2,500 trees – plus fertilizers and herbicides incentives. This means the bigger the area, the more trees they can plant and also the more cash incentives they can get. However, apparently many of them actually did not have available land for jatropha cultivation. Their farmlands were used for the production of food and cash crops with little or no space available for new crops, such as jatropha. Even for the most infertile lands, farmers still used this type of land to plant drought resistance crops such as cassava, timber trees and fruit trees. With this reality, many plasma farmers did not plant the given seedlings. They hided or destroyed the given seedlings and provided misleading information to the company that they had planted the seedling in remote places, which were difficult for the field staff to visit for verification. The interviewed informants suggested that probably only one fourth of the reported land total that was really planted with jatropha, although the management claimed a higher figure of 40%.

After being operational for two years, PT JOP operation, notably the plasma recruitment was suspended in 2009. The former management said that by that time the Bakrie group as the owner decided to suspend the operation because their evaluation on the market prospect of jatropha was negative. They decided to cease the plasma recruitment since

Table 5.1 Distribution of plasma areas in 15 districts

No	District	Total Area (Ha)	Number of Trees
Southern Zone			
1	Maros	312.42	781,055
2	Gowa	1,368.68	3,421,709
3	Takalar	651.62	1,629,055
4	Jeneponto	642.07	1,605,177
5	Bantaeng	517.20	1,292,994
6	Bulukumba	4,123.39	10,308,485
7	Sinjai	179.35	448,384
Total		**7,794.73**	**19,486,859**
Northern Zone			
1	Bone	4,542.20	11,355,492
2	Wajo	1,543.78	3,859,448
3	Sidrap	721.48	1,803,708
4	Soppeng	478.52	1,196,306
5	Barru	594.31	1,485,770
6	Pangkep	818.36	2,045,893
7	Pinrang	182.31	455,770
8	Polman	364.71	911,777
Total		**9,245.67**	**23,114,164**
Total		**17,040.40**	**42,601,023**

Source: PT JOP.

they were afraid that the company would be overwhelmed by the seed supply from the outgrowers under the condition of unprofitable market of jatropha. Some informants suggest that in that year many outgrowers had already started to harvest their jatropha fruits and PT JOP was reluctant to buy the harvest.

Aside from the above explanation, some informants also suggest that the mismanagement in the operations of the plasma scheme was the main reason for the decision to suspend the operation. Prior the suspense, Bakrie commissioned an evaluation on the plasma management and based on the negative result they decided to stop field activities and to resize the company structure leaving only some core staff working on the financial settlement between PT JOP and Bakrie. PT JOP remained dormant until February 2011 before Bakrie finally decided to liquidate it.

In its dormant period, there was a strong rumor that PT JOP would be taken over by PT Bakrie Sumatera Plantations Tbk, that was said to be interested in using the huge contracted farming area of PT JOP for other crop production, such as cacao.[132] However, until the company liquidation had taken place, this rumor was never materialized. Another information from the former management said that PT JOP was approached by some interested investors, including by a local jatropha processor company owned by a Japanese investor – PT Jais Bone Sejahtera – for a joint venture cooperation.[133] But none of the cooperation offers was approved by Bakrie.

PT JOP was recorded as the biggest actual domestic jatropha investment ever being implemented in Indonesia. An approximate amount of Rp. 100 billion investment had been disbursed during its operational period, where most of the amount was spent on *dana talangan* of its plasma scheme, personnel costs and investments in properties. There was no significant jatropha seed trade being realized during the operational period. The company only occasionally purchased jatropha seeds from its plasma organizers in small quantities. According to the former management, it was their strategy to tame the angry farmers and to maintain the relationship with some of the plasma organizers who had personal relationships with the Halids.

The purchased seeds were stored in the warehouse inside the company office. Until its last year, the company never processed the seeds but the former management claimed that it had shipped 11 tons of jatropha beans to a buyer in NTB in 2009.[134] An anti-climax for a billions of rupiah investment.

[132] Based on the information of Dr. Nasruddin, a former agronomy adviser of PT JOP in an interview on 4 October 2011.

[133] The owner of PT Jais Bone Sejahtera made a complaint to the Vice Governor of South Sulawesi on the unwillingness of JOP to cooperate for raw material supply for his jatropha oil processing plant. See 'Investor Jepang Keluhkan Pasokan Jarak di Sulsel' (http://www.antara-sulawesiselatan.com/berita/3264/investor-jepang-keluhkan-pasokan-jarak-di-sulsel - accessed on 24 July 2012).

[134] Interview with a former JOP general manager assistant on 6 July 2011. However, the claim was not able to be verified due to the absence of any written record.

Figure 5.3 Motoharu Tatebe, the owner of PT JBS at the company's jatropha seeds buying station in Jeneponto (Source: PT JBS website)

5.2.2 PT Jais Bone Sejahtera

PT Jais Bone Sejahtera (PT JBS) was established in 2009. The company was owned by a Japanese investor, Motoharu Tatebe.[135] The company invested approximately ten billion rupiah to construct a biofuel processing plant in the Parangloe Warehouse Complex in Makassar. The production capacity of the plant was 8,000 ton oil per year.[136] Initially the raw materials were planned to be supplied from PT JOP plantations. However, the company failed in its negotiation with PT JOP. PT JBS also was not allowed to buy jatropha beans from the plasma farmers of PT JOP. Therefore, it decided to establish its own supply chain of raw materials.

PT JBS conducted a roadshow to introduce jatropha to several districts in South and West Sulawesi Provinces. To avoid overlap with the plantation areas of PT JOP, the company focused its activities in the Luwu region and West Sulawesi Province. In the roadshow, the owner held official meetings with several district heads to ask for supports to establish jatropha plantations in the respected districts. PT JBS offered farmers to grow jatropha by promising that the company would provide seeds and technical assistance support to the interested farmers. To persuade farmers to grow jatropha, PT JBS recommended them to apply the mixed cropping system. The company promised to buy the harvested beans. The offered price was 800 rupiah per kilogram beans. The price was claimed to refer to the official jatropha beans price standard regulated by the government. To convince farmers about its seriousness to buy jatropha beans from them, PT JBS established jatropha buying stations in several districts.

The jatropha biofuel processing plant of PT JBS was officially put in operation in September 2009. In January and February 2010, the company was reported to export eight barrels or 1,600 kilolitres of jatropha biofuel to Japan. Yet, despite of this achievement, which was published in its website, in the same month PT JBS decided to relocate its processing plant

[135] Motoharu is married to a Bugis woman and converted to Islam. He is also known as Muhammad Kamal Miftah.

[136] Source: http://www.antarasulsel.com/berita/3264/investor-jepang-keluhkan-pasokan-jarak-di-sulsel - accessed on 11 February 2011.

to Polewali Mandar District in West Sulawesi Province. The reason of the relocation, based of the official statement of the company on its website, was to bring the plant closer to the raw material sources. PT JBS claimed that the supply of jatropha beans in West Sulawesi Province was more reliable. In an article published on its website, the company claimed that it had established 250 hectares of jatropha gardens in Polewali Mandar District, and 150 hectares each in Majene and Mamuju Districts. The company expected to re-operate its processing plant in August 2010, the time when the claimed jatropha gardens started to produce beans. However, after the relocation there were no further updates about the company activities on its website. At the time when I conducted my fieldwork, I did not find any information about its activity. There is a possibility that the company finally stopped its operation in 2011 due to the lack of raw material supply for its biofuel processing plant.

5.2.3 The Green Light Biofuels Pilot Project in Pinrang District

Green Light Biofuels is a biofuel company based in the United States of America. Its business portfolio is focusing on the production of biofuel from waste oil.[137] Following the global hype of jatropha, the company also tried to expand its portfolio into jatropha-based biofuel by establishing a pilot project in Pinrang District of South Sulawesi. The pilot project was led by Ross Jax, a former regional representative of ACDI-VOCA (Agricultural Cooperative Development International - Volunteers in Overseas Cooperative Assistance), an American NGO primarily focusing on supporting the development of commercial cacao in Indonesia. South Sulawesi is a key focus province of ACDI-VOCA since 1990s. Ross Jax joined the Green Light Biofuels as the managing director for its South East Asia office from May 2008 to July 2009. He was responsible to lead the jatropha plantation trial in South Sulawesi, Indonesia and Dak Nong, Vietnam. Both Indonesia and Vietnam were previously covered by Ross Jax when he worked for ACDI-VOCA.

In running the jatropha plantation trial in South Sulawesi, Ross Jax recruited his former staff at ACDI-VOCA, Suharman and Lengkang. Both are known as cacao experts.[138] Suharman was recruited as the farmer organization manager, while Lengkang was the cultivation officer. In addition to recruiting his former staff, Ross also contracted a local NGO, SCORE (Sulawesi Cacao Research and Development) Institute to provide technical assistance to farmers.

[137] Effective from July 1, 2015, this company has been acquired by Valley Proteins, Inc., which also focuses on waste oil to energy business. Source: http://www.glbiofuels.com/ - accessed on 12 March 2016.

[138] I know both Suharman and Lengkang for many years. I met Suharman for the first time in 2005 when he was in Central Sulawesi as the provincial manager of ACDI-VOCA and I was the program manager of UNDP Indonesia. While for Lengkang, I know when I worked for the AusAID-SADI in 2007. That time my program provided an office space for his cacao program. I contacted Ross Jax, Suharman and Lengkang for interviews. However, Ross Jax did not reply to my request. Only Suharman and Lengkang that expressed their consent to be interviewed. I had a face to face interview with Lengkang at his office (PT Armajaro – a cacao exporting company). While for Suharman, the interview and correspondences were conducted by emails. Suharman works for the cacao development program of SwissContact and at the time of interview he was working for the program in Aceh.

Figure 5.4 Local workers preparing seedling bags at PT Green Light Biofuel's nursery in Pinrang. (Source: PT Green Light Biofuel photos collection)

The jatropha plantation trial project was implemented in Pinrang, South Sulawesi. Pinrang District was selected because of the familiarity of the project staff with this district. Pinrang is one of the key cacao producing areas in South Sulawesi and becomes a focus area for ACDI-VOCA. Utilizing their local networks in Pinrang, the project staff managed to persuade the farmers to trial jatropha.

Pinrang was described as a suitable area for jatropha plantation because the availability of land and the farmers were seen to be very positive about new commodity opportunities. At the time when the pilot project was taken place, cacao was experiencing a downfall due to the pest and disease problems.[139] Due to this problem, many cacao farmers started to look for other alternatives and those who joined the project considered jatropha as a new commodity potential. They were attracted by the information given by the field officers on the bright future prospects of the crop.

[139] South Sulawesi cacao sector experienced a serious downfall in early 2000s due to severe cacao pod borer and vascular-streak dieback diseases and late tree regeneration problem. Many cacao farmers at that period of time started to shift to other crops, such as maize and oil palm. A cacao revitalization program called National Movement on Cacao Rehabilitation (*Gerakan Nasional Rehabilitasi Tanaman Kakao* or *Gernas Kakao*) by government is implemented since 2008 to assist cacao farmers to revive their cacao gardens.

The project activities included the establishment of jatropha using seeds supplied from Bogor. A demonstration plot of one hectares was established in ten locations. The land was provided for free by the participant farmers. The agreement was that the landowners would receive profit when the plants started to produce. However, they were paid for cultivating jatropha in the demonstration plot areas. During the establishment of the demonstration plot areas, much employment was generated for the land clearing work, the construction of infrastructures and the maintenance of the nurseries.

The trial project involved approximately 1,000 farmers covering 50 hectares of land. The pilot project aimed to introduce jatropha to farmers as an alternative additional income source. The introduction was through farmer groups. The project did not provide cash incentive other than free seeds and seedlings, fertilizer and technical assistance by the field officers. The project distributed approximately thirty thousand seedlings to farmers.

The characteristic of land used in the project was fertile and productive. The land was planted with cacao, rice, maize, tomato, watermelon and chili. Jatropha was introduced using the mixed cropping system with the existing crops. However, the project was stopped after seven months of operations. The 2008 global economy crisis was used as the reason for this sudden decision. The Green Light Biofuels claimed to experience financial problems because of the crisis. The project had not yet established any contract with the participant farmers due to the premature life of the project. According to both Suharman and Lengkang, the sudden termination of the project did not cause problems at the farmer level. After the project was stopped, farmers abandoned their jatropha gardens and shifted to other crops, including replanting cacao following the lauching of the *Gernas* Program by the central government to support cacao farmers in reviving their cacao gardens.

5.2.4 Yoel Pasae – Jatropha Biodiesel Technology Developer

Yoel Pasae is a researcher and lecturer in the field of industrial chemistry at *Universitas Kristen Indonesia Paulus* (UKIP), Makassar. At the time when the interview was taken place, he was in his last year as a PhD candidate in biodiesel study at Hasanuddin University.[140] Yoel had been researching biodiesel since 2002 when he collaborated with *Institut Teknologi Bandung* (ITB) and the Indonesian Coconut Plantation Research Center in Manado, North Sulawesi to research the biodiesel potential of coconut. From coconut, he then further explored the biofuel potentials of other crops, such as oil palm, soybean, *ketapang* (*Terminalia Cattapa*), *kepoh* (*Sterculia Foetida L.*) and Jatropha Curcas. According to him, it turned out jatropha had the most potential for its highest oil content among the other potential biodiesel crops. He claimed that this plant is very familiar to the people of Eastern Indonesia, especially in South Sulawesi. He began to focus on jatropha in 2004. Because the laboratory facilities at UKIP were limited, he conducted his research at ITB in collaboration with the biodiesel research group at ITB led by Tatang H. Soerawidjaja and Robert Manurung, while simultaneously doing his master study.

[140] The tittle of his PhD dissertation was 'The Production of Fatty Acid Methyl Ester from *Kepoh* Tree oil (*Sterculia Foetida L.*) for Biodiesel Additive.'

In UKIP, Yoel led his research team at the Engineering Faculty to develop a jatropha biodiesel processing machine. According to him, the production of biodiesel requires three sets of machines: an extractor, a reactor and a mixer. He received funding from the High Education Directorate of the Ministry of Education to build the prototype machine in 2005. The prototype had a daily production capacity of approximately 100 liters biodiesel. Yoel said that at that time, UKIP was among the three universities in Indonesia that were able to develop jatropha biodiesel processing machine. The other two were ITB and IPB. Each university had its own type of machine.

With his expertise in biodiesel, Yoel was one of the key promotors of jatropha in its heyday in South Sulawesi. He established and led the provincial chapter of the Forum Biodiesel Indonesia (Indonesian Biodiesel Forum) in South Sulawesi (which also covered West Sulawesi), and the members consisted of researchers and staff from UKIP, Hasanuddin University, the Indonesian Coconut Research Institute, the Indonesian Cereals Research Institute, the State Crops Office of South Sulawesi and PT PLN. The Forum at that period of time was active in organizing series of workshops and seminars to promote biodiesel. In addition to this Forum, Yoel also established a company, PT Energi Indonesia Timur (PT EIT) to market his biodiesel technology products, which not only consisted of a biodiesel processing machine but also simple technology, such as the costumized cooking stove. Aside from developing the processing technology, Yoel was also involved in the promotion of jatropha cultivation in South Sulawesi. He collaborated with the Indonesian Cereals Research Institution to undertake a jatropha cultivation pilot project in Tana Toraja. He actively communicated with several district governments to support the cultivation of jatropha in their regions. He envisioned the establishment of jatropha biofuel production centers in many districts to achieve self-sufficiency in fulfilling local fuel consumption.

Yoel had a preference for a small-scale jatropha industry. He said that by establishing a small-scale industry, it would be easier for either local government or investor, and even the local community to invest in this sector. According to him, it only required approximately 500 hectares of jatropha garden per district to support the operations of a small-scale jatropha biodiesel factory. The existence of the factory at the local level would be good for the local economy, because it would generate employment, both directly and indirectly.

At the time when the interview took place in June 2011, both the Forum and PT EIT were already dormant. The Forum was only active for several years and became inactive after most of the individual members were transferred to new positions in their offices as well as relocated to the other places. The same thing also happened to PT EIT. PT EIT was originally designed to target the local government procurement projects for the biodiesel processing machine. However, the plan was not running as expected, because the procurement process for the government's biofuel projects was managed directly by the central government in Jakarta. The company failed to win any project. It only succeeded to sell three units of customized biodiesel processing machines to local buyers. One of the three was sold to Yoel's own jatropha project funded by the corporate social responsibility program of PT PLN in South Sulawesi. The end of the jatropha hype in 2010 has also contributed in the decline of the activities of both the Forum and the company.

After the jatropha hype, Yoel shifted his focus to research other biodiesel potentials in the context of biofuel engineering. From his experience in developing biofuel from jatropha, he admitted that many of the earlier claims were overwhelming. He said that according to his experience in pressing oil from the beans, the maximum oil content was only 20 percent in a kilogram seeds. This was different from the claim that one kilogram can produce up to 30%. He further said that so far as he knew there was no yet proven quality variety of jatropha available for mass cultivation.

Based on his experience in developing biodiesel processing technology he said that the biggest obstacle for the jatropha processing technology was the high component material costs, such as methanol – which is a key component agent in the oil refinery process. According to him, the government should subsidize the processing costs in order to make it a feasible business for investors.

5.2.5 PT PLN - Corporate Social Responsibility Project

In my interview with Yoel Pasae, he mentioned his jatropha project with PT PLN. I decided to follow up the information by contacting PT PLN. Through the assistance of a friend, I managed to contact the Corporate Social Responsibility Unit to conduct interviews in July 2011. At that time there was little record left about the pilot project due to the bad archieving system and most of the involved staff members had been assigned to new positions or moved to the other offices.

The pilot project was implemented in 2006, where Yoel Pasae through his company, PT EIT received a grant from PT PLN's CSR Program to establish a jatropha demonstration plot in a location owned by PT PLN in Barru District. The grant also covered the procurement of a jatropha biodiesel processing machine from PT EIT to demonstrate publicly the production of biofuel from jatropha. The duration of the grant was only three months and no further follow up was taken place after the termination of the grant both by PT PLN and PT EIT.

Aside from the CSR grant for the jatropha demonstration plot, in the same year PT PLN also provided an additional grant to Forum Biodiesel Indonesia and PT EIT for an exhibition of jatropha biodiesel technology to welcome the Biofuel Expedition[141] in Makassar. In the exhibition, PT EIT displayed its biodiesel processing machine and five units of the jatropha cooking stove.[142]

[141] The Biofuel Expedition was sponsored by PT Toyota Astra Motor Tbk in collaboration with the Tim Nasional Bahan Bakar Nabati (the National Biofuel Team) and was held from 30 July to 10 August 2007. The expedition was started in Manado and ended in Jakarta. It travelled through Gorontalo, Palu, Mamuju, Makassar, Surabaya, Yogyakarta, and Bandung. The expedition involved eighteen test cars (Innova, Avanza, Rush, Vios and Dyna variants) that used biogasoline (3-20% ethanol mix), biodiesel (2.5-20% mix), butanol (10%) and pure palmoil (40% mix) on the Dyna Truck by using converter kit. Source: http://www.indobiofuel.com/gratis%2048.php - accessed on 23 September 2011.

[142] In its financial report, it was stated that for the exhibition 200 kilograms of jatropha beans were procured at Rp. 25,000 per kilogram. The paid price was very high in compare to the average price at that time, Rp. 1,000 to 1,500 per kilogram. However, it was noted that paying high price for jatropha beans was a normal practice of researchers or NGOs. This practice becomes a cause of confusion at the farmers level in understanding the real prices of jatropha beans.

Aside from the given supports to Yoel's activities in jatropha biodiesel promotion through its CSR program, there was no other support provided by PT PLN for jatropha development activities in South Sulawesi. While the national biofuel roadmap has set certain mandatory targets of energy mix for institutions, such as PT PLN to achieve, in reality the policy to use jatropha biodiesel or other biofuel options was still not existent in the official planning of the company. The use of jatropha biofuel for rural electrification was still considered as not feasible despite the scenario of the national DME Program stated jatropha as one of the potential rural energy sources. In its support to the national government's DME Program, PT PLN in South Sulawesi provided priority funding for the construction of microhydro power plants in the villages that were not covered by the existing PLN grids. Furthermore, PT PLN also did not have any arrangement on fuel mix policy to allow the use of jatropha biodiesel in combination with the fossil diesel fuel for its existing diesel power plants.[143] This means that PT PLN has not opened itself to become a potential buyer of jatropha biodiesel.

The half-hearted support of PT PLN in South Sulawesi towards jatropha development resonates the same policy of PT PLN elsewhere, such as in NTT (see the discussion in Chapter 4). The given supports tend to be fashion driven as well as a form of formality only in demonstrating its support to the national government's agenda on jatropha development. All supports were funded through PT PLN's CSR fund and there was no initiative to internalize it in the company's business portfolio.

5.2.6 PT Vale Indonesia Tbk - Jatropha for Revegetation in Ex-Mining Area

PT Vale Indonesia Tbk, formerly known as PT INCO Tbk,[144] is the biggest nickel mining company in Indonesia and contributes to approximately five percent of the global nickel production with an annual production of 75 thousands metric ton of nickel matte. It operates in Sorowako, South Sulawesi since 1968 with a concession zone covering three provinces: South Sulawesi (118,387.45 hectare), Central Sulawesi (36,635.36 hectare) and Southeast Sulawesi (63,506.18 hectare). The company is currently in its second concession period, which will finish in 2025.[145]

As part of its mine closure preparation, in 2006 PT Vale developed an initiative called Road Map to Sorowako Heritage: Soft Landing Mine Closure Scenario to comply with

[143] Similar with any other provinces outside Java Island, diesel power plants are the main source of electricity in South Sulawesi. The common use of diesel power plants in Indonesia is caused by both the difficulty of constructing a power distribution network for widely dispersed locations and by the small-scale of demand in each locality. (JICA 2002: 1).

[144] PT INCO Tbk was acquired by a Brazilian mining company Companhia Vale Do Rio Roce (VDRC) in August 2006. VDRC changed its name into Vale in November 2007 in order to simplify its company name and for rebranding purpose. In this dissertation I will refer to PT INCO for any events by the company before the acquisition in August 2006.

[145] The first concession contract of PT INCO Tbk (PT International Nickel Indonesia Tbk) was received in 1968 through the Presidential Decree No. B91/Pres/7/1968 dated 27 July 1968 that provided the company a permit to commence its commercial production from 1 April 1978 to 31 March 2008 or for 30 years. On 29 December 1995, the Decree was amended through the Presidential Decree No. B745/Pres/12/1995 to allow PT INCO to continue its operation until 28 December 2025.

the regulations of government regarding the reclamation of ex-mining areas.[146] The scenario aims to rehabilitate the ex-mining area through revegetation and biodiversity restoration.[147] The revegetation of the ex-mining area is conducted systematically through the back filling of the area with the original topsoil, landscaping, and the planting of cover crops and pioneer trees.

Regreening the ex-mining area presents significant challenges for PT Vale in finding the suitable vegetation to be grown in this area due to its poor soil quality characterized by high content of heavy metals, low organic maters, low nutrient status and high clayey content. The ecosystem restoration initiative is taken care of by the Land Rehabilitation Unit of the Mining Department. This unit is linked with PT Vale research and development unit, which performs the collection and selection of local flora and fauna species to be restored in the ex-mining area. In 2006, the nursery facility had identified 140 species of endemic flora and collected 34 of these species. The selected flora species are stored and propagated at the company's nursery facility. While the collected local fauna, such as *anoa* (*bubalus*) the endemic dwarf buffalo of Sulawesi, *rangkong* bird (*Rhyteceros Cassidix*) and *maleo* bird (*Macrochepalon Maleo M.*) are kept and bred at the area prepared to become a national park, called the Wallacea Sawerigading Park (Saad 2007: 17).

Jatropha was introduced as an option for the revegetation project in 2006 after a mobile workshop (learning trip) of PT Vale to West Java and North Sumatera in September 2006. The mobile workshop was aimed to collect ideas for soft landing mine closure scenario of PT Vale after 2025 and the quality improvement of the community development initiatives of the company.

Jatropha development for land rehabilitation and biofuel production became a consideration after their visits to four institutes focusing on jatropha research and development in their mobile workshop: the Surfactant and Bioenergy Research Center of Institut Pertanian Bogor, BPPT-Research Center for Biotechnology, BPPT-Research Center for Energy Technology, and Yayasan Puri Cikeas.

Inspired by the presentations and materials they collected from their visits, the Land Rehabilitation Unit of the Mining Department developed a plan to use jatropha for land rehabilitation as a starting point for alternative energy production. The planting of jatropha as well the other revegetation related activities in the ex-mining areas were carried out by PT Vale's contractors. This activity did not involve the local people because according to the regulations of the Mining Department, both the mining and

[146] Until 2016, the Government of Indonesia has established a list of laws and regulation on the reclamation of ex-mining areas, such as: the Forestry and Estate Crops Ministrial Decree No. 146/Kpts-II/1999 on the Guidance on the Reclamation of Ex-Mining Areas; the Government Regulation No. 76 Year 2008 on Forest Rehabilitation and Reclamation; Law No. 4 Year 2009 on Coal and Mineral Mining; and the Energy and Mineral Resources Ministrial Decree No. 7 Year 2014 on Post Mining Land Reclamation for Coal and Mineral Exctraction Business.

[147] The scenario includes the development of a national park called the Wallacea Sawerigading Park, which will be the showcase of Sulawesi biodiversity.

ex-mining areas are not accessible for the public. Therefore, those who work in the location are labors hired by the contractors.[148]

It was also designed that a separated jatropha cultivation activity will be operated under the community development program of the External Relations Department. The plan was that PT Vale will empower the local community to produce biofuel which will be used by the company. The jatropha biodiesel was designed to substitute twenty percent of the company's diesel fuel consumption. This amount would provide PT Vale with an annual budget saving of approximately USD 20 million. The company was also expected to be qualified in accessing the Clean Development Mechanism Fund for applying green energy scheme in its business (Saad 2007: 60).

However, the use of jatropha for land rehabilitation was proven to be not feasible. Based on the planting test by the land rehabilitation unit in an area covering approximately ten hectare, the plant was not suitable for the ex-mining area where the land is rocky and dominated by clay. Many trees died due to water locking during the wet season and also experienced slow growth. After two years of testing, the jatropha project was stopped before realizing any processing activity. The remaining trees were left without further maintenance. When I visited the location, I found several remaining jatropha trees in poor condition. The trees were surrounded by bushes and covered by parasite plants. After the failed test, the land rehabilitation unit concentrates its focus on the use of local endemic trees, such as *betao* (*Calophyllum Soullatri*), *pine* (*Casuarin Aequisetifolia*), *damar* (*Podocarpus Spp*), *gaharu* (*Aqualiria Mlacensis*), *eboni* (*Diopyros Celebica Bakh),* and *natoh* (*Elaeocarpus Culminicola*).

Meanwhile, for the community based jatropha development this activity was administered by the External Relations Department. The plan was to develop approximately 200 hectares of jatropha garden under the community development program in the farmers' own plots. The department collaborated with an agro-inputs company, PT Anugrah Cemerlang Indonesia (PT ACI) that supplied jatropha seeds and agro-inputs. However, the plan was also stopped at its initial stage due to the lack of interest from community groups to grow jatropha.

The lack of community interest in growing jatropha was caused by the existence of other commodity crop options that were more promising. The years when jatropha was introduced in Sorowako, farmers were also experiencing commodity booms of oil palm,

[148] A scenario was also proposed by PT Ekuator Minang Konsultan, a consulting company that prepared the soft landing mine closure scenario, for PT Vale to apply the community based agroforestry model in the revegetation process. PT Ekuator proposed to establish a pilot project where PT Vale allocates the ex-mining areas to the selected five local poor families and provides them with financial supports to run the polyculture-agroforestry scheme in the allocated plots. They will be planting the allocated plots (each of 2.5 hectare) with a mix of fast growing trees, perennial fruit trees, and commodity crops, such as cacao (Saad 2007: 54-56).

Figure 5.5 The remaining of jatropha seedlings at the nursery of PT Vale Indonesia in Sorowako (Photo: Henky Widjaja, 2011)

patchouli and pepper (see the discussion on pepper boom in Chapter 4 – Box 4.1.).[149] Of these three commodity crops, patchouli (*Pogostemon Cablin*) or locally known as *nilam* was a new commodity crop introduced in East Luwu. Nilam produces high value essential oil that has been used as an essential ingredient in perfumes, incense, insect repellents and alternative medicines. There is no synthetic substitute for patrchouli oil, which increases its value and demand. The essential oil is extracted through steam distillation of the leaves. Nilam leaves are eadible and have been used to produce herbal tea or freshly consumed.

[149] Oil palm enjoys increasing popularity since early 2000s and becomes a popular option after the fall of cacao – a former primadona crop in South Sulawesi (see: http://sawitindonesia.com/rubrikasi-majalah/berita-terbaru/petani-kakao-sulawesi-beralih-tanam-sawit - accessed on 19 September 2015). Oil palm in South Sulawesi is mostly cultivated by the independent smallholders that supply the local palm oil factories. In 2010 the total area of oil palm in East Luwu was approximately 6,452 hectares with total production of 68,567.66 tons. Source: http://www.luwutimurkab.go.id/lutim3/index.php?option=com_content&view=article&id=144&Itemid=200 - accessed on 21 April 2014.

Nilam is easy to grow and the leaves can be harvested several times a year. The first harvest can be done after six months. According to the interviewed farmers in Sorowako, nilam was first introduced by farmers from Kolaka, Southeast Sulawesi. There was a high demand for patchouli leaves from a distillation plant in Kolaka. The collectors came to Sorowako and the surrounding districts to look for the supply and introduce nilam to the local farmers. The demand became bigger after a distillation plant was established in Malili (a sub-district in Sorowako).

Nilam seedlings were supplied from Kolaka, Subang and Aceh and further propagated by farmers themselves using the stem cutting method. The stem cutting can be applied after nine months old. The stems were sold Rp. 100 per unit or Rp. 5000 per kg. After one year, one hectares of 3000 cuttings can produce up to 2 tons wet leaves. The price of wet leaves was Rp. 5000-7000 per kg, while the price of patchouli oil was Rp. 400,000 per kilogram (the ratio is 1:40 wet leaves). The production cost of patchouli was considered to be relatively low. Not only because farmers can produce their own seedlings but they also produced their own organic fertilizer, which is locally known as *pupuk kocor*, that is made from agricultural wastes. It is a mixture of rotten pineapple, papaya, animal manure (preferably goat) and sugar.

Driven by the high value of patchouli oil, several farmer groups submitted grant proposals to PT Vale to finance the construction of their own distillation plants. When I was there, I was given an opportunity to review the submitted proposals from community groups for the community development grant program. I found five proposals were proposing for grant support to construct patchouli oil distillation facilities.

The lack of community interest to join the jatropha project of PT Vale demonstrates the common logic to opt for the most profitable crops based on their familiarity with the crops and the certainty of the markets. In my interviews with the local farmers, I was told that they were not interested to cultivate jatropha because they were not convinced about the market prospect of the crop and at the same time they have other more lucrative and certain crop options to select. They were also not persuaded by the discourse about jatropha as an alternative energy source despite many of them were still not covered by the service of PT PLN. For them, rather than to allocate their plots to cultivate jatropha as an energy crop, they preferred to cultivate their plots with commercially proven crops, such as pepper that can give them sufficient income to cover their daily needs, including their energy needs.[150]

When I was visiting the pepper gardens in Mahalona Village near Sorowako with a group of pepper farmers and PT Vale staff, I found something interesting regarding the adopted energy source. As a newly established village for transmigrants, the village had not been covered by PLN grids. However, I saw several huts with solar panels installed on their roofs or on the poles standing in front of the huts. The solar panels were not provided by PT Vale or the local government, but procured by the farmers at their own initiative to

[150] Interview on 9 September 2011 in Sorowako.

address their energy needs. Electricity in this village is very central for the farmers not only to power the water pump for irrigation but also for the workers. They use the electricity to operate their radio, fridge and for charging their cellular phones. They bought the solar panels in Makassar. The cost for one solar panel and a battery with the capacity of 500 watt was approximately Rp. 7 million. According to the farmers, the price was more expensive compared to the price of a diesel generator, which was only Rp. 1.5 million for a 900 watt power capacity, but the investment for solar panels is for a lifetime because solar power is free. Using a diesel generator will require them to buy diesel fuel, which is expensive and sometimes not available. One farmer said that he had used solar panels for two years and that he had not experienced any problem, including with the battery. Hoping to be connected to PLN grid for them will be ridiculous. The farmers said that even if the grid was available, the subsciption fee would be very expensive. It would cost them around Rp. 4 million, and they still have to pay the monthly bill for their electricity consumption. After all, they did not mind to spend Rp. 7 million for powering their garden because the cost was nothing in compare to the profits they gained from their pepper yields. This case shows that farmers have their own solutions to address their energy needs, and do not mind to invest as long as they have the financial capacity and enjoy the benefits. Energy in this case is an important supporting element in their farming activities, which can enhance the productivity. On the other hand, they are not be interested in planting energy crops for their own consumption if it is at the expense of their opportunity to earn income.

5.2.7 Jatropha Seeds Supplier - The Case of PT Anugrah Cemerlang Indonesia

PT Anugrah Cemerlang Indonesia (PT ACI) is a Makassar based company. It produces and markets agro-input products with liquid fertilizer as its key product. It applies a multi level marketing system in marketing its products. This company also targets agro-inputs procurement projects of both government and the private sector.

In 2006, when the national government endorsed jatropha as a priority biofuel crop, PT ACI saw it as an opportunity to diversify its business portfolio by selling jatropha seeds directly to farmers and to jatropha projects. In an interview with the company,[151] I was informed that the company supplied jatropha seeds from Mataram, Western Nusa Tenggara. The company had a plan to construct a jatropha oil processing plant in the same location of their fertilizer factory Makassar. However, the plan was never being materialized.

In June 2006, the company signed a Memorandum of Understanding with the community development unit of PT INCO on the cooperation of both parties for the development of *jarak* under the community development program of PT INCO. The MoU document mentioned *Ricinus Communis*, the castor plant, for *jarak*, instead of jatropha curcas. In my interview with the staff of the company, I asked for a

[151] Interview with Amir, an administration staff of PT ACI on 15 September 2011.

clarification about the term and received a confirmation that what they meant in the MoU was jatropha curcas. This mistake reflects a common failure in distinguishing jatropha from castor that often occurred and that is caused by the limited knowledge on jatropha.

The MoU between PT ACI and PT INCO stated that both parties agreed to initiate a jatropha development project under the community development program of PT INCO covering an area of 200 hectare. PT INCO will purchase jatropha seeds and organic fertilizer as well as hiring extension services from PT ACI. The total value of agro-inputs investment per hectares was Rp. 485,000, which consists of two kilograms of superior jatropha seeds, @ Rp. 100,000 and three bottles of liquid fertilizer, @ Rp. 95,000. Meanwhile, PT ACI agreed to buy the harvest at the price of Rp. 1000 per kilogram. In its proposal to PT INCO, PT ACI claimed that one tree will yield ten kilograms per harvest or 30 tons per hectares with a planting ratio of 3,000 trees per hectare. This level of productivity would provide farmers with an income of 30 million rupiah per hectare. However, the claimed productivity level was seriously exaggerated even in comparison with the most optimistic claims in the existing jatropha literature (for example, the claim of ten tons per hectares in Hambali *et al.* 2006).

As mentioned in the previous section, the cooperation between both parties was stopped at its initial stage due to the lack of interest from community groups to cultivate jatropha. There was no proper documentation both by PT INCO and PT ACI about the project implementation other than the documentation of the MoU and presentation material. PT ACI also did not provide me with any official record about its jatropha business. The information by the interviewed staff suggested that its involvement in jatropha business was short-lived. It ended immediately after it failed to establish a market in South Sulawesi.

5.2.8 Community Jatropha Nursery Business in Jeneponto District

On 28 July 2011, I went to Jeneponto to meet Syarif, a retiree of the Fishery and Marine Office of Jeneponto District. I was recommended to contact Syarif by my friend, Irma, from my Hasanuddin University alumni network who worked at that office. According to her, Syarif was known in his office to have experience in jatropha cultivation. She informed Syarif about me and he agreed to meet at the Fishery and Marine Office in Jeneponto.

Syarif said that he and his family ran a small-scale nursery in front of his house. He purchased seeds and polybags, and together with his family they grew the seedlings until 15 days old. That was the age when buyers came to collect the seedlings. When I asked him if jatropha was a program of Jeneponto government since the local climate is very suitable, he said that his government never had such program. The activities were purely private investments.

The key agricultural products of Jeneponto are maize, cassava, peanuts, paddy and

palm sugar, but the distribution are only concentrated on the irrigated parts of Jeneponto.[152] Most lands in Jeneponto are dry and not productive. In some areas, farmers can only grow rice once a year during the short rainy season. But in many areas, the land cannot be used for farming because of the extreme soil condition. People in these areas are mostly depended on their labor. They work for other farmers in Jeneponto and other regions or as laborers and pedicab drivers in Makassar. Jeneponto is also known to have the highest criminal level in South Sulawesi due to the high poverty level.

Palm sugar, produced from the *lontar* palm (*Palmyra Palm*) trees, is a popular product in Jeneponto. The *lontar* trees are the most common perennial tree species grown in Jeneponto due to its drought resistant characteristic. The *lontar* trees also produce a local alcoholic beverage called *ballo*. Selling *ballo* is a source of income for many poor farmers in Jeneponto. However, the trade is banned by the government because this alcoholic drink is associated with crime.

Jatropha itself is not a new plant for the farmers in Jeneponto. Jatropha is traditionally used to make a torch. People in the village crushed the seeds and apply the crushed seeds on cotton. The jatropha torch is used for night lighting and known as *kanjoli*.

Syarif took me to meet Mustari, a local businessman in Kelurahan Panaikang, Binamu Sub-district. He runs various business activities. He is a local seaweed trader. He collects seaweeds from farmers and delivered the product to a big buyer in Makassar. He also runs an inter-islands goat trading, where he transports goats from Sumbawa and Sumba by using traditional phinisi ships every week and sells the goats to buyers in various regions in South Sulawesi, and he is also known as a trader in second hand building materials. In 2008, he initiated a jatropha nursery business by involving farmers in ten sub-districts in Jeneponto.

Mustari told me that he supplied jatropha seeds from Palu and Luwuk Banggai in Central Sulawesi. He was partnering with Daeng Rani, his friend from Tamalatea Sub-district, to import the seeds. A nephew of Daeng Rani became his contact person in Palu to look for the seeds. He transported the seeds by truck. According to him, he transported seeds around ten times. He bought the seeds for Rp. 3000 per kilogram and sold them for Rp. 5500 per kilogram. This nursery business was centered at Daeng Rani's house in Tamalatea.

While some farmers bought materials from him, some others got the materials as credit. They were farmers who did not have working capital other than their labor. The applied profit sharing arrangement was fifty-fifty. The seedlings were sold for Rp. 1000 per unit. At the time when the nursery business was active, it created a lot of employment. Men, women and children worked very hard in maintaining their nurseries. The men collected soil, while women and children filled the polybags

[152] Jeneponto has one dam in Kelara to irrigate some parts of the region.

with soil, manure and seeds. They also bought water to water the seedlings. The expectation was they would receive income every 15 days.

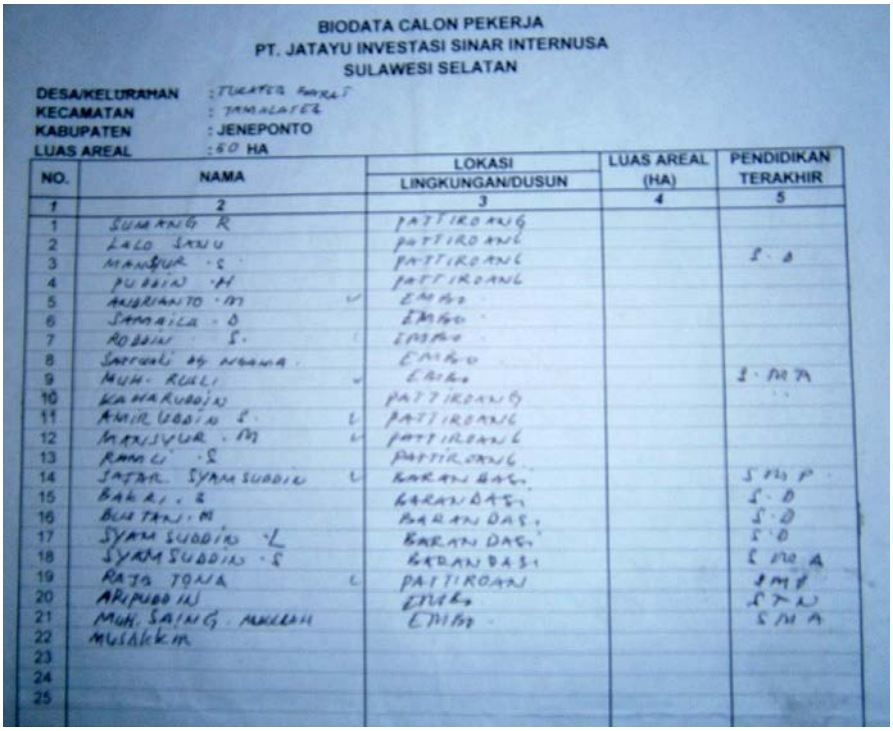
The nursery business was mushrooming because of the existence of PT JOP activity in Jeneponto. PT JOP sourced their seedlings from these independent nurseries. According to Mustari, PT JOP always paid for the seeds they collected. Problems occurred when the company suddenly stopped its procurement.

When I verified this procurement with PT JOP former staff, where I interviewed Dr. Nasruddin and Ilham Gani, I was informed that the procurement of seedlings from the community nurseries in Jeneponto was actually violating the company's standard of operation. According to the official standard, all seedlings were supposed to be produced by company's nurseries. However, because in 2008 the company was in rush to meet the target to supply their plasma farmers with seedlings, the managers decided to also procure seedlings externally.

After PT JOP did not continue its seedlings procurement from them, there were two new investors, PT Makmur Tunas Kencana and PT Jatayu Investasi Sinar Internusa that came to collect seedlings from farmers through Mustari but they never paid the seedlings. Farmers trusted the two companies because they made promises to them.

Aside from buying their seedlings, the two companies also offered to lease land from farmers. The offered lease price was Rp. 50 million per hectares for a five year period. The companies also hired local figures, including Mustari to collect land and farmer data with a promise that if they can collect more than 1000 ha, they would get a car as a reward. According to Mustari, he collected more than 1000 ha but after he submitted the list of farmers who registered for the cooperation scheme there was no further news from both companies. Mustari said that he and the farmers were very disappointed for being cheated by the two companies and for being the victims of the empty promise of the companies to lease their lands. 'If we think about it, it is very depressing. We spent our time and our money for nothing. We are very disappointed', he said.

Due to the loss and the absence of buyer after PT JPN stopped to purchase the seedlings from them, Mustari and Daeng Rani finally stopped their jatropha nursery business. They both experienced significant financial loss. I was informed that Daeng Rani was the one who suffered the most serious losses. He borrowed money from *Bank Rakyat Indonesia* for his investment. He had to sell his assets to repay the loan. After that he was reported to experience a serious depression and finally died in 2011. Farmers who joined the business also suffered from financial losses. When the business was totally stopped, they decided to destroy the remaining seedlings. Many of them refused to repay their loans to Mustari and Daeng Rani and some others demanded to be paid for their labor. After this bad experience, they have lost their interest in jatropha.



BIODATA CALON PEKERJA
PT. JATAYU INVESTASI SINAR INTERNUSA
SULAWESI SELATAN

DESA/KELURAHAN : TUKAMASEA BARAT
KECAMATAN : TAMALATEA
KABUPATEN : JENEPONTO
LUAS AREAL : 60 HA

NO.	NAMA	LOKASI LINGKUNGAN/DUSUN	LUAS AREAL (HA)	PENDIDIKAN TERAKHIR
1	2	3	4	5
1	SUMANG R	PATTIROANG		
2	LALO SANU	PATTIROANG		
3	MANSYUR · S	PATTIROANG		SD
4	PUBBIN · H	PATTIROANG		
5	ANDRIANTO · M	EMBO		
6	SAMAILA · D	EMBO		
7	ROBBIN · S	EMBO		
8	SAFRUDI DG NGAMA	EMBO		
9	MUH. RULI	EMBO		SMA
10	KAHARUDDIN	PATTIROANG		
11	AMIR UDDIN S	PATTIROANG		
12	MANSYUR · M	PATTIROANG		
13	RAMLI · S	PATTIROANG		
14	SATAR SYAMSUDDIN	KARANBASE		SMP
15	BAKRI · S	KARANBASE		SD
16	BUNTANI · M	KARANBASE		SD
17	SYAMSUDDIN · L	KARANBASE		SD
18	SYAMSUDDIN · S	KARANBASE		SMA
19	RAJA TONA	PATTIROANG		SMP
20	ARIFUDDIN	EMBO		STM
21	MUH. SAING MAKKAU	EMBO		SMA
22	MUSAKKIR			
23				
24				
25				

Figure 5.6 A form filled with list of laborers to be employed by a jatropha investor in Jeneponto, South Sulawesi (Photo: Henky Widjaja, 2011)

PT. MAKMUR TUNAS KENCANA
ADMINISTRATUR JENEPONTO
JALAN SEJAHTERA BTN ROMANGA BLOK A 4/16 HP. 085255621749

DAFTAR PENDATAAN ULANG

Nama Calon Sinder .... : AGUS SALIM Nama Calon Ass Sinder Kec : BINAMU / RAHMAN LALLO
Nama calon Mandor : MUSTARI Desa /Kelurahan* : PANAIKANG Kab. Jeneponto/~~Bantaeng~~ *

No	Nama petani	Dusun/RK	~~Desa~~/Kelurahan	Data awal lahan(Hektar)	Data Survey lahan (Hektar)	Tanda tangan
1	JAMALUDDIN		PANAIKANG	1.00		
2	JUMALI		〃	1.00		
3	BASO. A		〃	0.50		
4	RABAI		〃	1.00		
5	SUMAKKARA		〃	1.00		
6	M. DG. NALING		〃	1.00		
7	DOLO		〃	1.00		
8	SASSA		〃	0.50		
9	MUDA		〃	0.50		
10	BUA		〃	0.50		
11	BETA		〃	0.50		
12	JAKO		〃	0.50		
13	SAMAILA		〃	1.00		
14	BAHAR		〃	1.00		
15	SAMPARA		〃	1.00		
16	NURU		〃	1.00		
17	BASRI		〃	1.00		
18	LOBO		〃	1.00		
19	SITTI		〃	0.50		

Figure 5.7 A list of farmers and their lands to be included in a jatropha investment in Jeneponto, South Sulawesi (Photo: Henky Widjaja, 2011)

5.2.9 Jatropha Project by the Estate Crop Office of South Sulawesi Province

In September and October 2011, I visited the Provincial Estate Crop Office of South Sulawesi to collect information on the provincial policy and programs on jatropha cultivation as an energy crop. Interviews with the key officials were taken place at several occasions. I interviewed Hatta Kadir, head of programming unit and Muh. Anas, head of estate crops development division. Hatta was my key respondent who also provided me with the statistical data on jatropha projects under the agency. My visits were made during their busy schedule in preparing APBD-*Perubahan* (the revised annual local budget) and the inspection visit of the central inspectorate auditors for an annual performance monitoring.

According to Hatta, jatropha was introduced by the government as a response to the increasing national energy shortage. At that time several programs were launched by the government to address the national energy crisis, such as the program to substitute kerosene with gas. Jatropha was introduced as a simple energy technology that can be self-produced by the people. For that objective, the government initiated the Desa Mandiri Energi (DME) Program to promote the cultivation of jatropha and also distributed several pressing machines and stoves to motivate people to start using jatropha fuel.

Under the DME Program, jatropha became a priority crop to receive budget allocation from the government since 2008. Four districts: Maros, Jeneponto, Sidrap and Luwu became the pilot locations for jatropha development. In these locations, farmers were provided with free seeds and were also paid to cultivate jatropha. Based on the official data of the Provincial Estate Crop Office of South Sulawesi (see Table 5.2), from 2008 to 2010 an amount of Rp. 1,176.056,000 was allocated to finance the pilot project activities in the four districts.

The pilot project was claimed to be successful in Maros and Sidrap. Anas told me that the yields in the two districts were satisfactory. Despite this positive result, the project encountered the reality that there was no buyer for the produced seeds. 'The plants condition was very good. We had good yields. I remember to see bags of seeds, but there was no buyer', he said. Finally the Provincial Estate Crop Office of South Sulawesi decided to stop the pilot projects in 2011 because of the absence of profitable market for jatropha seeds. Anas claimed that his office decided to stop the projects despite receiving an offer from the central government through the Ministry of Finance to use the special credit program for biofuels called Credit for Biofuels Development and Plantation Revitalization (*Kredit Pengembangan Energi Nabati dan Revitalisasi Perkebunan* or KPEN-RP) to continue financing the projects. According to Anas, he refused the offer because he did not think that using the resource for a failed crop would be a wise decision.

According to the statistical data on the Total Area, Production and Productivity of Jatropha Farmers in South Sulawesi in 2010 issued by the Provincial Estate Crop Office of South Sulawesi (see Table 5.3), jatropha was cultivated in twelve districts in South Sulawesi. Approximately 9,298 farmers involved in the cultivation of jatropha in these twelve

Table 5.2 - Jatropha Development Activities of the Provincial Estate Crop Office of South Sulawesi from 2008 to 2010

No.	Year	Activity	Volume	Budget Source	Budget	Location
1.	2008	Matching fund for jatropha cultivation under the DME Program.	1 package	APBN	19,600,000	
		Matching fund for jatropha cultivation under the Non-DME Program.	1 package		18,780,000	
		Matching fund for the jatropha nursery under the DME Program	1 package		6,000,000	
		Maintenance of the jatropha nursery under the DME Program	5 hectare		40,190,000	Sidrap
		Maintenance of the jatropha nursery under the DME Program	10 hectare		40,190,000	Luwu
		Maintenance of the jatropha nursery under the DME Program	5 hectare		5,500,000	Sidrap
		Jatropha processing agroindustry development	1 unit		50,000,000	Sidrap
		Jatropha processing agroindustry development	1 package		215,500,000	Maros
		Matching fund for jatropha cultivation under the DME Program.	50 hectare		254,370,000	Maros
		Matching fund for jatropha cultivation under the Non-DME Program.	50 hectare		187,520,000	Jeneponto
2.	2009	Maintenance of the jatropha nursery under the DME Program	10 hectare		66,858,000	Sidrap
		Maintenance of the jatropha nursery under the DME Program	10 hectare		66,858,000	Luwu
3.	2010	Maintenance of the jatropha nursery under the DME Program	10 hectare		96,740,000	Sidrap
		Matching fund for jatropha cultivation under the DME Program	40 hectare		107,950,000	Maros
Total					**1,176,056,000**	

Source: The Provincial Estate Crop Office of South Sulawesi.

districts. The total planted area was 7,645 ha. The total production from the twelve districts was 79 tons. The presented statistical data, however, was not reliable to become a statistical reference on the actual jatropha cultivation in South Sulawesi since it was based only on the estimation prepared by the district level estate crop offices. Hatta told me that the presented numbers had not covered the statistical data of jatropha plantations ran by the investors because many of them operated their plantations without coordinating with the provincial or district level estate crop offices.

The weak coordination between the investors and the government had not only caused the absence of comprehensive data on jatropha cultivation in South Sulawesi, but also the absence of information on jatropha investment activities. The Provincial Estate Crop

Table 5.3 - Data on Total Area, Yield and Productivity of Jatropha Farmers in South Sulawesi in 2010

No	district	land size (hectare)				yield (ton)	productivity (kg/hectare)	farmer (Hh)
		TBM	TM	TR	total			
1	2	3	4	5	6	7	8	9
1	Luwu		358	196	554	24	67.04	1,092
2	Luwu Utara							
3	Luwu Timur							
4	Palopo			20	20			39
5	Tana Toraja							
6	Toraja Utara							
7	Bone		38	4,043	4,081	10	263.16	2,720
8	Soppeng			26	26			20
9	Wajo							
10	Sinjai		65	50	115	22	338.46	107
11	Bulukumba			1,665	1,665			3,644
12	Selayar		150	15	165	3	30.00	472
13	Bantaeng							
14	Jeneponto		161	477	638	16	99.38	776
15	Takalar			15	15			15
16	Gowa							
17	Maros		5	168	173	1	200.00	287
18	Pangkep							
19	Barru							
20	Pinrang	159	18	6	183	3	166.67	126
21	Sidrap			10	10			
22	Enrekang							
Total		**159**	**795**	**6,691**	**7,645**	**79**	**1,164.71**	**9,298**

Source: The Provincial Estate Crop Office of South Sulawesi.

Note: TBM = Tanaman Belum Menghasilkan / Non-Yielding Crop, TM = Tanaman Menghasilkan / Yielding Crop, TR = Tanaman Rusak / Failed Crop, HH = Household.

Office of South Sulawesi had no data or information on the types, schemes, coverage, and progress the investments.

5.2.10 Jatropha Projects by the District Government: The Case of Gowa District

To further expand my investigation on jatropha projects implemented by the government, I went to the Forestry and Estate Crop Office and the Industrial and Trade Office of Gowa District.[153] The Gowa government's jatropha project was funded using the local budget

[153] The two visits were conducted on separate days. My first visit was on 27 September 2011 where I visited the Forestry and Estate crops Office and interviewed Ir. Djamaluddin Makmun, the Head of the Gowa Forestry and Estate crops Office, and Joni the staff of the Program Development and Implementation Division. On the next day, I went to the Industrial and Trade Office and interviewed Burhanuddin, the head of general affairs at the office and formerly work for the Bappeda (Local Planning Agency) of Gowa.

for two years in 2007 and 2008 and the project was executed by the two offices. The Industrial and Trade Office was responsible to pilot a jatropha biofuel processing facility. A small factory was established in Parangloe. The factory was equipped with six processing machines. Five were the pressing machines and one was the fuel processing machine. These machines were provided by the national government through the Ministry of Trade and Industry. To supply raw materials for the machines, the government developed fifty hectares of jatropha garden for each processing machine. The development of the jatropha gardens was under the jurisdiction of the Forestry and Estate Crops Office. The office distributed approximately 300,000 seeds, which they supplied from Jember in East Java Province. The office also established a nursery located in Bellapunrangan, Parangloe.

There were approximately 1,800 hectares of jatropha gardens established by the farmers under both the private and government projects. Most of these gardens were located in Biringbulu and Parangloe Sub-districtcs. According to Djamaluddin, the head of the Forestry and Estate Crops Office, the Gowa government never prepared special locations for jatropha cultivation. The locations were decided by the farmers. Many farmers grew jatropha on the deforested hills, even though the plants were not intended for reforestation. In his explanation, Djamaluddin said that planting jatropha in degraded areas, such as the deforested hills was better that letting the areas to be grown by *alang-alang* grass (*Imperata Cylindrica*) only. He cited the statement of the Director General of Estate Crops who recommended to grow jatropha in the locations where grasses (*alang-alang*) grow, 'The director always tells us to compare the economic benefits of *alang-alang* and jatropha […] and of course it is better to plant jatropha than to let the location grown with *alang-alang* only. We used this same message in promoting jatropha to farmers.'

In promoting jatropha to farmers, the Gowa government also distributed four sets of jatropha processing machines to farmer groups. The machineries were provided by the Ministry of Trade and Industry. Farmers were expected to produce crude jatropha oil for their own fuel consumption as well as to sell it to any potential buyer, including to the biofuel industry for further processing to produce biodiesel.

The jatropha project, however, was not run as smooth as designed. When the trees started to produce beans, farmers immediately realized the absence of reliable market for their harvests. Farmers wanted to sell their jatropha for Rp. 2000 per kilogram but there was no buyer who wanted to buy at that price. The highest price offered to farmers was Rp. 1,000 per kilogram. The government also found that it was impossible for the government to buy the harvests to supply theirown biodiesel factory because the absence of budget. Furthermore, in their calculation, the production costs to produce jatropha biodiesel were too high and not competitive against the price of the fossil fuel. The high production costs were not only caused by the high farmgate price demanded by the farmers, but also caused by the low actual oil content of jatropha

which was only around 20-25% based on the result of a test run by the government.[154]

The low market price for jatropha and the absence of post-harvest processing activities immediately decreased the value of jatropha and caused massive disappointment of farmers. They arranged a series of protests in front of the district head office demanding the local government to compensate them for their losses. Many farmers replaced their previous crops with jatropha because they were convinced by the promising future of jatropha. The district head at that time, Ichsan Yasin, who was preparing for his second-term reacted to the protest immediately to prevent his political rivals to use this problem to attack him. The solution that time was to compensate the farmers by including them in the ongoing commodities development project. Their jatropha trees were replaced with new crops, such as cacao, kapok, and maize based on their land suitability.

Aside from the government's jatropha project, Gowa also hosted jatropha projects ran by private investors. The biggest private investor was PT JOP. Based on the list of PT JOP plasma areas in South Sulawesi (see Table 5.1.), there were around 1,368.68 hectares of jatropha garden under the company's plasma scheme in Gowa District. PT JOP promised farmers that jatropha could yield around four to five tons per year and offered to buy the beans for Rp. 1200 per kilogram. However, the actual results were very different both in terms of the yield and the price. The productivity per hectares was very low and the buying price was only Rp. 600 per kilogram at the time farmers wanted to sell. The disappointing results experienced by the plasma farmers of PT JOP in Gowa also became a problem for the government. To prevent unrest, the local government decided to assist farmers in replacing their jatropha trees with other crops.

The activities of PT JOP in Gowa was also suggested to have political nuance. Djamaluddin said 'It was at the same time with the 2008 South Sulawesi governor election. Their investment was used to promote one candidate, Amin Syam (then was the incumbent of governor and the chair of Golkar Party in South Sulawesi where Nurdin was assigned to lead the campaign team). Of course, we in Gowa government did not like it because we support Syahrul (who is the old brother of Ichsan and was competing with Amin Syam in that election).'

According to Djamaluddin, learning from the failure of both private and government jatropha projects, the district head became very cautious in responding to investment offers on new commodities, such as jatropha. He said that the district head had set up a rule to obligate investors to provide guarantees and to show a concrete example of success before involving farmers.

[154] The calculation of production costs suggested that the cost was higher than the price feasible for an economic jatropha oil production. Farmers wanted to sell their jatropha for Rp. 2000 per kg. The price was too high because the oil content in one kilogram of jatropha beans was only around 20-25%. It means that one litre oil will cost around Rp. 8000 to 10000 for the raw material only. This number still has to be added with the costs of other additive materials, labor, and so forth. The total production costs was far above the price of diesel fuel - which was only half of the calculated production costs total and still lower even if the price of the beans were Rp. 1,000 per kilogram.

5.2.11 Jatropha Research Project at Hasanuddin University

To understand the role of the local academicians in the rise of jatropha in South Sulawesi, I visited the Agricultural Faculty of Hasanuddin University and interviewed Dr. Nasruddin, a senior lecturer. He is also a well known cacao expert and a former agronomist of PT JOP. The interview was conducted at his office at the campuss of Hasanuddin University, where I had an opportunity to meet with two other lecturers: Prof. Elka Akib, his partner consultant at PT JOP, and Dr. Farid.[155]

Popularly known as a cacao expert, Dr. Nasruddin became interested in jatropha when he joined PT JOP as an agronomist from 2007 to 2009. He received the job offer after he had been approached by Nurdin Halid. At that time he also asked his colleague, Prof. Elka Akib to join him as agronomist. For his field staff, he recruited many of his students from Hasanuddin University and Universitas Muslim Indonesia. Aside from working with resources from South Sulawesi, Dr. Nasruddin also collaborated with agronomists from Institut Pertanian Bogor assigned by the Bakrie Group.

Funded by Hasanuddin University, in 2008 he administered a research project with some of his students to study the propagation and the early growth of jatropha. He claimed that in his research he collected seeds of jatropha from the all districts in South Sulawesi with the aim to map and conserve the local jatropha varieties. For his research project, he established a small demonstration plot at the back of the agricultural faculty building. In this demonstration plot he conducted several tests to intercrop jatropha with other crops, such as maize and peanut. His research project lasted one year only. There was no significant result achieved from this research due to the short duration. He did not continue his research after he resigned from PT JOP. When I conducted the interviews, I visited the place where he used to have the demonstration plot. The plot was already abandoned with several mature jatropha trees (two metres tall) still standing and having grown wild. In addition to this research project, he also wrote a book on jatropha, entitled: *Budidaya, Hama dan Penyakit Tanaman Jarak* (Cultivation, Pests and Diseases of Jatropha) based on his literature research on jatropha. The book provides general information on jatropha that he used as a manual for the extension officers of PT JOP.

As a senior agronomist of PT JOP, he provided advices on cultivation, supervising the extension staff, and also developed a proposal on the company's business model. He proposed to PT JOP to apply the nucleus-plasma model with the aim to secure the raw material supply. He stated that at least 50% of the supply should be secured by establishing nucleus plantations. He proposed the company to establish nucleus plantations of a minimum fifty hectares per district which will serve two functions: to produce a basic supply of biofuel feedstock for the planned processing plant and as demonstration plots for the surrounding farmers in order to attrack them to join as plasma farmers. However, Dr. Nasruddin learned that his proposal was ignored by the company. He said, 'I proposed to apply the nucleus-plasma model. I advised JOP to establish nucleus

[155] The interviews took place on 4 October 2011.

Figure 5.8 Jatropha demonstration plot at Hasanuddin University (Photo: Henky Widjaja, 2011)

first before asking farmers to join as plasma farmerss. Nucleus is important to convince farmers, because you know… their eyes are their brain. But when the proposal was taken to Jakarta, it came back totally different. Bakrie decided to establish plasma without nucleus'.[156]

His other important advice that was ignored by PT JOP was the advice to avoid the monoculture sytem by adopting the intercropping system. He said, 'Jatropha should not be cultivated under a monoculture system because it will be difficult to find land for jatropha. It is impossible to ask farmers to only grow jatropha on their land. This is a very basic aspect that the company ignored. I advised to introduce intercropping with peanuts and dry land paddy. Intercropping can be done at the beginning of the planting and also at the pruning time. After the pruning, the tree canopy will be opened and there is enough time to plant short period crops, such as peanuts. But I am not recommending to intercrop with

[156] As what has been mentioned in the section on PT JOP case, the plasma system of the company was reported to cover approximately 8,000 farmers and 17,040 hectares of lands in 15 districts. However, these figures were said to be different from the reality on the ground. According to Dr. Nasruddin, the maximum real figures were probably only 60% from the reported figures. The incorrect data was caused by poor land verification process by the field staff and weak management of the plasma system.

maize because it is very nitrogen extractive. It is better to intercrop jatropha with peanut because it has the rooting system that fixes the soil nitrogen. In my research project, we conducted an intercropping test with maize and the result was pretty good, but it is still better to intercrop with peanuts.'

He further said that jatropha should not be introduced as a replacement of commercial crops because it will not be competitive and risky for farmers. Jatropha should be introduced in marginal locations where livelihood options are limited. He said to persuade farmers in such locations, he just simply asked them to compare the economic value of jatropha with *alang-alang*.

A similar view was given by Farid who said, 'Plants, such as jatropha should be introduced only in marginal areas. For many poor farmers, a price like Rp. 500 or 700 per kilogram is already a blessing. Better to earn something than nothing.' According to Farid, he encountered several cases where jatropha was replacing productive commercial crops and causing financial losses for farmers. He said, 'In Pattiro, Bone, I found farmers who cut down their coconut trees for jatropha. This was because there was no guidance from the field officers of PT JOP. At the end, when jatropha collapsed, farmers became very upset. Most field officers did not dare to return to their locations after that happened. The trauma over jatropha has made it difficult to revive this plant.'

While Dr. Nasruddin was not favoring the conversion of commercial crops with jatropha, he admitted that during his time with PT JOP he might also have contributed to the shifting of many farmers to jatropha. He was a host of a weekly radio talkshow at RRI (Radio Republik Indonesia – the national radio station) every Saturday night. In this talkshow he spoke about various topics on rural life and agriculture and at the time when he was an agronomist of PT JOP he also introduced jatropha in his talkshow. He believed that farmers, especially cacao farmers might have decided to grow jatropha after listening to his radio program. At that time, cacao as the key commodity of South Sulawesi experienced a downfall that forced farmers to search for other crop options, and jatropha was one option that was selected. His popularity as a cacao expert in South Sulawesi had made him trustworthy when he introduced jatropha as a new promising commodity to replace cacao. Dr Nasruddin left the company when the field activities were stopped in 2009 and he did not get involved further in any jatropha related activities since then.

5.2.12 Jatropha Investment in Luwu District– The Case of PT Luwu Agro Raya

I received information on PT Luwu Agro Raya from a marketing staff of a cable TV company of Rahman Halid (the former manager of PT JOP). He informed me that he knew a Chinese businessman named Louis who had a jatropha venture several years ago. However, he did not give me the exact address of the businessman nor his profile (the information was nothing more than 'he used to talk about jatropha everytime I collected the monthly subscription fee at his house.') So in tracking Louis, I contacted the TV cable office and they gave me a description of his address – but not with the complete address details. I met Louis after several times visiting his house. He spends most of his time in Palopo where he

runs a construction business. An appointment was made through his wife who arranged a brief interview with him on 23 November 2011.

Louis is a senior contractor in Palopo, Luwu. He started his business at a very early age. He was 20 when he entered his father business in rattan trade. Later on he started his own construction venture. His first project was the construction of sugar factory in Arasoe, Bone. In 1973, at the age of 23, he won a tender of PT Aneka Tambang (a government nickel company) in Pomalaa (now Southeast Sulawesi) to construct the office buildings, workshop, warehouses and bridges for Rp. 600 million. As a senior contractor in Palopo, Louis has a very good relationship with the local elites, both government and influential individuals in Luwu area.[157]

Because of his strong local network in Luwu, he was contacted by his old friend who owns the Modern Group (a prominent conglomerate group in Indonesia known for their Fuji Film distribution company) in 2007 to join a new venture in jatropha. Modern Group was partnering with a Japanese investor in this venture and the share arrangement was 40:40:20. Louis received a 20% share for his role in facilitating communication and managing the field activities. This venture was his first involvement in agribusiness/ plantation. He was asked to facilitate the investment in the Luwu area. The initial plan was to lobby the local government to provide land for the venture, but it turned out to be that they finally established a partnership with three local land owners who provided them with ten hectares of land for their trial plots.

The lands were in two locations: Bupong in Padangsappa and Bua in Pakkalolo. According to him, there was no payment made to the landowners, but they agreed that if the pilot project was successful, the landowners will get free seeds for further development. Prior to the cultivation of jatropha in the venture area, the location was used for cacao cultivation. However due to the decline of production and massive pest attacks, the farmers decided to cut down the cacao trees and became interested in jatropha. According to Louis, for the jatropha plot preparation he used bulldozers and hired laborers to clear the area.

This venture involved an investment of Rp. 2 billion and lasted eight months only. The investment was used for land preparation, seeds and laborers. Seeds involved in this venture were supplied from multiple sources: local seeds, NTB, Malaysia and China. The imported seeds were hand carried by him in several flights, while seeds from NTB were supplied by the Modern Group. Louis said that local seeds had a good performance and were competitive with improved seeds from Malaysia and China. According to him, prior to his venture there had been some jatropha activities – including by PT JOP and the local government. The quality local seeds were supplied by farmers from these projects. There were also some trees grown since the Japanese colonial period. Louis informed that these quality local seeds were taken to Japan for further research.

[157] Since decentralization started, Luwu area has been split to 4 districts: Palopo City, Luwu, North Luwu and East Luwu.

While there was no assessment on the real productivity of jatropha in his venture, Louis claimed that one tree could produce approximately 7-8 kg. This figure was based on the test done in China for the China imported seeds. The local seeds were also claimed to have a good productivity since as he described: 'The tree had many branches and fruits'. According to him, pruning is the key of high yield: 'More branches means more fruits'.

The venture lasted eight months only. Louis explained that this was caused by a sudden drop of fossil fuel price. Apparently the venture was triggered by the skyrocketing price of fossil fuel. Jatropha was perceived as a competitive and profitable alternative energy source. 'We invested when the fuel price was above $100 per barrel. And we estimated that it would reach $200. If it was realized, then it would be profitable to produce jatropha biodiesel. However, the price of the fossil fuel fell againto around $60-70. Because of this, we decided to stop the venture' he said.

He explained that actually the investors realized this condition and there had been an effort to improve the profitability potential of jatropha by exploring the possibility to produce edible oil from jatropha. He claimed that his venture had included a research on how to address the toxic nature of jatropha. The research was conducted in Japan by his Japanese partner, but until he stopped the venture no convincing result was achieved.

Louis said that he was in the process of investing in oil palm plantation. The plan was to acquire 22,000 ha from government and farmers. Through his lobby, he claimed that he had secured land for his new venture. Communication with the government is important because they provide direction on the suitable areas for oil palm production. Furthermore, accessing government land is considered as a low cost investment. He claimed that he got a twentyfive years tenure and only had to pay a minimum amount of money for land tax in using the land.

About his planned oil palm venture, Louis pointed out the importance to involve local farmers as the plasma farmers as he said that 'Involving them as plasma farmers will prevent negative actions, such as stealing and sabotaging'. He calculated that the investment cost per hectares was around Rp. 27 million. This was the amount invested until the trees start to produce in the fourth year. Louis also said that before the trees start to be productive, he intercroped oil palm with maize since the method has been applied elsewhere with satisfactory results. The profit from maize would cover the costs for the initial four years.

5.3 Jatropha Projects Analysis

In this section I will present the analysis of the twelve jatropha (see the summary of the projects in Table 5.4 List of the Researched Jatropha Projects) by focusing on the factors explaining the implementation of the observed projects. The focus will be on the discussion about the drivers of the projects and the motivations of the actors to identify opportunities and benefits that were pursued and materialized in the observed projects. The focus of the analysis will also be on the strategies and the networks of both actors and technology adopted in the projects.

Table 5.4 - List of the Researched Jatropha Projects

No.	Name	Location	Year	Description
1.	PT Jatro Oil Plantation	Fifteen regencies in South Sulawesi	2007-2011	A national private investment covering 17,040 ha (40 million trees). Plasma model with contract for 25 years. Farmers were provided with cash and in-kind loans paid at the beginning of their participation. Aside from the market problem, this project failed due to mismanagement and corruption both at the management and farmer level.
2.	PT Jais Bone Sejahtera (PT JBS)	South and West Sulawesi	2008-2011	A Makassar-based Japanese company with jatropha oil processing plant and outgrower scheme in South and West Sulawesi. The company recorded an export of 2 barrels of jatropha oil to Japan in 2010 but no further exports after that. The operation was terminated after 2011.
3.	Green Light Biofuel	Pinrang	2008	A pilot project of 50 ha covering 1,000 farmers. Lands were leased and farmers were paid for their labor. Implemented for just 1 year and terminated due to unfeasible market prospects and the lack of investor interest.
4.	PT Energy Indonesia Timur & Forum Biodiesel Indonesia – Yoel Pasae	Makassar	2006-2009	Producing customized jatropha oil processing machines. Initially targeting government procurement projects in South Sulawesi.
5.	PT PLN Jatropha CSR Project – Yusuf Hamma & Yoel Pasae	Barru	2007	Funding duration was only for 3 months. It was a demonstration plot only in PT PLN location.
6.	PT INCO-Jatropha for Soft Landing Mine Closure Scenario	East Luwu	2006	Implemented by the land rehabilitation of mining department PT INCO. Tested in 10 ha ex-mining area. Trees died due to soil condition. Project was terminated after one year of implementation.
7.	PT Anugerah Cemerlang Indonesia – PT Vale Program	Makassar and East Luwu	2006	A contract to sell castor and agro-inputs to PT INCO community development program. Community Development Seeds were supplied from Mataram. The contract was terminated at its initial stage due to the lack of community interest in jatropha.
8.	Community jatropha nursery – Mustari	Jeneponto	2007	A local venture by farmers in Jeneponto in response to jatropha hype. Focus on seedlings business. Stopped after being cheated.
9.	Estate Crops Office of South Sulawesi	South Sulawesi	2008-2010	14 projects implemented in 2008-2010 with a total budget of IDR 1,176,056,000 (Euro 115,000). However, there was no clarity on the implementation regarding locations, activities and results.
10.	Estate Crops Office	Gowa of Gowa	2008	The office procured and distributed 300,000 seeds as a follow-up of the allocation of 6 machines for jatropha – 5 pressing machines and 1 oil processor by the National Trade and Industry Ministry.
11.	Agricultural faculty, Hasanuddin University – Germ plasma collection and demonstration plot	Makassar	2008-2009	Utilizing the momentum of jatropha hype, the agricultural faculty launched a research project on local jatropha varieties to collect and preserve indigenous jatropha varieties in South Sulawesi. The research was led by Dr. Nasaruddin, a cacao expert and former consultant of PT JOP. The funding was from the university.
12.	Luwu Agro Raya	Luwu	2007	A joint venture trial by local, national and foreign investors (Japan). Driven by the skyrocketing fuel price. Total venture capital was IDR 2 billion and lasted for 8 months. Seeds from China, Mataram and local sources.
	Total			**1,176,056,000**

Source: The Provincial Estate Crop Office of South Sulawesi.

5.3.1 Drivers and Motivations

In Chapter 3 I have presented the discussion on the two key drivers of the jatropha hype in Indonesia: market and non-market drivers. Both key drivers exist in the twelve researched projects. Key actors in the researched projects mentioned that the market opportunities from the soaring of fossil fuel prices and the global trend for biofuels were the key drivers for their jatropha related projects. Actors interpreted markets for jatropha at three levels: global, domestic and local. The global trend for biofuels was seen as an opportunity for exporting jatropha biodiesel to countries that had adopted favorable policies toward biodiesel. Aside from the availability of foreign market for jatropha biofuel, it is also noted that the interest in jatropha occurred at a time when the stock market was booming and a lot of venture capital was being invested in biofuels (Tjeuw 2017: 2). Meanwhile at the national level, the existence of the biofuel consumption targets was perceived as a positive market signal for the domestic jatropha biodiesel industry. In parallel, at the local level, the emerging interest in jatropha investment had created immediate markets for the local suppliers of seeds, seedlings and technologies.

The potentials in the first two levels of markets had encouraged some investors to establish a complete jatropha value chain from the cultivation of the plant to the production and trading of jatropha biodiesel, such as in the case of PT JOP and PT JBS. Meanwhile, for the local markets, the actors were only targeting specific parts of the value chain as their market targets, such as supplying the seeds and seedlings and the jatropha related technologies. These parts of the value chain were the tangible targets for most of the observed jatropha projects due to the absence of local buyers for jatropha biodiesel production in South Sulawesi, including even in the jatropha projects of PT PLN and PT Vale. While allocating CSR budget for jatropha projects and having the potential to become strategic buyers of the jatropha biodiesel, the companies did not have a clear plan to use jatropha biodiesel for their own consumption. Both companies stated that the use of jatropha biofuel was only for the community based rural energy production. As coined in the previous section, the given supports tend to be fashion driven as well as a form of formality only in demonstrating their supports to the national government's agenda on jatropha development with no initiative to internalize it in the companies' business portfolio.

The availability of funding, such as the CSR itself, research grants, and government budget allocation for jatropha related activities had became another key driver of many of the observed projects. These non-oil drivers had attracted actors, such as government officials, university researchers, the private sector, and NGOs to implement various jatropha projects and they apparently perceived them as end goals of their interests in jatropha instead of the production of biofuel itself. This is a condition that generated opportunistic behavior, as they designed their activities to match to the conditions of the funding with further implications on the unsustainability of the projects after the available funding expired.

The opportunistic behavior of the actors and the short life of the projects are closely related to how the actors defined and perceived the jatropha projects where they

involved. The analysis of these factors indicates that the term 'project' in the twelve jatropha projects had been widely translated in the way Indonesians in general define *proyek*, a specific connotation of 'easy money'.[158] Aspinall (2013: 30) points out that *proyek* is commonly perceived as a window of opportunity to benefit from the available funding. Such opportunities occur for those involved in the management of the projects (corruption, mark-ups) and for input and machinery suppliers or project beneficiaries.

Actors also used the positive discourses on jatropha (a solution for the fuel crisis, environmental rehabilitation and income generation) as a basis to access and approve budget allocation as well as to attract investment for their projects. The tendency to pursue short-term benefits from the projects was confirmed by findings on corruption in the jatropha projects run by government agencies (such as the case of the jatropha project by the provincial agency that received multi-year funding to establish model gardens, while the implementation appeared to be fictitious), as well as in the commercial jatropha projects, for example in the case of PT JOP, where the managers exploited the venture for their personal interests.

It is not entirely surprising to find in a new sector, such as jatropha, where the business plans are based on rough estimates as the product is untested, fraud is much easier to disguise. This is especially because the failure potential of such a new industry is higher, thus any failure is easily acceptable.

The research also points out that for the observed jatropha investment projects, while there were high expectations on jatropha, the reality that jatropha was not yet a commercially proven crop made actors very cautious about getting involved. Formal project proposals mentioned well-established business models for collaboration between companies and farmers, such as 'nucleus-plasma', land-leasing agreements and joint ventures. However, in the implementation of the projects, activities were predominantly guided by the informal common understanding between the project actors that their cooperation was just a *proyek* or a pilot project, emphasizing its short-term and trial nature. This understanding therefore minimized the expectations of the actors, limiting them to the benefits they had gained during the implementation of the project, for example, rent for the landowner and wages for the laborers. This resonates the analysis given by Persoon and van Est (2003: 17) on how projects may be perceived as resources in their own right, because they bring direct gains in terms of material benefits, paid labor, increased access to resources and new opportunities. In some cases, these benefits,

[158] Originating in the developmentalism of the New Order period when Indonesia was awash with oil money and the abundance of government and international donors funding for development, a new form of clientelism was created. The development programs and funds are channeled and implemented as projects, which in the Indonesian context is widely understood as *proyek* – a specific connotation of 'easy money'. The *proyek* is a key mode in the neoliberal approach to governance, with government bodies and international agencies dispensing significant parts of their funds in this way (Aspinall 2013: 30) – where the implementation of projects should be delegated to the third party, notably the NGOs, instead of being directly executed by the government or the funding agencies. This condition is a key strategy imposed by donors to empower civil society (NGOs) in their engagement with development. Acting as development brokers, the political entrepreneurs have been quick to understand that the creation of an NGO has become a best means of procuring funds from development projects (Platteau 2004: 229).

intended as incentives in relation to overall project aims, are valued in themselves, irrespective of the purpose they are supposed to serve.

Against this background, it could be argued that the word 'project' had been translated as a type of business model for testing jatropha on the ground, and was instrumental for actors, such as companies or research institutes to test jatropha in field settings in a way that transferred the costs and risks to others, especially to the farmers. However, the common understanding of the short-term and trial nature of the project made it easier for the actors, including the project partners (especially the farmers and workers), to accept and agree upon the sudden termination of the projects for a variety of reasons, including the absence of a market, the end of subsidies and lack of additional funding.

5.3.2 Actor Networks in the Jatropha Projects in South Sulawesi

An actors network is crucial for translating global discourses on jatropha to national and local levels, mediating the jatropha hype circulation between scientists from international level down to the very local research labs, bridging the hype to policy makers and business institutions, and providing access to production factors on the ground for investors (Amir *et al.* 2008, Fatimah and Yuliar 2009, Afiff 2014, Simandjuntak 2014, Vel 2014). The analysis of the actor network in this research is applied to analyze the interconnections between actors and how their networks provide access to the targeted resources.

In the observed projects, opportunities were created through a variety of networks to influence a policy or a decision by using various positive discourses relating to jatropha at that time. As noted by Vel and Nugrohowardhani (2012: 33), a policy comes with a budget, and many of the actors were able to access budgets for their projects by influencing policy through their networks, such as the jatropha related research projects in the local universities, and the CSR projects.

The presentation of the twelve projects in the previous section shows how the optimistic discourses were used and maintained by the key actors for their own interests. The positive discourses in these projects were created and maintained through a variety of networks to influence policies resulting in form of budget provision for a wide range of jatropha projects, and to convince and persuade other actors to get involved.

Each project exhibits the personal network of the key actors from where they gained access to capital or funding as well access to human resources, technologies and land. They utilized their social networks to provide them with intermediary services to access various resources upwards and downwards. This can be seen in the cacao networks of ACDI-VOCA utilized in the case of Green Light Biofuels pilot project, the socio-political networks of the Halid family in the case of PT JOP – where they used their networks to access the capital provided by the Bakrie Group and to recruit outgrowers, and the Indonesian Biodiesel Forum networks that were utilized by Yoel Pasae to lobby for a research grant, to market his company's jatropha processing equipments and to access CSR funding. Meanwhile, actors with limited local networks were suggested to dominantly

rely on the official channels to access resources, as demonstrated in the case of PT JBS that relied on government support and business cooperation to access farmers as their plasma farmers and seeds suppliers.

The research on the twelve projects also shows the interconnections of several projects where one actor, such as Yoel Pasae became a key actor for several jatropha projects (his own jatropha research project at UKIP, his joint research project with the Indonesian Cereals Research Institution, his biodiesel technology products venture - PT Energi Indonesia Timur (PT EIT), and his jatropha CSR project with PT PLN). As the forerunner of jatropha development in South Sulawesi, Yoel benefited from his web of networks with the national level biofuels researchers at the ITB and with the local key stakeholders in South Sulawesi through his provincial chapter of the Indonesian Biodiesel Forum.

The interconnections of projects were also exhibited in the close relationship between PT JOP venture with the jatropha research in Hasanuddin University by the company's senior agronomist, and the community jatropha nursery venture in Jeneponto. The interconnections of these projects demonstrated that one project (in this case PT JOP) became a source of inspiration on opportunities for its actors to develop their own jatropha projects based on their ability to access resources in their own places.

5.4 Conclusion

In this chapter I have presented the discussion on the twelve jatropha projects in South Sulawesi that are covered in my research. The analysis is based on qualitative research data where the interview questions centered around the motivations and drivers for establishing jatropha projects (why) and the operation of these projects (how) through the web of actors in the projects.

The twelve projects suggest that the overall motivation for the emergence of these projects in South Sulawesi was driven by the high expectations of jatropha becoming a high-value biofuel alternative of the diesel oil and the availability of a large amount of funding from investors, companies and governments for various jatropha-related projects. However, the incomplete value chain for jatropha in South Sulawesi (as also happened elsewhere) with very little processing of jatropha oil and no clear marketing of end products taking place had caused a strong pursuance of non-oil objectives in these projects.

The key actors, such as government, university researchers, private sector, and NGOs were attracted by these non-oil objectives to implement various jatropha projects and apparently perceived them as end goals of their interests in jatropha instead of the production of biofuel itself.

The analysis of the actors in the observed projects suggested that the common understanding of Indonesians of the term 'project' had shaped the strategy and behavior

of actors in these projects. In Indonesia, the term 'project' has a specific connotation which is linked to its standard definition as 'a planned set of interrelated tasks to be executed over a fixed period and within certain costs and other limitations'. Focusing on this specific connotation helps to explain why little attention has been paid to fostering a market for jatropha, why there has been so little long-term financing of jatropha projects, why the opportunistic behaviors of the actors were considered as 'a common sense' and why the short life of the projects was 'easily accepted'.

In the analysis on the actor networks in the twelve jatropha projects, it is shown that the social networks of the actors play an important role in providing intermediary services for them to have access to capital, grants and budget allocations as well as to access key production factors such as the technology, land and labor. The pre-existing networks as well as the connectedness to key individuals were the key advantages for most of the projects to access the desired resources. Those with limited networks will have to rely mostly on the official channels to access resources. The results difference between the two can be significant, because it is more likely that those who are well connected to political, financial and/or social power to have better chances to achieve their associated objectives.

Yet, the existence of political connections and influences for a venture itself is also proven not a solid guarantee of success. The story of PT JOP which was owned by the Bakrie Group, a politically influential business group and operated by the locally influential Halid family is an example of this case. The combination of the business objectives and the political interests in the operations of the venture failed to go hand in hand. The venture performance was negatively influenced by the incapability of the Halid family to manage the operations, because of serious mismanagement and misuse of the venture resources. In addition to that, the involvement of the venture combined with local political events had derailed the venture from its business focus and created negative sentiments towards the venture due to its political siding.

The next chapter will continue the discussion on the importance of social networks by presenting the analysis on how the selection of intermediary actors is crucial for the success implementation of a project.

6 The biofuel stories in Moncongloe

This chapter presents a comparison between jatropha curcas and cassava – two biofuel potential crops – in Moncongloe of Maros, South Sulawesi. Jatropha was massively cultivated in Moncongloe from 2007 to 2009 under the plasma scheme of PT Jatro Oil Plantation (JOP). Almost in the same period of time, farmers gradually shifted to cassava to supply the growing demand of cassava processing industries for bio-ethanol and other cassava based products. The comparison explores the reasons why farmers in Moncongloe were interested in jatropha and why they shifted to cassava. A common explanation of the shift itself is central in the disappointment of farmers on the low real yields, unfavorable farm gate prices and the absence of a market due to the broken promise of JOP. While my research confirms these common reasons, local key factors explaining the shift were also revealed.

My research focuses on the specific contexts of Moncongloe, I examined local socio, economic and tradition contexts that are central in farmers' decision making processes regarding the selection of crops. It aims to understand how local factors in Moncongloe have influenced and determined farmers' decision in crops selection.

For the purpose of my research, I conducted ethnographic observation in Moncongloe to examine the key local factors that influenced farmers' crops selection decisions. Interviews were administered with farmers and key figures notably the middlemen as well as with both jatropha and cassava companies. The effort to understand the specific contexts of Moncongloe was also accompanied with literature reviews on the history and current state of the area.

The research suggests the existence of four determinant factors in farmers' decision making: access to resources, actors in the supply chain, business model, and market. The analysis of access to resources was focused on the effects of the rapid peri-urbanization process in Moncongloe which signifies the on-going deagrarianization on farmers' access to land and the availability of labor. Meanwhile, for the analysis of actors in the supply chains, the focus was on the patron-client pattern in relation to the role of middlemen or brokers in the supply chain of jatropha and cassava. The research reveals the existence of two different types of middlemen: commercial and non-commercial intermediaries that have significant influences on farmers' participation in the cultivation of jatropha and cassava.

The analysis of the business model was conducted by comparing the plasma model in the jatropha case with the open market model in the cassava case. The analysis aims to examine the effectiveness of each model in securing the supply chain in the context of Moncongloe. The business model analysis is closely related to the first two analyses, where access to resources and intermediary actors play central roles as conditions for the success of the adopted business models. Lastly, the market analysis was conducted by examining the available market options for each crop. The analysis suggests that the existence of alternative and competitive markets determine farmers' calculation in bearing the risks of crop selection.

After this introduction, I will first present the profile of Moncongloe with specific focus on its agrarian transformation process that will be the central background in the discussion on jatropha and cassava investments. A patron-client analysis on the commercial and non-commercial intermediaries in Moncongloe will be presented before the conclusion of this paper.

6.1 Moncongloe: From Forest to Satellite City

I visited Moncongloe Bulu Village for the first time in July 2011 to collect field data on PT Jatro Oil Plantation (JOP) activities. My first interviews with the former company staff and the participating plasma farmers suggested that doing research in Moncongloe would not only provide rich information on the story of PT JOP's jatropha activities, but also an opportunity to observe the local conditions, which appears to explain the responses of Moncongloe farmers towards jatropha. The observation and analysis are essential in understanding the process of crops introduction and commercialization in Moncongloe, which is not only limited to jatropha but also other crops, notably cassava which is now a new important cash crop for Moncongloe farmers.

One important feature of Moncongloe which makes it interesting as a study site is that it presents a very dynamic deagrarianization process.[159] In present days, Moncongloe Bulu Village as part of the Moncongloe Sub-district of Maros District is transforming to become a satellite city of Makassar. By looking at its history, Moncongloe has experienced both agrarian and social changes for decades.

Moncongloe (Makassarese for the highland) is located 22 km on the east of Makassar at the border area of Makassar with Maros and Gowa. Moncongloe is a sub-district of

[159] Bryce (1993: 5) defines deagrarianization as a process of economic activity reorientation, occupational adjustment and spatial realignment of human settlement away from agrarian patterns. This process is manifested in a decreasing role of agriculture in rural people occupation and income sources, social reidentification as people start to regard themselves less as farmers and imagine futures outside of agriculture, increase movement between rural and urban areas, and the presence of spatial interpenetration since urban and rural become increasingly intermixed (Rigg 2001 as cited in Hall et.al. 2011: 119). For this chapter, the term deagrarianization is specifically used for the process of peri-urbanization or *desakota*, the process by which massive belts of mixed 'urban' and 'rural' land use have been created in the extended metropolitan regions in Southeast Asia.

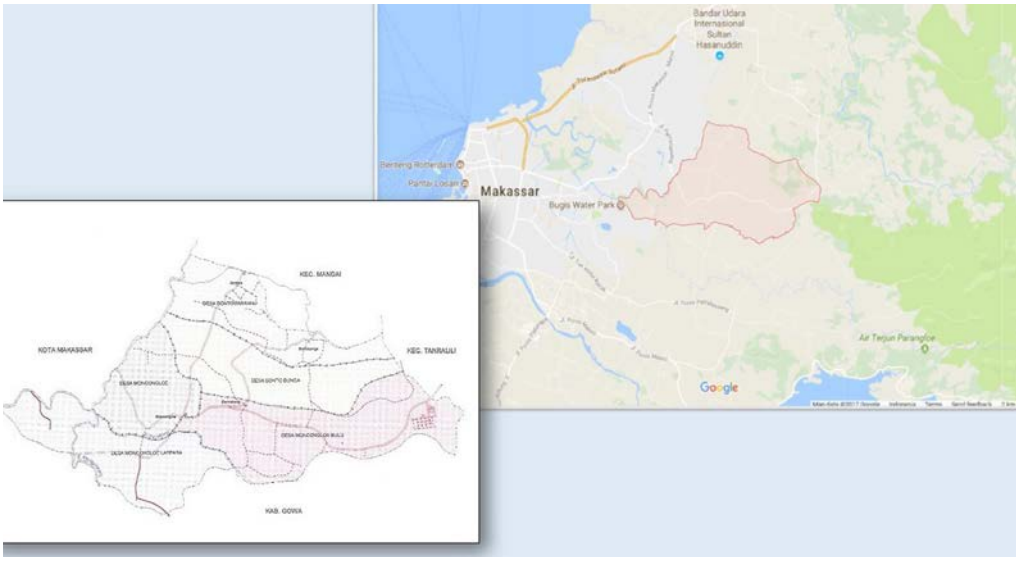


Figure 6.1. Moncongloe Map (Source: www.maps.google.co.id)

Maros District. Historically, Moncongloe was a district under the Kingdom of Tallo in the 16th century and governed by a nobility titled *gallarang*. The *gallarang* held power in Moncongloe until 14 years after the independence of Indonesia, where their authority was stipulated by the Government Regulation No. 34 Year 1952 juncto Government Regulation No. 2 Year 1952 on the establishment of *Makassar Afdeeling* which includes Maros as an *onderafdeeling* with 16 districts each governed by their local nobilities of *karaeng, arung* and *gallarang*. In 1959, the administrative status of Moncongloe was changed to village level under the sub-district of Mandai following the issuance of Law No. 29 Year 1959 on the establishment of regencies in South Sulawesi, including the Maros District. This law also ends the official authority of local nobilities and replaces them with the formal Indonesian administration. The status of Moncongloe was upgraded to sub-district level in 2000 and consists of five villages.[160]

In 2011 Moncongloe Sub-district covers an area of 46.87 km² with a population of 17,257 inhabitants (BPS Maros, 2011). While it has a long history of presence, not much documentation is available on Moncongloe. In my research I conducted data collection, both primary and secondary data to understand the sequence of changes in the area. In doing that, I refer to my interviews and observation as well as to the available publications on Moncongloe.

6.1.1 Gaining Diversity, Losing Resources

Historically, Moncongloe is the birthplace of a well known Islamic cleric, Asy-Syaikh al-haj Yusuf Abu al-Mahasin Hidayatullah Taj Al-Khalwati al-Makasari or Syekh Yusuf in 1626. His

[160] The official website of Maros District: http://maroskab.go.id/statis-4-sejarah-maros.html (accessed on 15 March 2012).

mother was the daughter of the Gallarang of Moncongloe. In the modern literature on Islam in South Sulawesi, Moncongloe is described as a place in South Sulawesi where the Islamic rebellion, Darul Islam was once had its presence. Moncongloe was a base of the Darul Islam rebellion since 1950 and lasted until 1967, which was two years longer after the death of the leader Qahar Muzakkar in 1965. During the period of the Darul Islam in Moncongloe, the local head of rebellion enforced the implementation of Islamic Syariá which affected the local system, where traditional religion, *Patuntung* was banned and the believers were forced to convert to Islam, furthermore the *gallarang* system was denied in order to create an egalitarian social system.

The existence of Darul Islam in Moncongloe was ended through the occupation of national army. This area was turned into a home base of Kodam (military area command) XIV Hasanuddin which consisted of several military housing complexes for the Military Police Corps (CPM), the army cooperative center (*Pusat Koperasi Angkatan Darat-Puskopad*), the army medical unit (*Kesehatan Daerah Militer-Kesdam*) and the military escort unit (*Kompi Pengawal-Kiwal*). As a military homebase, Moncongloe experienced a massive agrarian change. Moncongloe which used to be a forested area and homogenous in terms of population – a closed society, especially during the period of Darul Islam - suddenly experienced a rapid exploitation of natural resources and hosting a new and diverse population.

As written in the book of Taufik, *Kamp Pengasingan Moncongloe* (the Dentention Camp of Moncongloe), the establishment of the military homebase in Moncongloe was closely linked with the existence of the ex-communists rehabilitation camp (*kamp instalasi rehabilitasi*) which was established in the same period. There were 911 communist prisoners, 859 men and 59 women, who were detained in the rehabilitation camp from1969 to 1978, and being used to support the construction of the military housing complexes and their infrastructures. Taufik (2010) described that only few of the prisoners had any farming experience, as they were mostly white collar professionals but in just one year they transformed 460 hectares of forest into productive farmland where they grew cassava and maize. Three years later, when Moncongloe was officially classified as a rehabilitation camp, prisoners were forced to hand over three quarters of the land they had cultivated to the military officers in charge of the camp. They were also forced to form corvee labor teams to work on the officers' land, to harvest bamboo and timber, which they processed to make posts and plywood and other building materials, and to collect rocks for construction.

What happened in that period has shaped Moncongloe that we see today. Moncongloe is no longer a forested area, especially because the heavy exploitation of timber and bamboo which was sold to the Paper Mill of Gowa by military officials.[161] This environmental change is considered as the cause of regular drought and landslides in Moncongloe nowadays. The existence of the military housing complexes and the

[161] In Taufik (2009), it was written that bamboo was an important source of income for military officials in Moncongloe. They used the prisoners to clear bamboo forests and sold the bamboo to the paper mill for Rp. 50 to Rp. 100 per tree.

rehabilitation camp in Moncongloe has also changed the land tenure structure, where forests were cleared to provide space for arable land and housing complex of the military personnel. Every military personnel received five hectares of land, while the prisoners were given one hectares per person– which in the reality only one forth hectares that was fully owned by them and later on sold to either military officials or to the locals to earn some cash after being released from the camp in 1978.

It was during this period that the construction works of road infrastructures in Moncongloe, connecting villages (and military complexes) in this area and also Moncongloe with the main provincial road in Daya, Makassar were realized. The workers were mainly the communist prisoners. The other significant change was the change of population composition, from homogenous moslem and Bugis-Makassar population to a mixed and diverse population. The existence of military complexes and their populations had caused the diversification of ethnicities and religions in Moncongloe. Non-moslems, mostly the Christian Torajans, found their ways to migrate in Moncongloe as part of the military complexes populations. They constructed a church – *Kamsing* Church, which was built by the prisoners and they also introduced pig rearing in Moncongloe, which was not there when Moncongloe was an entirely moslem area.

The military homebase has contributed to massive changes in Moncongloe everyday life. The diversity as well as the infrastructure and the agricultural development as 'positive progresses' can be credited to them. However, their roles in environmental destruction and marginalization of the locals' access to resources, especially lands have contributed in perpetuating the poverty of the locals. In my field work, I found the existence of a gap between the descendants of the soldiers and the locals in terms of land possession. The descendants, who are the second and the third generations and mostly are farmers, and still own a relatively big parcel of farming land – two hectares on average. While in comparison, the locals only own a small parcel of land – below one hectare, and many own so little that they have to become sharecroppers or laborers for the other farmers.

The poverty situation in Moncongloe has shown little improvement over time. By referring to the description given by Amir (2010), during the period of Darul Islam rebellion Moncongloe people lived in extreme poverty. They did not have enough rice supply for their staple and had to consume poisonous wild tubers. People wore clothing made from recycled jute bags because they had no access to markets due to the civil war. In the peace period, with the changes in their landscape, poverty tended to be perpetuated. In addition to the inequalities in resource ownership, Moncongloe faces unfavorable environmental conditions for their agriculture. Moncongloe has no access to technical irrigation and has to depend on the annual rainfall. Due to this condition, there are no technical irrigated rice fields in Moncongloe and farmers can only grow rice once a year during the wet season.

Main agricultural products of Moncongloe are dry land crops, such as maize, peanuts and cassava, and vegetables such as lemongrass, and Siamese ginger (*lengkuas*), also fruits, such as mango and jackfruit. While these products are popular and easily absorbed by the market, but not all products are given good prices at farm level. Some, such as mango and

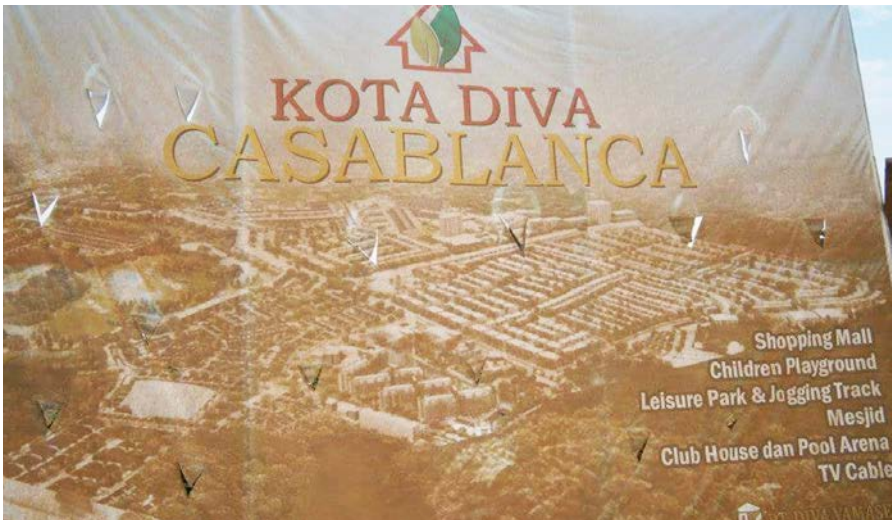


Figure 6.2 A billboard on the satellite city to be developed in Moncongloe (Photo: Henky Widjaja, 2012)

jackfruit, were sold for Rp. 2000 per kg for manggo and Rp. 5000 per fruit for jackfruit to the village collectors, while the market prices in Makassar were Rp. 10,000 per kg and Rp. 30,000 per fruit (2011 price rate). In my observation, this condition occurred because not all products have regular buyers. Products, such as Siamese ginger has a quite good price. It was sold for Rp. 2000 per kg and it is transported everyday to Makassar markets by the village collectors after being harvested by farmers. However, products, such as mango and jackfruit remain on the trees waiting for the collectors from outside the area to offer prices. Often, they are left on the trees and failed to bring income to the farmers.

6.1.2 Kampung Perampok to Satellite City

It is noted that Moncongloe once had a negative reputation as *kampung perampok* or the village of thugs. There are many bad stories about Moncongloe that caused this reputation. Some stories refer to the previous existence of the Darul Islam rebellion in Moncongloe. In these stories, Moncongloe is identified as *daerah gerombolan* (land of robbers – the rebels were always associated with robbery acts as a fact of their history). On the other hand, many other stories link the existence of military in the area with criminal acts – mostly as the backing of criminals. For this reputation, until early 2000s Moncongloe was not a place to go to, especially after sunset.

The negative reputation of Moncongloe began to disappear or was forgotten when the area became part of the new metropolitan development plan of Mamminasata (an abbreviation of Makassar, Maros, Sungguminasa (Gowa) and Takalar).[162] It was since

[162] The Mamminasata Metropolitan plan is regulated by Presidential Decree No. 55 Year 2011 on The Spatial Planning of Mamminasata Metropolitan Area, and Gubernatorial Decree of South Sulawesi No. 16 Year 2007 on the Establishment of Mamminasata Metropolitan Development Coordination Board.

early 2000s, when the rumor on the Mamminasata plan started to spread and several locations including Moncongloe attracted the attention of land investors. The inclusion of Moncongloe in the land market became more intensive when infrastructure development projects started to take place in this area. The construction of the middle ring road connecting Makassar, Maros and Gowa that will bypass Moncongloe has become the main attraction for land investors and developers to invest in Moncongloe. In September 2011, Moncongloe is officially declared as a part of future satellite city of Makassar which will cover an area of 3,445 ha for approximately 300,000 inhabitants (see Table 7.1 on the areas distribution for Mamminasata Satellite City plan). This plan was stipulated in a MoU between South Sulawesi Province, Maros and Gowa Districts, and the Real Estate Indonesia of South Sulawesi on Mamminasata Satellite City Development. Two sub-districts of Maros (2,510 hectare): Mandai and Moncongloe and two sub-districts of Gowa (935 hectare): Patalassang and Parangloe are designed as the locations of this new satellite city.

Land prices in this area have increased significantly, where the 2011 price for 150 meter square (10 x15, a standard size of land parcel or *tanah kapling*) was Rp. 30 million (USD 3000) – a price which was used to be paid for a hectares of nonirrigated rice field in Moncongloe years before. The increased land price has created a new income boom for the farmers. Suddenly, amidst their poverty, their land asset became so valuable. Poor in income but rich in asset is a new reality for Moncongloe farmers.

This new development in Moncongloe is parallel with the analysis given by Persoon and Simarmata (2014) that the marginality of an area is never permanent. They point out that the changing of perspectives or new market opportunities may lead to a redefinition of marginal areas. They argue that the marginality of lands can be undone by a variety

Figure 6.3 A sign board stating that the land was not for sale in Moncongloe indicating the emerging of land conflicts in the area (Photo: Henky Widjaja, 2012)

of reasons. Interest in new land for cultivation of crops is at present a major cause of marginal lands conversion into productive lands. Furthermore, the development of new infrastructure (roads, railways, dams, and so forth), the opening of frontier areas for exploitation activities (especially mining), and the changing of political decisions on the status of certain areas (transforming isolated areas for transmigration locations and special economic zones) can lead to the integration of these isolated areas into the mainstream socio-economy activities because of increased accessibility and demographic changes.

It is noted that selling lands in Moncongloe is not only lucrative for the poor farmers, but also for those who are relatively wealthy. Army families, for example, also started to sell their lands through land brokers. My key informant, Daeng Ma'ja, who was a head of the neighborhood association unit (*Rukun Warga*) in Moncongloe Bulu Village and who used to be a community facilitator for PT JOP in Moncongloe said that he become a mediator for army families to sell their lands, and he also helped the interested buyers to persuade the families to sell their lands.

Most lands on the side of the village main road had been sold. Farmers sold their lands for wedding, children education, buying motorcycle, and so forth. My other informant, Daeng Naba, a village agro-products collector, sold 0.5 ha of his land for Rp. 250 million (USD 25,000). He used some of the money to help his cousin who wanted to join the army. He paid bribe money as of Rp. 30 million. Some farmers had sold their farming land and only have kept the land on which they have their houses. These farmers are now working as sharecroppers for the other farmers, sometimes even on their former lands currently owned by outsiders.

Land selling in Moncongloe becomes very easy because most lands have been certified. According to Daeng Ma'ja, since the government launched the National Land Certification Project (*Proyek Nasional Agraria* / PRONA), most land owners in Moncongloe used the opportunity to register their land ownership at the affordable costs. In 2010, another land certification program was provided, Public Service for Land Certification (*Layanan Rakyat Untuk Sertifikasi Tanah* / LARASITA). This program provides an innovative solution for land registration by establishing mobile services in rural areas.[163] According to BPS Maros (2011), there were 343 land ownership certificates issued in Moncongloe in 2010. Moncongloe was the first rank and followed by Mandai Sub-district (335) for the issuance of land ownership certificates - both areas are part of the future Mamminasata satellite city.

6.1.3 Last Phase of Agriculture

The transformation from rural to urban in Moncongloe signifies another phase of agrarian change in this area. First, it tells us very obviously that agriculture is no longer the future

[163] Moncongloe is one of the covered areas (http://kab-maros.bpn.go.id/Propinsi/Sulawesi-Selatan/Kabupaten-Maros/Berita/Kegiatan-Larasita-Kantor-Pertanahan-Kab--Maros-di-.aspx - accessed on 15 March 2012). For the description on Larasita, please see: http://portaldaerah.bpn.go.id/Propinsi/Jawa-Tengah/Kabupaten-Banjarnegara/Artikel/LARASITA--KANTAH-KABUPATEN-BANJARNEGARA.aspx - accessed on 15 March 2012.

Table 6.1 - Areas distribution for Mamminasata Satellite City Plan

No.	Main functions	Total (ha)	Maros	Moncongloe (Maros)	Mandai (Maros)	Gowa	Pattalassang (Gowa)	Parangloe (Gowa)
1	Transportation, commercial	979	154.6	154.6	0	824.3	824.3	0
2	Trade & services	667	650.3	650.3	0	16.7	16.7	0
3	Green areas & sport center	730	606.5	606.5	0	123.2	65.3	57.9
4	Housing	585	584.6	568.1	16.5	0	0	0
5	Recreation	825	817.1	680	137.1	8.2	0	8.2
	Total	**3,786**	**2,813**	**2,660**	**154**	**972**	**906**	**66**

Source: JICA-Mamminasata

in Moncongloe. Part of it is caused by the on-going transfer of land ownership and also the future change of land use. Another part is caused by the reality that being included in the urban expansion process has influenced the regeneration of farming in Moncongloe.

As an area located very close to the city that will soon be part of it, the temptation for the young generation to opt for non-farming employments is very strong. This is perpetuated by the reality of poor agriculture conditions in Moncongloe which by itself discourages the young generation to continue to focus on agriculture when opportunities to shift do exist. Many of the youngster find jobs in Makassar as daily laborers, such as at the Makassar Industrial Estates (*Kawasan Industri Makassar* / KIMA) or as construction workers. The increase in land prices in Moncongloe also provides an opportunity to the farmers to get money for their children education or to access formal employment, preferably as civil servant, police and military – by bribing using money from land selling. All of these can be understood as the strategies of the farmers to deal with their post-agriculture future related to the on-going transformation in their area.

Regarding the selling of land in Moncongloe, it is interesting to note that until the time of my fieldwork the land selling transactions have not caused a wave of migration into the area. This is because the new land owners bought the lands for both investment and speculation motives without intention to use the land immediately. In my interview with Daeng Ma'ja on this matter, he jokingly told me that as a head of RW, he now has some of the richest people of Makassar as his residents. In saying this, he refers to the upper class Indonesian Chinese of Makassar who are the most dominant buyers of lands in Moncongloe. However, he said that it seems none of them were going to live in Moncongloe in the near future.

The fact that land plots have been sold but not yet being used has provided opportunities for the previous land owners or other farmers to continue using the lands for agricultural purposes. The use of such idle lands can be given by the new land owners to the locals under certain commonly practiced arrangements. First, the sharecropping method where the locals are given access to use lands and will pay some amount of rent or simply share the produce at the agreed percentage. Second, the locals do not pay rent but they will

be responsible to pay the annual land tax and to guard the land. However, there are also conditions applied for the given permission, especially the restriction to use the lands for construction and the restriction to grow perennial plants.

The given permissions to use the land that has been sold amidst the peri-urbanization process somehow serve as a transition phase for the agricultural activities in Moncongloe before finally meet their ending. And in this phase, while access to land can be 'retained', freedom to decide on types of crops is no longer fully in the hand of farmers.

6.2 Farmers Experiences with Jatropha Curcas under PT JOP Plasma Scheme

Jatropha Curcas or *jara'* in Makassar language is not a new plant for the Moncongloe population. It has been used for generations as traditional medicines and torch fuel. In addition, some locals also plant jatropha in their front yard for its traditional function as spiritual fence to guard the house from evil spirits. While it has been traditionally used for many applications, jatropha was never commercially traded nor planted in a large-scale manner in Moncongloe until PT Jatro Oil Plantation (JOP) introduced the plant as a new potential cash crop and recruited local farmers as their plasma or outgrowers.

6.2.1 Why did Farmers in Moncongloe Cultivate Jatropha

In my research, I found three key reasons why farmers wanted to grow jatropha. First, farmers became motivated to grow jatropha because they were driven by overwhelming promises on the prospect of jatropha. Jatropha had been introduced as a promising commodity with a very clear market and steady or increasing prices following the rise of fossil fuel price. Farmers were persuaded with a dream to make South Sulawesi as 'the next Middle East', a rich biofuel producing province. They heard rumors that in other regencies some farmers succceded to earn income from jatropha for the hajj pilgrimage trip to Mekkah. This situation was further exaggerated by the overwhelming information on the market price of jatropha seeds. Price information was varied and mostly over rated. This price bubble was not only because of the information manipulation by brokers, but also because of the sporadic seeds buying for research and demonstration purposes that bought seeds at premium prices up to Rp. 100,000 per kg. Many farmers were finally interested to grow jatropha with the expectation to be able to sell their harvest for premium prices.

The second reason was the decline of their incomes from their previous crops. I was informed by Ilham Gani, a former district plasma and nursery manager in Sidrap, Pinrang and Maros, about the shifting of many maize farmers in his areas to jatropha because of the overwhelming productivity and profit calculation of jatropha over maize. Jatropha was claimed for being able to produce seeds up to three kilogram per tree. The claimed figure was way higher than the productivity rate of maize, which requires around ten plats to produce one kilogram of grains. According to Ilham, even though the selling price

of jatropha seeds was only Rp. 500 to Rp. 1,100 per kg in comparison with Rp. 900 to Rp. 1,500 per kg for maize, jatropha was still more profitable and attractive for its high productivity claim. However, Ilham noted that the productivity claim was not proven to be correct since farmers never achieved the promised yields. Jatropha also required a lot of maintenance such as periodic pruning and weeding which is costly. Furthermore, both the harvest and post-harvest process were not easy.[164]

The jatropha hype in South Sulawesi were took place at the same time as the fall of some key commodities, especially cacao due to the severe cacao pod borer and vascular-streak dieback diseases and the late tree regeneration problem.[165] Some jatropha investments, including PT JOP, used the downfall of cacao to introduce jatropha as a new cash crop potential to the cacao farmers. Jatropha was introduced with a claim on its comparative advantage, especially on its potential to yield from the first six months in comparison with cacao that requires two years for its first yield if the decision to replant cacao is selected. Dr. Nasruddin, the leader of PT JOP agronomy advisers, who is also a senior cacao consultant in South Sulawesi told me that he used his cacao network to promote jatropha for PT JOP. This included the promotion of jatropha prospects through his weekly radio show on rural issues and agribusiness at Radio Republik Indonesia in South Sulawesi. According to him,[166] many cacao farmers shifted to jatropha for their disappointment with their cacao problems. However, later on, the unproven potentials of jatropha and the existence of Gernas Program for cacao had encouraged many cacao farmers to replant their cacao garden.[167]

The third reason for farmers to be interested in jatropha was because they considered the jatropha planting technology as very simple. Jatropha or 'jara' in local Makassar language is not a new crop for people in South Sulawesi. It has been grown since a long time ago with many traditional uses. The familiarity of farmers with this plant makes them to think that they can continue their traditional cultivation practice for jatropha under the introduced mass commercial cultivation scheme. For example, many farmers refused to clear their lands for jatropha. For them, growing various crops in one plot is a strategy of economic survival since every type of crop is a potential income source for them and thus growing only jatropha exclusively under a monocropping system will endanger their economy. In addition, farmers were also reluctant to apply the modern cultivation technique for jatropha because they considered the technique as expensive and to some extent it was a waste of money in comparison with their traditional practice in growing jatropha as a wild crop without special treatment. An example of this technology dispute is the farmers' opposition to propagate jatropha using seeds which will require them to use the expensive polybag, while they can easily propagate by using stem cuttings, as what they usually practice, without any necessity to use a polybag.

[164] Interview, 21 July 2011.

[165] South Sulawesi cacao sector experienced a serious downfall in early 2000s. A cacao revitalization program called National Movement on Cacao Rehabilitation (*Gerakan Nasional Rehabilitasi Tanaman Kakao* or *Gernas*) by government is implemented since 2008 to assist cacao farmers to revive their cacao gardens.

[166] Interview, 4 October 2011.

[167] Despite the existence of the Gernas Kakao Program, majority of cacao farmers in Luwu area and in West Sulawesi were reported to convert their cacao gardens to oilpalm gardens as a new green gold potential.

Their misunderstanding was further exaggerated by false information provided by company field staff and agronomy advisers on the actual cultivation technology. Jatropha was misleadingly described as a low cost but high yield crop, which to some extent confirmed or was similar with the common knowledge of farmers about this crop.[168] However, when farmers started planting jatropha, they started to realize that jatropha is basically similar with the other commercial crops which require inputs, such as fertilizers and pesticides and also labor for the crop maintenance and harvest. In addition to this, farmers were also experiencing disease and pest attacks which were beyond their anticipation. And at the end, they finally learned that their actual yields were far below the stated claim which led to greater disappointment towards jatropha.[169]
Ironically, the limited knowledge on the good agricultural practices for jatropha was also a problem for company field staff and agronomy advisers. This problem was then becoming a disaster for farmers because they were used as a research testing laboratory. I was informed by farmers in Moncongloe that they were once instructed to prune their jatropha trees at the peak of the wet season by the agronomy advisers. By some farmers this instruction was opposed because they know rain water will damage the pruned branches and ultimately will kill the trees. However, the advisers insisted with their instruction which finally resulted in the death of many trees.

The bias and unanticipated actual experiences in jatropha production were not only causing problems for farmers. In my further research findings, I learned that the problems of low productivity and the inability to do an effective harvest had caused another unanticipated problem of seeds depreciation for seeds collectors. The low yields and inability to do effective harvest required collectors to store the harvested seeds for some periods of time until the amount was economically sufficient to be transported and sold to JOP. According to Haji Syamsu who was a plasma organizer in Maros District and also a seed collector for JOP, he had to wait for approximately three months to collect 5 bags of 100 kg seeds from farmers. During the waiting time, the collected seeds became drier and ultimately experienced weight depreciation of approximately ten percent.[170] The weight depreciation was not anticipated and recognized by the company especially in paying him for the delivered seeds. Therefore, to avoid financial loss, Haji Syamsu always paid farmers below the price determined by JOP (Interview, 31 July 2011).[171]

6.2.2 Cheating and Broken Contract

Moncongloe was the first location of PT Jatro Oil Plantation (PT JOP) commercial jatropha activities before they further expanded their coverage to the other sub-districts in Maros,

[168] In the traditional cultivation practice, jatropha was grown as wild plant without any maintenance in their yards or garden. Farmers claimed that even without maintenance, their jatropha trees always produced many fruits.

[169] Since many farmers immediately stopped their jatropha cultivation at the very early ages of one or two years when they encountered problems of marketing and disappointing prices - in addition to the reality that they never really harvest their yields, it makes the accurate data on actual productivity per hectares per year was never recorded.

[170] According to Haji Syamsu, the weight depreciation also causes the decrease of oil content potential of the seeds.

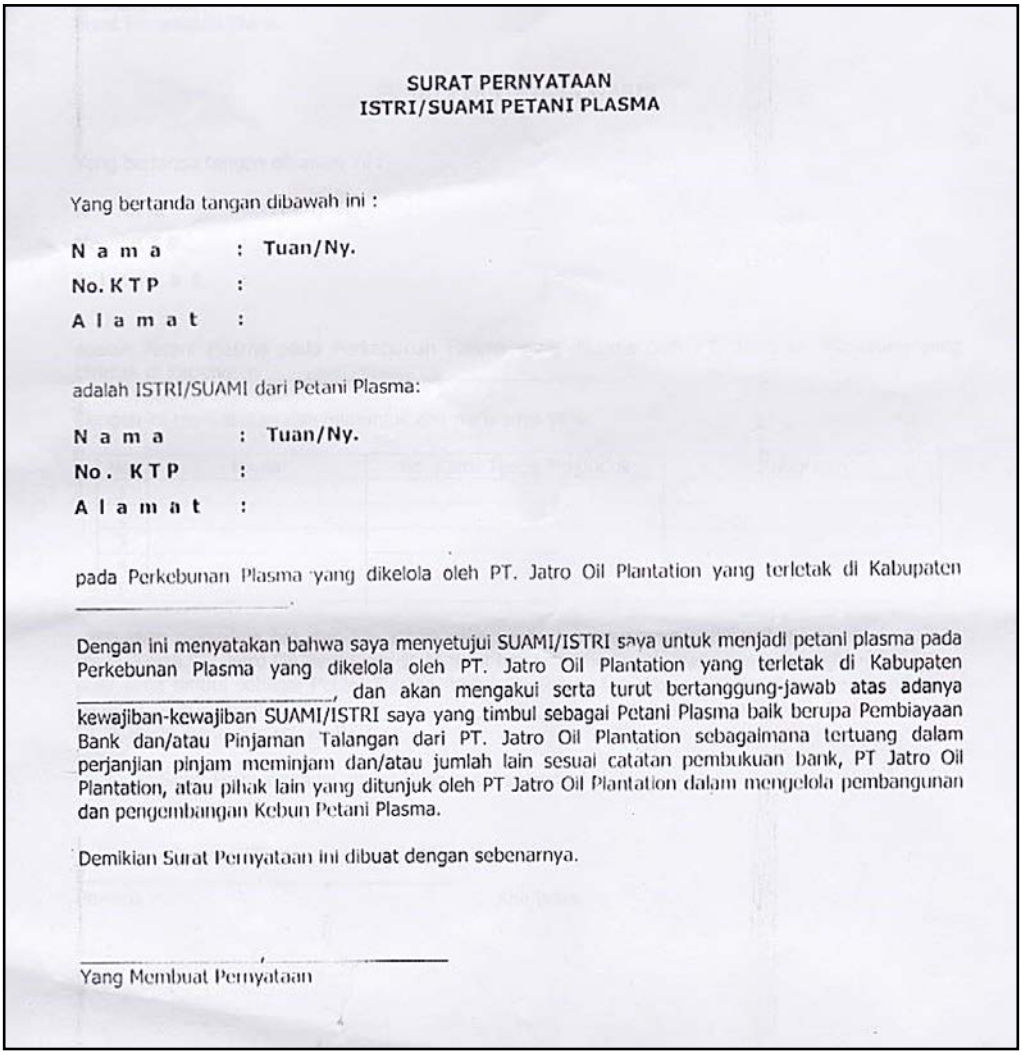
[171] For his lower price, Haji Syamsu had to harvest and process the fruits by himself since farmers refused to collect the seeds for him at the offered price.

Figure 6.4 Villagers preparing polybags at PT JOP nursery in Moncongloe in 2008 (Source: PT JOP photos collection)

and later on to 14 additional districts in South Sulawesi. For the company, Moncongloe had a strategic position, not only for its status as the pioneer in their jatropha investment but also for its short distance to the Sultan Hasanuddin Airport and Makassar City which enable them to use Moncongloe as their favorite showcase site to their prospective investors.

By PT JOP, jatropha was promoted as a high yielding oil producing plant with high market demand and steadily increasing price following the rise of global and national fossil fuel price. It was claimed to have a potential productivity of 3 kg seeds per tree annually (approximately above 6 tons per hectares at planting ratio of 2500 trees per hectare) with an offered contract price of Rp. 1,000 per kilogram. For farmers in Moncongloe, this was a very lucrative income opportunity since many of them did not have regular income sources. Most farmers were relying on seasonal incomes from their crops, and they supplement their income from one crop with incomes from other crops and many of them also work as laborers and sharecroppers.

The offered opportunity by PT JOP became more interesting at that time since the company also established a nursery – which was their first nursery in South Sulawesi to produce seedlings not only for Moncongloe but also for other districts at that time – that created many employment opportunities for the local population. Many locals were recruited to work at the nursery for various positions, either as plasma organizers and



SURAT PERNYATAAN
ISTRI/SUAMI PETANI PLASMA

Yang bertanda tangan dibawah ini :

N a m a : Tuan/Ny.
No. K T P :
A l a m a t :

adalah ISTRI/SUAMI dari Petani Plasma:

N a m a : Tuan/Ny.
No. K T P :
A l a m a t :

pada Perkebunan Plasma yang dikelola oleh PT. Jatro Oil Plantation yang terletak di Kabupaten _____.

Dengan ini menyatakan bahwa saya menyetujui SUAMI/ISTRI saya untuk menjadi petani plasma pada Perkebunan Plasma yang dikelola oleh PT. Jatro Oil Plantation yang terletak di Kabupaten _____, dan akan mengakui serta turut bertanggung-jawab atas adanya kewajiban-kewajiban SUAMI/ISTRI saya yang timbul sebagai Petani Plasma baik berupa Pembiayaan Bank dan/atau Pinjaman Talangan dari PT. Jatro Oil Plantation sebagaimana tertuang dalam perjanjian pinjam meminjam dan/atau jumlah lain sesuai catatan pembukuan bank, PT Jatro Oil Plantation, atau pihak lain yang ditunjuk oleh PT Jatro Oil Plantation dalam mengelola pembangunan dan pengembangan Kebun Petani Plasma.

Demikian Surat Pernyataan ini dibuat dengan sebenarnya.

_____, _____
Yang Membuat Pernyataan

Figure 6.5 A supplementary sheet of the JOP outgrower contract template stipulating the agreement of the outgrower (both husband and wife) to participate in the scheme and to perform their obligation to pay back the received loans from the company (Photo: Henky Widjaja, 2011)

foremen (mostly local elites who were promised permanent status at PT JOP) or as casual laborers. In addition, some labor intensive activities such as seedling preparation in polybags were given to women and children, who were paid Rp. 50 per bag. Furthermore, the existence of a nursery also provided spillover effects to the locals who took the initiative to open kiosks and food outlets to serve the laborers. The positive experiences with the nursery made farmers believe the positive future of jatropha as a promising crop and also to expect further benefits from PT JOP by joining the plasma scheme.

Joining the plasma scheme, indeed was attractive for various facilities and 'easy to entry' conditions. In the plasma scheme of PT JOP, farmers were provided with a loan (*dana talangan*) which unfortunately was mistakenly translated in the daily language as 'incentives' - literally understood as 'free token'. There were two types of 'incentive' provided by PT JOP: 'cash incentives' (Rp. 200 for tree planting and Rp. 300 per tree for the first year maintenance) and 'in-kind incentives' (fertilizers, herbicides and basic farming tools). These incentives were in tandem with the distribution of 2500 seedlings per hectares plus technical assistance from the company. All these incentives have a value of approximately Rp. 3 million per hectare. As the main requirement for farmers to join the plasma scheme, they were asked to submit copies (not the original document) of their land certificates which were used as a basis to calculate the total seedlings and the amount of 'incentives' to be paid to them.[172] The participation in the scheme was formalized in a contract for a period of 25 years.

The contract stipulated that farmers were obliged to plant jatropha in the agreed area – while the total area referred to the total amount of land mentioned in the submitted land certificate copies. Farmers were obliged to sell their jatropha harvest only to PT JOP at the predetermined contract prices. The payments of *dana talangan* would be deducted on the jatropha price paid by PT JOP. During the period of contract, farmers were not allowed to sell or transfer the ownership of their land without the permission of JOP and prior settlement of their loans.

The recruitment of plasma farmers was conducted by the plasma units established in every district, where JOP was represented by their plasma staff and assisted by local elites who were recruited as plasma organizers and facilitators. In Moncongloe, 271 farmers in 12 groups covering 209 hectares were recruited as the plasma farmers. Most of the farmers who joined the plasma scheme were not fully aware of the conditions and regulation mentioned above. In my research, I found that none of the plasma farmers were given their copies of contract. After they signed the contract letters, all copies were kept at the plasma office leaving them clueless about the content. In general, the experience of plasma farmers in Moncongloe illustrates the common stories of JOP plasma farmers in the other places.

Farmers were not aware, at the beginning, that the received 'incentives' were actually loans from the company since those incentives were distributed once they submitted their land certificate copies without signing the contract letters. According to Haji Syamsu, a former plasma organizer in Moncongloe, most farmers signed their contracts after they received their cash planting incentives and had planted the given seedlings. The signing took place months after they received the money or planted the seedlings. This happened because the plasma unit (not only in Moncongloe but also in the other JOP districts) was in hurry to distribute seedlings produced by the nursery in order to achieve the given target in recruiting plasma. The submitted land certificate copies were not verified properly,

[172] 2,500 seedlings per hectares was used as the basic assumption in calculating the total incentives.

especially in clarifying the exact total areas to be planted with jatropha.[173] The plasma staff used the total land stated in the certificates as the basis in calculating the total number of distributed seedlings and incentives and simply ignored that the numbers were not representing the actual areas committed to jatropha.

The using of the land total to calculate incentives had provoked farmers to submit as many land certificate copies as possible in order to earn bigger incentives. Many of the submitted land certificate copies were apparently only land tax copies (*pajak bumi dan bangunan*), and the lands were not actually owned by the plasma farmers. They were only sharecroppers on these lands and legally they had no right to use the lands for any legal commitment with other parties without the consent of legal land owners. Some parts of these lands were lands that had been sold to land investors who were not yet using them and therefore entrusted the previous owners to use the lands for farming. PT JOP accepted the land tax copies as long as they were accompanied by the reference letters from the village heads confirming that the applicants were the sharecroppers of the lands. Since the arrangement between landowners and sharecroppers prohibits the cultivation of perennial plants, such as jatropha, and farmers had no legal rights to use the lands for contract application, they finally could not plant jatropha on that land although they had received the incentives.
However, even for those who used their own land certificate copies, many were apparently only interested in the incentives and did not have intention to grow the plant. I was informed by the former plasma staff that many farmers abandoned the distributed seedlings in hidden places or just simply planted them without any maintenance and care. In my interview with farmers, they claimed that the lack of labor was their main obstacle to plant and maintain the seedlings. The lack of labor happened because most farmers run their farm only with labor supply of their family members.

Before jatropha, there was no significant labor intensive crop in Moncongloe. Most of the crops planted in this area are short lived seasonal crops and tree crops with low maintenance, while usually only the adults do the farming activities. Jatropha, on the other hand, requires labor more than the other crops. Despite they were given initial cash as incentive to plant the seedlings, which they can use to hire labor if necessary, most of them apparently did not use the paid incentives for that purpose since hiring external labor would reduce their income from the incentive – daily labor wage was Rp. 30,000 – 40,000 which equals to incentives for 150-200 seedlings. In addition to this labor factor, it is very obvious that they were over supplied with seedlings due to the imbalance ratio between the distributed seedlings with their actual available lands for jatropha cultivation. As a result, only a small percentage of the distributed seedlings were really planted.

Farmers were angry with the company staff and the local organizers when they realized

[173] Land total in the submitted land certificate by an applicant may consist of land for house, paddy/corn field, productive home garden, and unproductive lands on the hill where some perennial crops are planted. There was no clear agreement on where jatropha will be planted by the applicant. In the realization, jatropha was mostly planted scattered on these lands.

that the 'incentives' were actually loans and the signed contract would bind them and their lands for the period of 25 years. They blamed these field operators for not telling the truth to them and they refused to obey the contract. Their main objection was about the use of their lands as 'collateral' for the loan. Farmers, whom I interviewed told me that the company had no reason to use their lands as collaterals since they were not informed about the condition. They only knew that their land certificates would be used to determine total seedlings and incentives paid to them, and the incentives were supposed to be the payment of their labor for planting the seedlings. Further, they said that their lands were far more valuable than the given incentives. The skyrocketing land prices in Moncongloe were obviously more valuable than the whole plasma package which was only around Rp. 3 million per hectare.

Despite their objections, none of the farmers was reported to have returned the received incentives. This was also the case for those who used absentee landlords' land tax copies and cannot use the lands for jatropha cultivation. While legally they had violated their contracts, none of the farmers expressed their concern on the legal risk of their acts. Those whom I interviewed said that PT JOP had a weak legal basis to enforce the contract since the company only had the certificate copies instead of the original ones. They even further blamed PT JOP for not fulfilling its promise to buy the harvest yields from farmers. PT JOP suddenly stopped their field activities in 2009, at the time when farmers in all districts started to harvest their yields. Farmers told me that in their understanding they were contracted to produce jatropha for PT JOP, but since PT JOP did not purchase their yields it meant that the contract was automatically ended.

The fact that many farmers breached the contract by discontinuing their jatropha production or even never planted the given seedlings, however, did not give authority to JOP to force them to repay their debt. This was because, after the second year JOP was not able to continue their operations, including to fulfill their obligation to buy the seed yields from farmers as regulated in the contract. This situation, then, provided a strong reason for farmers to neglect their obligation to PT JOP, leaving the company without collateral assets to compensate its losses. In my interview with Haji Syamsu, he told me that the only thing that binds the relationship between farmers and JOP was the purchase of seeds by the company. As long as the company still performs its obligation of buying seeds from farmers they have the right to ask farmers to plant jatropha as constituted in the plasma contract. However, since it was the company cannot meet its obligation, then farmers, including the unfaithful ones, were free from the contract (Interview, 31 July 2011).

About the unfaithful acts of many farmers who by intention breached the contract, I was informed by Ilham Gani that for farmers in general such an act was not new. Ilham said, 'It was not new for farmers to deal with this kind of issue. Most farmers in South Sulawesi have already had experiences with credit programs, especially the "Kredit Usaha Tani" (Agribusiness Credit Program) by Bank Rakyat Indonesia in 1998. The Kredit Usaha Tani also required farmers to submit their land document copies, but the bank was not able to confiscate the lands when farmers failed to return their debt. Such awareness is very common among farmers and they are ready to defend their lands against any

legal action'.[174] His information suggests that many farmers, based on their previous experiences with various credit programs, had developed a negative mentality in seeing credit money as a free token without any obligation to be returned, and such mentality has been shown in this case study.

In my research, I found that only few farmers that really planted the distributed seedlings on a massive scale on their lands. I was informed by the former plasma staff that only one fourth of the submitted land total was really planted with jatropha, although the company senior management claimed a higher figure of forty percent. However, most of them used their unproductive lands, especially lands on the hilly areas that are stony, dry, and traditionally used to grow trees, maize, and cassava or just simply left fallow. This type of land is not favorable for land investors since they mostly are located far from the village road. Very few gardens were located on the flat area. One location that was still exist until my 2012 fieldwork belonged to the community organizer, Haji Syamsu. Haji Syamsu is not an original resident of Moncongloe. He is a land broker who owns several parcels of land in Moncongloe. As a community organizer he used his lands to set up a model garden to attract plasma farmers. According to him, his jatropha garden was also used by JOP as a showcase location for their potential investors. At the time of my fieldwork, his garden was already in a poor condition. The jatropha trees were left unmaintained and some parts of the plot had been used to grow cassava. While for gardens on the hilly areas, all of them had been cleared by farmers who were frustrated with the uncertainty of the plant prospect. Some were just cleared in 2011 after being abandoned since 2009. The interviewed farmers were complaining about their income losses for replacing their previous crops with jatropha, and also for the opportunity costs that they encountered for wasting their time and land use potential (see Box 6.1 Marten's Opportunity Cost Story).

The sudden withdrawal of JOP from their field activities had caused disappointment among their plasma farmers, especially since it happened when most of the planted jatropha trees had started to yield.[175] The absence of JOP to purchase the yields made it difficult for the farmers to find alternative buyers who could offer the same purchasing price. Farmers told me that they were approached by some buyers who offered them prices below Rp. 1,000 per kg seeds. The offered prices were considered too low, especially after they realized that the costs of harvesting and post-harvesting were high. Some farmers were asking for Rp. 1,500 per kg seeds as the lowest economical price for their jatropha. I was told that some farmers finally sold their jatropha for Rp. 500 per kg seeds minus harvesting. Buyers were asked to harvest and process the seeds by themselves. One of the buyers was Haji Syamsu who purchased the seeds and later on sold them to JOP.[176]

[174] Interview, 21 July 2011.

[175] There was no accurate data on the actual production at that time, because farmers did not record the actual productivity since they never really harvested the yields due to of the absence of purchasing by JOP.

[176] Despite the field activities were stopped in 2009, JOP continued to operate until February 2011. Seeds collection through middlemen, such as Haji Syamsu was part of their final activities. There was no clear information on the objective of seeds collection, but they were possibly traded as seeds to the other jatropha investors.

6.1 - Marten's Opportunity Cost Story

Marten is a Christian Torajan who has lived in Moncongloe since 1968. He inherited the land from his father who was a military police. His farm land is located on the hill far from his house where he grows cassava, maize, vegetables, banana, mango and jatropha. In the same location, he also raises pigs and has a small stable for the pigs. Marten was one of the few strong believers of the jatropha prospect in Moncongloe. He was the second biggest jatropha grower. He claimed that he planted five hectares of his land with jatropha. Marten said that he was interested because he was informed that the seeds were used as fuel alternative and that they had a prospective market. When he decided to participate, he replaced his cassava with jatropha. At the beginning of the cultivation, he even hired labors to help him to plant and maintain the plants. He said that he followed the recommended planting practices, including the 2x2 m planting space, fertilizer application (in addition to the provided fertilizers, he also added manure), and frequent weeding using the provided herbicide.

At that time, he was expecting that the yield and income from jatropha would be sustainable. He said that even though the price was Rp. 500 per kg as long as it was sustainable at least his income would be certain. He claimed that his concern was to earn income for his children. If the land can be productive, his children will have a productive activity to do daily. Moreover, he said that the harvest was not difficult and suitable for children. His confidence and expectation were very big because both the company staff and community organizer said to him that he would not regret to plant jatropha. However, when the plants started to produce he could not sell the yields. No one from JOP came to his place to collect and buy the seeds.

Disappointed with his experience, Marten cut down his jatropha trees in 2010 after waiting for a year. He replanted the area with cassava and banana. At the time of interview (July 2011), he told me about his plan to plant beechwood trees (white teak / jati putih). He showed me 10 kg of beechwood seeds that he bought for Rp. 25,000 per kilo. He said that a friend of him planted beechwood trees five years ago. A buyer had offered his friend Rp. 175 million for one hectares of mature beechwood trees (approximately 1,000 trees per hectare). The price was still on negotiation because his friend was asking Rp. 200 million. Marten said that if only he also planted beechwood instead of jatropha five years ago, he would be very rich now.

Marten said that he was traumatized with his jatropha experience. Thinking about the opportunity cost would only make him stressed. The plant really has no use for him. Even the wood cannot be used for firewood because of the succulent characteristics of the plant (wet and easy to rot). He said that jara' (jatropha) makes him jarra (traumatized). Marten said that his experience with jatropha was similar with the experience of clove farmers who replaced their clove trees with vanilla because they were dreaming to gain a fortune. Both ended with big losses.

Disappointed with the sudden withdrawal of JOP and the absence of alternative buyers made farmers to cut down their jatropha trees. Most of them were taken place immediately but some farmers decided to keep their trees, as part of their speculation for the possible future revival. However, since the trees were left unmaintained many were killed by parasite plants or diseases. Finally the fields were all totally cleared to provide spaces for cassava, a traditional crop with a new prospect.

6.3 Cassava in Moncongloe

During my first visit to Moncongloe in 2011, while looking for active jatropha gardens (or the remaining), all I could see along the roadside were the lines of small plots planted with cassava. The place where I had my first interview with the former plasma farmers of JOP was a traditional stage house ('rumah panggung') where a group of women were peeling and chopping fresh cassava in front of the house, while a bulk of fresh cassava chips was sun dried next to them. Cassava started to become a topic in our interviews when I asked farmers about the post jatropha activities in the Moncongloe.

Farmers told me that they immediately shifted to cassava when they realized that jatropha had no clear future. Cassava was selected to replace jatropha because of its existing high market demand and increasing prices. Cassava has been traditionally cultivated by most farmers in Moncongloe for its drought tolerance and low maintenance characteristics as their subsistence and commercial crop. In the past, cassava was sold to the nearest local fresh markets and to the local tapioca flour industries through the village collectors at very low prices making it not a significant income source for farmers. At present time, the farm gate prices of cassava have increased, from Rp. 100 – 200 per kg to Rp. 300 – 400 per kg for fresh cassava. The increased price is fostered by the existence of a high demand from the growing number of cassava processing industries in South Sulawesi.

Since 2007, South Sulawesi has become an investment destination of big scale cassava processors, both domestic and foreign – mostly South Korean investors.[177] By the investors, the processing of cassava is intended to produce cassava flour, cassava chips and bio-ethanol (See Box 6.2 Bio-ethanol On Hold). The final products of the industries are meant for the export market, where they are further processed as materials or ingredients of highly valuable products.

The increasing number of cassava processing industries has improved the economy of cassava in South Sulawesi, especially because they are competing with each other to obtain their raw materials from farmers. Big scale companies, such as EN3 adopt three types of supply strategies: own plantation, contract farming and open market. Establishing one's own plantation is conducted through land leasing,[178] land purchasing and joint cooperation As an

[177] In 2010, there was 25,010 hectares of cassava planted area in South Sulawesi with productivity of 601,437 tons (BPS Sulawesi Selatan 2011).

[178] The leasing price was approximately Rp. 1 million per hectares for 5 years duration (EN3 price data).

example, at the time of the research EN3 was in the process of negotiation with PTPN XIV, a cassava specialist state-owned plantation company in Enrekang District to make use of their available land to grow the improved cassava variety – Adira 4 for EN3 supply. Establishing a plantation is attractive and more preferable if the area is large (*hamparan*) making it more efficient for the mechanical operation (land preparation, planting to harvesting) in comparison with working with smallholders whose lands are scattered.

The option for contract farming is also popular, but it requires significant capital since a company has to provide contract farmers with initial working capital, ranging from cash, fertilizers to seeds as well as technical assistance. According to the experience of EN3 in managing contract farmers, the system is risky because of the relatively high moral hazard of farmers in the contract implementation. The company representative told me that there were still many contract farmers who prefer to sell their harvest to other buyers for higher prices even though they are under contract. The most dominant system that is adopted by all processing companies is the open market supply system in which companies source their cassava from farmers with the help of village collectors. The main challenge for companies in the open market system is to ensure the optimizing of production by farmers.

6.2 - Bio-ethanol On Hold

PT EN3 Green Energy (EN3 is an abbreviation of Environment, Energy and Engineering) is a foreign direct investment company from South Korea and also a subsidiary of EN3 Co, Ltd. It was established in 2007 in South Sulawesi. EN3 has two Integrated Post Harvest Processing Units (IPPU) – in Gowa and Takalar for the production of bio-ethanol, cassava flour and cassava chips. At present, EN3 is the largest cassava processing company in South Sulawesi.

While EN3 has a license for bio-ethanol production (issued by the Ministry of Mining and Energy in 2008) and a MoU with PT Pertamina for the selling of bio-ethanol to PT Elnusa Petrofin, until now it has not produced any bio-ethanol yet. According to Poppy Dwijayanti, company representative (interviewed in July 2012), the reason was because of the insufficient current supply of cassava for sustainable bio-ethanol production. She said that it would require a minimum 10,000 ton of cassava annually to run an efficient bio-ethanol factory. The current annual supply is around 5000 ton (2011 company data). The supply is relative low since the total supply to three main cassava factories in South Sulawesi (including EN3) in 2011 was around 10,000 tons. EN3 has to compete with many competitors, including local, national and international buyers. Poppy said that cassava industries in Java also obtain their raw materials from South Sulawesi. In addition, she suggested that there are other Korean investors awaiting for a permit to operate in South Sulawesi. Considering this current supply state, EN3 decided to focus on cassava flour and chips production only. These products are exported to Japan and South Korea as materials for food, textile, and chemical industries.

Figure 6.6 Villagers drying cassava chips in Moncongloe (Photo: Henky Widjaja, 2012)

Figure 6.7 A mini truck loaded with fresh cassava in Moncongloe (Photo: Henky Widjaja, 2012)

Cassava in general is still cultivated not as a priority crop. It is not cultivated on productive lands, rather it is a crop for unproductive and marginal lands with very limited inputs of fertilizers, chemicals and maintenance. Very common, cassava is intercropped with other crops, such as vegetables and tree crops. Cassava is not a priority crop because it takes longer period before can be harvested (six to eight months) in comparison with rice (four months), maize and legumes (three to four months). For many farmers, cassava is more considered as a reserve crop for food and income similar with their perennial crops.

Even in many of highly potential areas, cassava still receives limited attention from the government and is not a target of government input subsidies. In my interview with a government fertilizer supplier (September 2012), it was suggested that cassava was not a priority crop for government input subsidies in comparison with rice and dry season crops (*palawija*, such as maize and soya bean) because it does not present significant problems, such as diseases and pests for attention (the common pest is the wild pigs) that necessary for government intervention, nor potential for better results if inputs are provided based on the cost benefit ratio since the economic value of cassava in general is still low.

In order to make cassava attractive for farmers and to increase their productivity, companies apply two key strategies: firstly, companies offer competitive prices and purchase agreements to collectors and farmers; and secondly, they introduce improved cassava varieties to farmers, both directly and through the mediation of research institutes (Indonesian Legumes and Tuber Crops Research Institute / BALITKABI), and district governments (agricultural services).

6.3.1 Resources and Business Model for Cassava in Moncongloe

Moncongloe has the biggest cassava area among the 14 sub-districts in Maros District. The total harvested area in 2010 was 904 hectares of 2,117 hectares in Maros District (BPS Maros 2011). Cassava in Moncongloe is planted in many places. Small plots with less than 100 trees can be found in the front and back yard of houses. Bigger plots are mostly located on the hills where cassava is planted on unproductive lands mixed with perennial trees. Farmers plant cassava not only on their lands, but also on public lands – such as along the river banks and on absentee landlords' lands with permission or on the basis of a sharecropping agreement.

The small plots along the road side are mostly planted on the absentee landlords' lands. These are the land parcels belonging to land investors that are left idle. Some of the plots were fenced, but many were only bordered using the concrete foundation lines. They are currently operated by their former owners – the farmers whose houses are located next or behind these lands. Farmers use these lands for free, but some are required to pay the land tax. They are entrusted to guard the lands with the right to use the lands for their farming activities. Strict rule is applied in the land use, where they are only allowed to plant seasonal crops, such as vegetables, maize and cassava. Perennial crops are prohibited. On many parcels, there are fruit trees such as mango and jackfruit. However, they are old trees that were already there when the lands were sold. The operators were

Figure 6.8 Workers peeling cassava in Moncongloe (Photo: Henky Widjaja, 2012)

allowed to harvest and sell the fruits – with some are delivered to the owners, but they are not allowed to plant new trees as well as to cut down the existing trees because the trees are considered as assets by the new owners.

Farmers sell their cassava to village collectors who play an important role in rural commodities. They bring information on new opportunities – what the market wants and price updates - and also become the source of working capital and market guarantor for the introduced commodities. While cassava is not a new crop, farmers told me that they became serious in cultivating cassava after they received information and guarantees from village collectors, such as Daeng Naba (see Box 6.3 Cassava Economy of Village Collector). Some farmers prefer to sell their cassava before the harvest to save the costs of harvesting, which is a very common practice also for their other crops. Besides selling their cassava fresh to collectors, many farmers also process their cassava (peeled, chopped and dried with 3 : 1 ratio) to become dried cassava chips that can be sold for a higher price of Rp. 800- 1,200 per kilogram to the village collectors.

Farmers grow various varieties of cassava. While the dominant variety is the traditional edible cassava, farmers have also grown industrial varieties – improved hybrid varieties such as Adira and *Gajah*.[179] They received the information and seedlings from collectors

[179] A new improved cassava variety developed by a cassava researcher, Prof. Dr. Ristono, MS in East Kalimantan. This variety is edible but also suitable for industrial use for its high starch content. The claimed productivity is up to 100 tons per hectares in compare to 12 tons of traditional varieties (Source: http://cybex.deptan.go.id/lokalita/budidaya-singkong-gajah - accessed on 3 September 2012).

and government extension officers. For the *Gajah* variety, Moncongloe has become a model location for the development of this variety since October 2011. A South Korean company, PT Singkoang established a cooperation with the Maros Government to promote this variety.[180] Despite the fact that this variety is supposed to have a very high yield, some farmers that I interviewed said that they encountered problems with the increased input costs required for this variety. Different from the traditional varieties that 'require' only very basic input (urea or even no input at all), the *Gajah* variety is input intensive. Farmers told me that the variety was introduced together with a list of fertilizers and chemicals that have to be purchased. While they were interested and some have tried to plant this variety, they did not fully follow the standard instruction on input application since the costs are considered high. Aside from the requirement to apply inputs, such as fertilizers and chemicals, the cultivation of these improved hybrid varieties also created additional labor costs, especially for the harvesting due to the extra size of the cassava. The farmers did not receive any assistance from the company or the government to address this problem. Farmers were only promised that their yields will be purchased by the company. However, farmers told me their concern about the possibility that the farm gate prices will fall at the time when the supply of cassava is abundant which would make their input investment to be ineffective.

Village collectors, such as Daeng Naba, when interviewed were still very optimistic with the prospect of cassava because his buyers were competing to offer him with good prices. He said that farmers were now enjoying the best prices ever for their cassava. However, he also noticed that the cultivation of cassava varieties such as Adira and *Gajah* was more suitable for the large industrial scale cultivation. The traditional cassava cultivation practices and farmers' perspective on cassava as non-priority crop were the biggest challenge for these varieties (Interview May 2012).

6.3 - Cassava Economy of Village Collector

According to Daeng Naba, he delivers approximately seven tons of cassava everyday to any of the three Korean cassava processing plants in Gowa that have become his regular buyers. The selling price is Rp. 500-700 per kg of unprocessed fresh cassava and Rp. 1500-2000 per kg of dried cassava chips. Every day, he checks the price in the three buyers by phone before he delivers his cassava. He supplies his cassava from his own garden and also from farmers. Usually farmers sell cassava to him before the harvest time for Rp. 5 million per ha. Cassava is planted for 8 months before being harvested. With the pre-harvest selling price of Rp. 5 million, a farmer only receives a maximum Rp. 600 thousand per month. He hires laborers to do the harvest (four laborers per hectare, Rp. 75-100 per kg). Naba paid Rp. 500 thousand per truck of 7 tons capacity or Rp. 300 thousand per small truck to transport the harvested cassava. Naba also provides credit for seeds and agro-inputs to farmers under purchasing contract. About his Korean cassava buyers, he said that he had no fixed purchase contract with them. They also do not provide any credit or assistance to farmers (interview July 2011).

[180] See 'Singkong Maros Akan Dibeli Perusahaan Korea', available at http://makassar.tribunnews.com/2011/10/27/singkong-maros-akan-dibeli-perusahaan-korea (accessed on 12 May 2012).

The growing prospect and motivation to cultivate cassava, however raise questions on the future and sustainability of this crop (and also the rest of agriculture) in Moncongloe. This positive development is parallel with the unstoppable transformation of Moncongloe from a rural to urban area. By looking at the condition where many cassava plots are located on lands that have been purchased by outsiders for future non-farming purposes, and the land transfer itself is still continuing, one will ask for how long that access to lands will be available for cassava cultivation? However, from a realistic point of view, cassava should be seen as the most suitable cash crop for this situation. Cassava's character as a short lived crop has made it compatible with the condition of land use in Moncongloe.

6.4 Commercial and Non-Commercial Intermediaries in Moncongloe Biofuel Stories

In my field research, as part of my ethnographic observation, I conducted the actors analysis on the patron-client pattern in relation to the role of middlemen or brokers in the supply chain of jatropha and cassava. The focus on the intermediary actors is based on the observation that they are some kind of patrons who serve as gatekeepers between companies and their constituents. More commonly, they are known as *tokoh masyarakat*, or community leader. These are people with roots in the community, who possess intimate connections to local communities, networks and neighborhoods. Sometimes, *tokoh masyarakat* are leaders of village cooperatives, communal savings groups, farmers' groups, or other formal organizations at the village level (Aspinall 2014: 554). Their role is essential in determining the success of companies in accessing resources and ensuring farmers participation.

The importance of patronage in this intermediary role has been mentioned and discussed in many books and articles. Peluso and Ribot in their article on 'A Theory of Access' coin that access to resources via social relations of friendship, trust, reciprocity, patronage, dependence and obligation are critically central in access webs (Peluso and Ribot 2003: 172). An example of this can be seen in the contract farming practices, where informal ties - constructed relations of trust patronage, and traditional reciprocities - are used by companies to enforce contracts and ensure grower loyalty especially when legal and property rights are difficult to control (Baumann 2005: 15).

In analyzing the intermediary role of patrons, I distinguish the intermediary patrons into two types: commercial and non-commercial intermediaries. Commercial intermediaries are those with reliability and competence in commercial activities and linked to their constituents through related commercial activities, such as village level collectors/ middlemen and senior farmers. Non-commercial intermediaries, on the other hand, are those who have no previous experience in relevant commercial activities but they have social and political influence on their constituents. They are usually people who have worked either in *proyek* (development projects), in NGOs, or in election committees in the villages. These are the previous experiences that they can use as a base for building a network.

The strong influence and control of patrons over their people and resources have been the main reason for outsiders to link with them for their specific interests, especially in ensuring access to the targeted resources, including by companies to integrate them as part of the supply chain, either in their role as leaders or as intermediate traders. It is noted that the modern value chain has risks to undermine the existing traditional business models, such as the role of traditional middlemen in the value chain. While their role is recognized to be highly significant in bridging the producers and markets, the role of middlemen in many modern business models has been associated with inefficiencies (Olsson et al. 2013) and often regarded as negative layers between the farmers and the markets urging the necessity 'to cut out the middlemen' (Masters 2008: 73).

Despite the existence of many minor opinions on their roles and functions, the debates on the position of middlemen in the modern business models are not yet concluded. Different views still see the prospect for middlemen to exist in the modern business models. Olsson *et al.* (2013: 1131) suggest that many traditional middlemen have overcome the challenges by adapting their roles in ways that make it possible to claim that they appear as 'new intermediaries.' Some recent studies, such as by Kusumawati *et al.* (2013: 901) on the central position of *punggawa* (a traditional middlemen in fishery among the Bugis community) in the fishery value chain shows that the *punggawa* do not only control the vertical flows of commodity and finances but also effectively function in determining the conditions under which production and trade are taken place.

Other scholars in their supports to the traditional middlemen point out the traditional reciprocity ties between the middlemen and the farmers as the core reason not to undermine their roles and functions (Crona *et al.* 2010). Even though traditional middlemen, which are closely associated with the patron-client relationship in economic activities, is often labeled as a system of exploitation of the poor by the mighty rich, they also contribute in smoothing economic differences where the poor have access to working capital and to social security provided by their patrons at the event of uncertainties, such as crop failure (Pelras 2000). The solid bond builds on traditional *adat* (customary) and religious values as well as social and economic dependency of clients toward their patrons – which is exaggerated by the absence of state in providing better protection (Timmer 2010a and 2010b) - explains why even in a very bad individual condition, clients tend to be still loyal to their patrons.

The case of jatropha and cassava in Moncongloe, as I have presented in this chapter, shows how JOP adopted exclusively non-commercial patronage system, consisting mostly of local elites, in intermediating their relationship with plasma farmers. On the other hand, cassava companies used the intermediary services of the village collectors who supply them through the open market system and who are significantly influential in motivating farmers to cultivate cassava.

The results of each strategy, however, were very different. The story of JOP as presented in this chapter shows the chaotic implementation of their plasma scheme for their full reliance on the mediation of village elites. In the story of the cassava company, EN3 also

experienced a disappointing result when they relied on the support of the elites (see Box 6.4 Cheating Elites in EN3 Experience). Although it did not happen in Moncongloe but it reflects the fragility of reliance on elites. On the other hand, the partnership with village collectors is proven to be more effective. Their relation is purely commercial, where village collectors are engaged using attractive prices and incentives for cassava that they delivered. Attractive prices and incentives, in turn motivate collectors to deliver positive information and to invest by providing loans to their farmers to improve their production, both in terms of quantity and quality as desired by the company.

6.4.1 Personal Quality in Patrons Stories

According to Pelras (2000), the patronage system in South Sulawesi has a very strong root in the social system that are characterized by reciprocity acts resembling positive *adat* and religious values (Pelras 2000). These characteristics are crucial for patrons to obtain and retain their followers, and any patron can lose their followers when they fail to meet these characteristics.

In interviews with farmers on their perceptions towards the patron figures in the cases of jatropha and cassava, I found that perception over personal quality is a crucial factor influencing farmers' loyalty and trust towards the patron figures. Farmers that I interviewed used to be PT JOP plasma farmers under the intermediation of Haji Syamsu and Daeng Ma'ja before they shifted to become Daeng Naba's cassava farmers.

When interviewed about their experiences as the plasma farmers of PT JOP, they told me that actually since the beginning they were little optimistic about the prospect of jatropha. Aside from the fact that commercial jatropha cultivation was new to them, they were not fully convinced because the introduction was very similar with the previous unsustainable projects in their locations. The similarities, especially in terms of the use of similar elites in promoting jatropha as in the previous projects were striking. One farmer said, 'We know who Daeng Ma'ja is. He always comes to us with his "projects" that never sustainable. So how can we expect jatropha will be success? We only learned from him that PT JOP will

6.4 - Cheating Elites in EN3 Experience

The EN3 representative, Poppy, told me about the negative experience of EN3 in trusting local figures in socializing and promoting their company. She said that in the first years of its operation, EN3 used assistances of local elites, such as sub-district heads (camat), village heads and other figures to introduce EN3 to the community. Many of them were provided with cash to recruit farmers. However, apparently, there were many cases where the money was not used for farmers recruitment but for other uses, including political campaigns since some were running for local member parliament positions. EN3 realized this when they found that the number of participants in those areas was remained low despite the fact that money had been spent for their recruitment.

pay incentives to those who participate just like in his other projects. And that was our main reason to participate.'

Another farmer commented about Haji Syamsu, 'He is an outsider. His presence in Moncongloe is because of his profession as a land broker. He came to us introducing jatropha but the business was not his own. So, why should we trust his promise on the jatropha prospect?' Other farmers told me explicitly that they think Haji Syamsu benefited a lot from intermediating PT JOP with farmers. One farmer said that he believed Haji Syamsu manipulated part of the incentives that were supposed to be paid to the farmers. Another one said that he was a cheater because he offered a lower price to farmers' yields compared to the agreed price with PT JOP.

On the other hand, when they were asked about Daeng Naba, a local trader, they provided different statements. One farmer said that he trusted Daeng Naba when he asked them to cultivate more cassava because he was open about the market price. Another farmer said that he trusted Daeng Naba because he was a good trader and he paid good prices. Another one said that Daeng Naba can be trusted because he lends his own money to farmers to plant cassava.

The above farmers' statements suggest that farmers have their own perceptions on each patron figure based on their experiences and knowledge on the figures that shaped their moral economy in terms of their responses and attitudes towards the figures and ultimately the projects in which they participated. In the case of jatropha, although actually farmers had already had a negative perception on figures such as Haji Syamsu and Daeng Ma'ja based on their personal experiences, they were still willing to participate in the jatropha project. Their participation was certainly not as a form of their loyalty or solidarity but to pursue benefits from the offered incentives with no moral obligation to the two figures because they believed that the two also gained from their roles. While for the case of cassava, farmers demonstrated loyalty and commitment for the positive personality they perceived on Daeng Naba and the existence of mutual benefits between them.

These two different results serve as an illustration of the analysis of Edward Aspinall on the two types of brokerage. Aspinall (2013: 569) points out that the definition of brokerage does not necessarily always involve the clientelism characteristics - contingency or reciprocity, hierarchy that emphasizes the unequal power relations between the patron and the client, and iteration, implying that the clientelistic exchange is never one-off but part of an on-going relationship. Some brokers might tend to be more tightly bound to their followers by way of personal, face-to-face, and especially, iterative relations. However, some brokers also tend to be opportunistic, less interested in long-term relationships and act in ways that do not seem very clientelistic and thus more unconstrained in pursuing their immediate interests. The first type of brokerage is clearly demonstrated in the traditional form of patron-client relationship of the village collectors and the farmers – where the village collectors still maintain the expected good personality and reciprocity towards the farmers. While the latter is illustrated in the relationship between the jatropha intermediaries and the farmers, which was built mostly on the

instant direct benefits pursued by both the patron and the followers. These two types of brokerage covered the same group of farmers as their clients who made decisions about the level of loyalty that they dedicated to each broker.

6.5 Conclusion

Throughout this chapter, I have presented a comparison between jatropha curcas and cassava – two biofuel potential crops – with the specific contexts of Moncongloe as the central background. The on-going process of peri-urbanization in Moncongloe has become an important limiting factor in farmers' decision making process in selecting crops to cultivate and also in committing to certain business models. The rapid land selling has affected the availability of land resource for farmers to cultivate. Although until now farmers are still allowed to use the plots of land that they have sold for farming activities, however, the freedom to determine types of crop is already very limited. Furthermore, the rise of land prices has made farmers to be very concerned about securing their land rights and very cautious in entering any legal commitment with other parties. These limitations, therefore, explain why neither jatropha – which is a perennial crop – nor the long-term plasma contract as adopted by JOP in their jatropha venture, was suitable for implementation in Moncongloe.

The presented case study on PT JOP investment in Moncongloe, besides confirming that problems of low price, market absence and unproven claims that were the central problems in jatropha failure, also shows two other substantial problems in the current commercial jatropha production. First, the case study proves that the selection of the outgrower model to be problematic in ensuring the sustainable raw materials supply. Lessons from the PT JOP case study suggest the difficulties in ensuring lands for jatropha cultivation in the plasma scheme. False data by both farmers and field staff occurred due to careless plasma recruitment that ignored the actual land use and access of farmers. Meanwhile, the risk of farmers' moral hazard – which unfortunately is very common nowadays due to their spoiling experiences with various previous programs – appears to be a main challenge in the outgrower model implementation.

However, the explanation of the PT JOP failure and also the success of massive cassava cultivation is not only limited to this 'rather technical' factor. The analysis on intermediary actors, as presented in this chapter, shows how the human factor as in the patron-client relationship of the intermediary actors was very significant towards the success as well as the failure in the case studies. The analysis shows that the perceptions of farmers towards the personal quality of intermediary actors determine their response and attitude towards the introduced opportunities.

The involvement of local elites as intermediaries in the operational of venture, such as PT JOP has proven to be negative for the company operational. As what has been shown in the case study, this strategy had created layers hampering the communication and transparency between PT JOP and its farmers, and also created dependency of the

company on their roles. To some extent, the involvement of local elites also explains the existence of farmers' negative mentality. Findings in the case study as well as the lessons from many failed development programs suggest that farmers' moral hazard is strongly perpetuated by the influence and manipulation of their elites.[181]

It is concluded from the analysis of the case of PT JOP that the selected patronage network failed to ensure access to land and the participation of outgrowers in this jatropha project. During the interviews some outgrowers told me that right from the beginning they had not been optimistic about jatropha. Aside from the fact that commercial jatropha cultivation was new to them, they were not fully convinced because its introduction was very similar to that of previous unsustainable projects in their locations, especially given the prominent role of the same elites. Another outgrower regarded his patron as an outsider who was only acting as an intermediary between PT JOP and the outgrowers for a commission and was not trustworthy. Against this background, their participation was certainly not due to loyalty towards the patrons, but rather, based on a desire to pursue benefits from the incentives offered. They perceived no moral obligation to the patrons, whom they believed also profited from their roles.

On the other hand, a different conclusion was drawn in the analysis of the interactions between the farmers and the village collectors in the case of cassava. The farmers see the village collectors not merely as intermediaries of the cassava company, but also as resembling the personal quality standard of the traditional patron-client system, where trust and a reciprocal relationship are the main foundation. It is very common for village collectors to not only buy products from farmers, but also become a source of credit, either for productive activities or merely for daily subsistence needs, thus creating a social bond. This bond allows them to act as the farmers' patrons, gaining loyalty and trust in return for the assistance they provide.

Lastly, in the comparison between jatropha and cassava presented in this chapter, I have also shown that the factor of alternative and competitive market contributes significantly to farmers' crop selection decision. The absence of an alternative market for jatropha in terms of alternative buyers for the seeds had caused none of the jatropha growers was interested to continue the cultivation after JOP suddenly stopped their operation. This is significantly different from cassava, where there are many market alternatives (local food markets and industrial markets) and buyer options that offer competitive prices to farmers.

[181] See for example SMERU 2002 on KUT (*Kredit Usaha Tani* or Farmer Credit Program) corruption by farmers and NGOs.

7 Conclusion

Throughout this dissertation, I have discussed and analyzed the jatropha curcas promotion in Indonesia to investigate questions relating to the causes of the jatropha hype in Indonesia and the reasons for its sudden decline. The discussion in this dissertation was specifically focused on the analysis of a list of jatropha projects implemented in South Sulawesi in the period of 2006-2011.

The analysis of jatropha promotion in Indonesia in this dissertation was started with the examination of the national context of jatropha promotion in Indonesia to understand why and how jatropha received heightened attention and support from various actors. For this national level analysis, I examined the background of the jatropha hype in Indonesia and the roles of key actors during the hype period: governments, scientists, state-owned companies, private investors, NGOs and farmers, by focusing on their backgrounds, activities and results. This dissertation has shown that the jatropha development in Indonesia was to a very large extent built on spectacular positive claims and promises. The spectacle was created and maintained by the key actors to influence policies and to create various opportunities around jatropha other than the production of the biofuel itself. In the absence of a clear market for biofuels, the existence of the non-oil objectives that were pursued by the actors have redefined the failure of the projects. The examination of jatropha hype in this dissertation has suggested that the current failure might not be a total failure for those who were involved. Against this background, I argue that the current failure should not only be understood from the business and technical or agricultural perspective, but needs to be broadened in order to include the political economy explanation to investigate the motivations and drivers of those involved.

The examination of the local factors that shaped the rise and fall of jatropha in South Sulawesi, the key drivers and motivations, and the strategies adopted by the actors in the observed projects, has suggested that the current failure might not be a total failure for those who were involved. This conclusion is based on two key factors. First, the reality that jatropha was an unproven commercial commodity had made most actors become aware and cautious about the risks when they would get involved in jatropha activities. This was explicitly demonstrated by most actors who played roles as project initiators, operators and managers. Their involvement in the jatropha projects were dominantly driven by the strong pursuance of non-oil objectives, such as financial funding and employment, and they perceived these objectives as their end goals to get involved in the projects instead

of in the production of biofuel itself. Therefore, those who managed to find specific opportunities to benefit within their projects would not perceive the failure as their loss. This *proyek* mentality is an unpleasant reality faced by many development initiatives, including jatropha development, and can be seen as a cause of its current failure.

The second factor that supports this conclusion is the common informal understanding among the actors that the projects they were involved in was just a *proyek* or a pilot project, emphasizing its short-term and trial nature. This understanding therefore minimized the expectations of the actors, limiting them to the benefits they had gained during the implementation of the projects. The common understanding of the short-term and trial nature of the project also made it easier for the actors, including the project partners, such as farmers and workers, to accept and agree upon the sudden termination of the projects.

However, I am not intending to say that in this kind of arrangement, actors such as farmers did not suffer any loss as if it was a zero-sum game. It should be noted that in spite of the existence of evidence of non-oil objectives pursuance by farmers that motivated their involvement, there were also cases where farmers demonstrated their serious commitment and efforts when they participated in commercial jatropha projects, such as in the venture of PT JOP, or when they cultivated jatropha independently as in the case of the government led project in Gowa District. Even though in the projects they were involved in, most farmers received support in the form of training, free seeds, fertilizers, and even cash payment for their labor, but some of them also still invested substantial resources, in the form of cash and foregone income and labor when they decided to join any scheme offered by the investors. They invested their own resources to hire labor and to buy additional agro-inputs, such as fertilizers, insecticides, and water for irrigation. Those who did not hire labor had invested their own labor (and their family labor) to prepare the land, planting, weeding, irrigating, pruning and harvesting their jatopha because of the expectations and trust on the given promises and spectacle. Moreover, converting land back to traditional annual crops also may incur substantial costs to get rid of the persistent remaining rootstocks of jatropha.

The short-term and trial nature of the observed projects also explains why there was no fundamental change in the agrarian structures in the projects' locations. Despite the existence of land allocation for jatropha in the locations where the observed projects were operating, the crop conversion was only temporary, relatively small-scale and there was no long-term land transfer.

In the next sections, I will present the summary of the key findings of the previous chapters while revisiting the research questions and drawing theoretical reflections on the topic. It presents the contribution of the research to the relevant academic discussions on jatropha both empirically and theoretically. And it offers ideas about what we have learned from the jatropha stories about the other miracle crops.

7.1 Revisiting the Research Questions

The discussion and analysis in this dissertation were structured around three driving questions: *What explained the emergence of jatropha hype in Indonesia? What were the key factors that influential in the rise and fall of various jatropha projects in South Sulawesi? What were the key drivers and motivation that made various actors participate in jatropha projects?*

In this section, I will present the summary of the answers of these questions that are divided into three key headings to address the three sets of sub-questions on (1) the background of the hype in Indonesia and the role of key actors; (2) the local factors that had been significant in the implementation of the jatropha projects in South Sulawesi; and (3) opportunities and benefits that were pursued and materialized in the observed jatropha projects in in South Sulawesi.

7.1.1 Jatropha Hype and Actors

The fluctuation of oil prices in the mid of previous decade and the increasing concerns about climate change had led to a global boom of investments and enthusiasm for biofuels. Much of the excitement had revolved around jatropha curcas that was labelled as a wonder crop.

Jatropha biodiesel was claimed to have various advantages as a sustainable energy resource over the fossil diesel fuel. It was claimed to have direct economic gains from producing and selling energy as well as the spin-off effects related to the production of cheaper or more reliable energy available to other sectors of the economy. It was expected to have the potential for a more stable price than the fossil diesel fuel, improving the reliability of the energy supply, lessening the need for foreign exchange to import fossil fuels and making energy accessible to rural people.

In this dissertation I use the concept of 'hype' in analyzing the global short life of jatropha euphoria. As suggested by Tjeuw (2017: 18), the jatropha hype and disappointment should not be confused with the commodities boom and bust cycle that happens periodically in the global economy. The main reason why the phenomenon of jatropha is a hype is because the enthusiasm for this plant was not built on a concrete market and price mechanism. Afiff (2014: 1699) points out that the up-and-downs experienced by jatropha did not resemble the normal cyclical boom–and-bust process faced by boom crops mainly because jatropha is not yet a reliable market commodity but it is still at the stage of technological innovation. The main drivers of the enthusiasm for jatropha cover the expectations to benefit from a niche created by the skyrocketing of fossil fuel prices in 2007 and further exaggerated the availability of non-market drivers, especially funding and subsidies for alternative fuel innovations. Therefore, the fall of jatropha was because of the failure to materialize the overwhelming expectations and claims on the niche market and the non-market drivers.

Despite the positive objectives behind the promotion of jatropha, it has been evident that most of the research claims were premature and not yet supported by scientific evidence for a successful empirical implementation. More crucially, there is a serious disconnection between the laboratory assumptions made by the technical scientists on the one hand and the social and economic realities on the other hand. As a hype, jatropha was full of overwhelming expectations and claims causing a serious gap with its material reality.

One of the crucial gaps was the historical aspect of the plant. There has been a misleading claim on the history of jatropha. While a substantial number of people in Indonesia retained a collective memory that was associated the term of *jarak pagar* with the Japanese wartime occupation, very few Indonesians actually have clear knowledge about the plant. The limited knowledge on the true history of jatropha has caused farmers to fall easily into the trap of overwhelming promises and claims on the jatropha potentials at the time of the hype. In Chapter 2, I have specifically focused on the reconstruction of the actual history of the cultivation and the use of jatropha in Indonesia. From my historical assessment on jatropha, I conclude that there was no record available to support the claims that jatropha had been widely cultivated and applied as biodiesel during the Japanese occupation period. All references that I used as my source of verification clearly indicate that it was castor, and not jatropha, that was cultivated under the mandatory instruction of the Japanese colonial administration. The examination also found that the cultivation of castor in that period was aimed at addressing the shortage of fossil based lubricant and not as diesel fuel replacement in the war period. Therefore, this conclusion explains why there is so little knowledge among farmers about the plant and little in terms of technology to process jatropha into biofuel, either in Indonesia as well as globally. Regarding the wide circulation of the false storylines about jatropha, I argue that this situation has been used by many promotors of jatropha to dictate the local memories of farmers, as if the plant has been part of their agriculture for a long time; and the application of jatropha for biofuel beyond its traditional function as the torch fuel is already proven. Since this type of storyline is very much unchecked and taken for granted, it was strategic in convincing and in mobilizing people to support jatropha.

The promotors of jatropha had framed the potential benefits of the plant in terms of environment, energy security, and rural development. Jatropha was described as an energy plant that can lead to energy independence, alleviate rural poverty and make use of marginal land not suitable for food production. In various reports, jatropha was praised as a wonder crop and farmers, biofuel producers, consumers, and the environment would all benefit from growing and processing jatropha.

However, the promotion of jatropha outpaced both the development of the market for end products, and more fundamentally, the evolution and spread of knowledge that might have helped to fulfill some of its potential (Hunsberger 2012: 251). In the last decade in a wave of enthusiasm for the plant, the hype won out over common agronomic sense, and both myth and capital were quickly dissipated as the plant struggled in hostile growing environments (Hawkins and Chen 2011: 21).

The research on jatropha cultivation practices and on the genetic selection to produce oil was only initiated in the late 1990s. There was insufficient knowledge, experience and technical capacity as well as a lack of reliable and improved varieties to support commercial large-scale jatropha production. Jatropha breeding is still in the early stages, progressing through conventional, mutation, molecular, tissue culture, and transformation phases. The problem is that reliable production data is lacking, especially in regards to breeding, management, and pest and disease susceptibility (Tjeuw 2017: 8-9). There was little knowledge on the best agricultural practices, such as spacing, pruning, and the correlation between fertilization of trees and yields. Seed harvesting and post-harvest handling techniques also had not been established and standardized. The absence of knowledge had created conditions of uncertainty. Inaccurate or wrong information was widely spread and this resulted in negative impacts both for the investors and the farmers. To understand how jatropha was introduced and promoted in Indonesia, this dissertation has presented an elaborated discussion on the key actors in the jatropha hype covering the identification of the key actors: governments, scientists, state-owned enterprises, private sector, NGOs and farmers; and the examination of their roles in understanding how jatropha assumed the privileged position during the hype period.

The discussion on the jatropha actors in this dissertation has shown a vast network of actors involved in various forms of negotiation and lobbying activities in their networks to attract, convince and persuade other actors by communicating, repeating and adopting positive messages. As presented in Chapter 3, the narratives on jatropha were first disseminated by the prominent ITB affiliated scientists who transferred the optimistic discourses on jatropha to their links in the government, politics and business.

Simandjuntak (2014: 3781) notes that the development of jatropha, as with other biofuel resources, such as oil-palm, began with policy-making. The policies stimulating the implementation of new technologies are based on the strength of narratives and lobbying activities in social networks surrounding the main policy-makers. In the case of jatropha, the narratives were presented by the leading jatropha scientists with a strong rhetoric on the powerful social and economic impact of the plant in addressing a complex problem faced by the government regarding multiple crises of economy, environment and energy.

In responding to the energy crisis in Indonesia, the then Indonesian president, Soesilo Bambang Yoedhoyono turned to the development of renewable energy, especially biofuel.[182] His government issued the Indonesia Biofuels Blueprint and specific attention was given to jatropha, which was perceived as the most suitable plant for biofuel production not only for the product but also for the claim that it can contribute to wasteland rehabilitation and income generation in marginal areas.

[182] The energy crisis is an irony to Indonesia as one of the world fossil fuel producers. It is a consequence of the heavily export-oriented policy in the energy sector. After Indonesia becomes a net oil importer in the beginning of the 2000s, the high production of coal and gas – where Indonesia has huge reserves for both – is prioritized for export, instead of domestic consumption.

During the period of active government support for jatropha, a significant amount of government funding was available for jatropha development activities: research, nurseries, plantations, oil productions, equipment and machineries (e.g. pressing machines and stoves), as well as the production of jatropha based products. The availability of the funding allocation had became a key non-oil driver for the creation of various jatropha related activities that were implemented sporadically by government agencies at the national and sub-national level. It attracted other actors to participate without any clear coordination and sustainability commitment causing confusion and significant pursuance of personal interests, including corruption at the implementation level.

Dillon *et al.* (2008: 1) critically note that the government's enthusiasm for biofuels had not been matched with equally vigorous programs to ensure the development of the industry in the planned timeframe. As this dissertation has discussed, the volatile prices for biofuel feedstock and petroleum since 2006 had led to dramatic shift in the cost of biofuel production, relative to petroleum fuels and the government's appetite for providing support had waxed and waned with the profitability of the industry. At the same time, as Amir *et al.* (2008: 129) point out the biofuels development blueprint at that time was not sufficiently supported by other strategic policy instruments in the form of government procurement schemes, and fuel specifications, nor had there been financial and economic instruments, such as subsidies and preferential taxation, whereas these are among key factors for the adoption of biofuel as an alternative technology. As the consequence of the absence of a clear biofuel procurement arrangement, the designed standby buyers for biofuels: PT Pertamina and PT PLN unilaterally withdrew from their commitment to purchase biofuels from the producers due to suffering mounting losses from their biofuel blend targets. All jatropha related projects of the government, including those under the DME (*Desa Mandiri Energy* or Energy Self-sufficient Village) were discontinued as the consequence of these dramatic developments since the government failed to continue its commitment to guarantee the market for the jatropha produced by the farmers under those projects.

Other than the absence of a clear and sufficient policy to support the development of biofuels, one key factor that limited the implementation of the national policy at the sub-national level is the current decentralized system of governance and the fragmented politics in Indonesia where the top-down effect of the national policy has become not as effective as in the New Order era. Since the late nineties the power balance between the center and the periphery has radically changed. Notwithstanding the Soeharto heritage of hierarchic rule and control, his rule has left a basically weak and vulnerable state characterized by excessive centralization, corruption and nepotism, military enforcement and a general lack of legitimacy of the administration. In the New Order era, a presidential instruction and a decree such as the ones issued by President Yudhoyono to support the biofuel development blueprint, always worked powerfully for the entire bureaucratic-military structure - which was completely under the control of Soeharto. However, in the post-Soeharto era, many changes occurred and have significantly diminished the effectiveness of central government instructions at the sub-national level (Roth 2003: 310 and Amir *et al.* 2008: 130).

The ineffective influence of the national policy, in many examples, are caused by the political conflicts between the national and sub-national politicians and the differences in development priorities between the national and sub-national governments. The introduction of laws on regional autonomy and the fiscal balance between the central government and the regions since 2001 has provided new opportunities to regional political and development agenda (Roth 2003: 310).

Although in South Sulawesi the local governments participated in implementing the national policy on jatropha development, they were still cautious on the possible negative impacts of this plant on the existing commodities in this province, in terms of competition in land use, the possible transmition of plant diseases and the reverse impacts on the farmers' livelihood as well as the local economy of the region. This cautious consideration was reflected in the hesitation of several district heads to approve the requests of jatropha investors to provide them with arable land to establish jatropha plantations because they were not convinced about the viability of jatropha in comparison with to the existing agricultural commodities in their areas, such as corn and cacao (a brief discussion on this case was presented in the data collection section of Chapter 1).[183] The case of jatropha failure that became a political threat for the district head in Gowa District as presented in Chapter 5, is another example that shows how a local government will ignore the national instruction if the result of the implementation would have political risks for the local government.

The other actor that played a major role in the promotion of jatropha in Indonesia was the business sector. However, the business sector had limited influence towards the national jatropha policies in spite of the key role of some state-owned enterprises in initiating the early years of the jatropha hype in Indonesia. This was evident in the absence of effective policies as well as the weak enforcement of the existing biofuels development policies that address the concern and interests of the business sector for a more pro-market jatropha development roadmap.

The business sector activities related to jatropha were mostly small-scale with, where companies working with small groups of outgrowers or with small demonstration/trial plots. In Chapter 3, I have discussed that companies investing in jatropha were not merely companies with a pure background and intention to develop and produce jatropha biodiesel and its diversified products. Many companies appeared to be investment companies that aim to attract funding from investors by selling the dreams and spectacle on jatropha as well as claiming and selling green investment or social enterprise images for their ventures. They built their portfolios by establishing pilot projects as their showcases to their potential investors.

Aside from the commercial reason, some companies, especially from the mining industry were involved in jatropha development activities merely in order to meet the specific ten

[183] The former plasma manager of PT JOP also mentioned the similar cautious reaction of several district heads in the PT JOP plasma areas who instructed a strict scrutineering by their estate crops agencies over the expansion process of the company's plasma areas.

percent biofuel consumption target as regulated by the national government. The jatropha activities in these companies were financed and managed through their corporate social responsibility scheme, where the jatropha development activities were mainly used for their ex-mining area rehabilitation program and community based energy development without any clear plan to produce jatropha biodiesel for their own consumption. Thus, their jatropha related activities were suggested to be fashion driven only and a form of formality in demonstrating their support to the national government's agenda on jatropha development without a true commitment to seriously adoptthe companies' business portfolio.

Another group of actors that were involved in the promotion of jatropha in Indonesia were the NGOs. In my research, outside of the twelve jatropha projects that I presented in Chapter 5, I did two brief assessments on NGOs which implemented jatropha development projects, which I mentioned in Chapter 1 and 3: Yayasan Dian Desa's jatropha development project in Sikka, Flores that received funding from the Japanese Embassy and SRP Payo-payo in South Sulawesi that received funding from *Helsingin Yliopiston Ylioppilaskunta*, the Helsinski University Students Union from Finland to implement a rural sustainable livelihood program in South and West Sulawesi. The background of these two projects covered the issues of environmental protection, rural energy development, and poverty reduction, with a similar background as the other NGOs driven jatropha projects.

Different from the experiences in other countries that were reported in many reports, the NGOs in Indonesia had a small role in the jatropha promotion. This was primarily because the limited availability of funding from donors for jatropha development activities in Indonesia. Development donors seem to act differently in responding to jatropha hype in Indonesia, in comparison with in countries such as those in Africa. The focus of donor programs in that period of time on the development of commodities with clear market prospects and value chains, had limited their interest to support jatropha which was in an early phase. Furthermore, the immediate failures of jatropha activities both in Indonesia and globally as well as the growing concerns on the negative impacts of both jatropha and biofuel development towards food security, environment and land ownership had confirmed the validity of their hesitation. In fact, some donors were more interested to support the campaigns of NGOs to voice out the concerns and criticism on the negative impacts of biofuel development, including jatropha.

The last group of actors that I examined in my research were the farmers. Despite their central role in planting and post-harvest processing of jatropha, as discussed in this dissertation, farmers had minor power in influencing the policy. Farmers had no representation in any of the jatropha policy making processes. Important decisions on business models, planting systems, and pricing were made in the absence of their voices. They were merely the object of the jatropha development policies of the government and the technocratic assumptions made by the jatropha scientists that simplified and in many cases undermined the technical, social and economy realities at the farmers level.

The presented case studies show that despite their minor role in policy making, the farmers still maintain their autonomy in making their own decisions about whether or

not to plant jatropha, and once planted, whether to continue to grow it or abandon it in favour of another crop. While, they can be seen as the victims of false claims farmers' involvement in jatropha activities was strongly driven by the interest of profit making. None of the observed projects in this dissertation presented a case of coercion towards farmers in their participation in the projects. Aside from being attracted by the overwhelming claim of big profits from planting jatropha, many farmers joined the outgrower scheme after being offered various incentives, such as free seeds or seedlings, agro-inputs, and cash payment for planting jatropha, income from land lease, market guarantee, and employment opportunities.

Similar with the freedom they had in deciding to cultivate jatropha or to join the business models offered by the projects, farmers also exercised their autonomy when they decided to abandon the plant or to leave the projects. When they realized that all claims made by the projects turned to be untrue, many farmers immediately stopped planting jatropha and withdrew from the schemes.[184]

This kind of freedom or flexibility, in many cases existed because of the pre-determined arrangement of the projects. As I discussed in the analysis of Chapter 5, the reality that jatropha was not yet a commercially proven crop had made actors very cautious about getting involved. In the implementation of the projects, some projects such as the projects of the Green Light Biofuel and PT Luwu Agro Raya, were predominantly guided by the informal common understanding between the project actors that their cooperation was just a *proyek* or a pilot project, emphasizing its short-term and trial nature. This understanding therefore minimized the expectations of the actors, limiting them to the benefits they had gained during the implementation of the project, for example, land rent income for the landowner and wages for the laborers. The common understanding of the short-term and trial nature of the project made it easier for the actors, including the project partners (especially the farmers and workers), to accept and agree on the sudden termination of the projects for a variety of reasons, including the absence of a market, the lack of subsidies and additional funding, as well as the immaturity of the commodity itself.

Summing up, this section on the hype and actors has shown that scientists, government, businesses, NGOs and farmers all 'do' things' that affect the ways in which jatropha hype was experienced in Indonesia. They contributed to the jatropha hype by conveying overly optimistic claims about its agronomic suitability and economic potential and framed their potential benefits in terms of environment, energy security, and rural development. These actors, either independent from each other or collaboratively constructed overwhelming positive stories on their jatropha projects emphasizing their growth potential and profitability in creating the bubbles of spectacle.

[184] Attracting and engaging farmers' participation by luring them with cash incentives is proven to be risky with moral hazard. Pasicolan (2003: 89) points out that paying people to plant trees on public lands was not a sufficient condition for their sustained participation. When incentive payments were delayed, people's participation can be erratic, conditional and problematic. The common problematic behavior when the payment delayed or finished includes: a) deliberate burning down of the project by the participants, b) participants' premature abandonment of the project, c) mutilation of seedlings when payment were delayed, d) hap-hazard performance of project activities and e) sudden mushrooming of 'fly-by-night' contractors and NGOs.

For new innovations, such as jatropha, spectacle plays a pivotal role in building momentum and engaging other actors. However, as argued by Hunsberger (2012: 234), the optimistic discourse on jatropha appears to be not only built by communicating, repeating, and adopting, but also guarding the narratives and challenging or suppressing dissenting information or views. The lessons from the jatropha hype in Indonesia have informed us about the small circle of actors who were central in the policy and technocratic assumption making the process that excluded and undermined the knowledge, experiences, interests and concerns of others. This situation contributed to the existence of gaps between the spectacle and the material reality which at the end have disbenefited everyone due to the supply of inaccurate information in the decision making process. The short-term benefits gained by some actors from the spectacle were at the expense of the other actors and finally sacrificed the long-term interest of everyone for the improvement and sustainability of jatropha sector.

7.1.2 The Motivations and the Drivers

The actors involved with jatropha in South Sulawesi represent a plurality of goals and strategic interests. They initially approached jatropha with one common background: the global issue of energy crisis, which they translated as an opportunity for the production of biofuels, especially jatropha to become a high-value biofuel alternative of the diesel oil. This opportunity attracted various actors, including those who had no experience in agribusiness but decided to promote jatropha for commercial investments even with very limited knowledge about the plant. They spotted relevant opportunities for them to benefit and contributed to shaping the enabling environment for their own interests.

This dissertation has shown that the variety of jatropha actors' motivations and goals was driven by their personal and institutional interests. As coined by Hunsberger (2012: 172) on an individual level, actors were driven by their thematic interest in science, agriculture or renewable energy. Other saw opportunities to advance their careers through business or job opportunities connected to jatropha, while, on an institutional level, the motivations of organizations were constructed by the mandates and interests of the organizations. These personal and institutional interests shaped their motivations for working with jatropha.

The analysis of the twelve case studies reveals that producing oil was not the only thing that attracted the actors. The availability of funding from the government, venture capital, CSR, and so forth for jatropha related activities had became another key driver of the observed projects. These non-oil drivers had attracted actors who apparently perceived them as the end goals of their interests in jatropha instead of the production of biofuel itself. This analysis confirms the notion of McCarthy, Vel and Afiff (2012) that I presented at the beginning of this dissertation stating that a failed project, like those in the jatropha case, might become successful in other ways. A failed project might not be a total failure for those involved. Actors who managed to spot specific opportunities to benefit within their projects will not perceive the failure as their loss.

The case studies have demonstrated the flexibility of the actors to invoke jatropha as a means of achieving a variety of objectives. They got involved in the jatropha projects with different priorities. Some were competing and conflicting with the original focus of the projects with the consequence of reverse effects derailing the projects from their focuses and negating the sustainability of the project. The case of PT JOP is an example of this case. The multiple goals pursued by the actors in this investment project were even beyond the conventional non-oil objectives with the use of the venture for various political interests of the managers. The combination of the business objectives and the political interests in the operations of the venture had failed. The political siding of the managers in the series of local political events had derailed the venture from its business focus and caused negative sentiments towards the venture.

The pursuance of various non-oil objectives in the observed projects displays the opportunistic behavior when they got involved in the jatropha projects. The opportunistic behavior of the actors is closely related to how the actors defined and perceived the jatropha projects. The term 'project' in the twelve jatropha projects had been widely translated in the way Indonesians in general define *proyek*, a specific connotation of 'easy money' where direct gains in terms of material benefits, paid labor, increased access to resources and so forth become the immediate focus to be pursued by the actors (Persoon and van Est 2003: 17, Aspinall 2013: 30).

Lastly, the strong pursuance of various non-oil objectives, especially by farmers who were driven by the availability of incentives confirms my argument that the jatropha fever in South Sulawesi at that time was not yet a commodity boom but only a hype phenomenon. As I have pointed in the discussion on hype, different from boom crops, such as oil palm, coffee and cacao, which booms and busts were influenced by market mechanism of supply and demand, jatropha as a hype crop was driven by overwhelming expectations and claims. Furthermore, the jatropha phenomenon in South Sulawesi did not display any specific character of Sulawesi commodity booms, such as in cacao and pepper where the traditional ethnic channels for technology, finance and marketing take place and determinant. In jatropha, everything was externally driven and the farmers performed the passive role as beneficiaries of the incentives provided by the projects.

7.1.3 Jatropha in South Sulawesi

In South Sulawesi Jatropha is known as a wild plant and locally known as *jara* or *kanjoli.* It is used as traditional medicine material and torch fuel. There was never any commercial cultivation in South Sulawesi before the hype started in this province. When the hype struck Indonesia, this province became the host of many jatropha projects, consisting of projects initiated by the governments, investors, research centers, CSR programs and NGOs.

In this section, I summarize the key local factors that contributed to the implementation and outcome of jatropha projects in South Sulawesi by focusing on actors, events and systems that were influential in jatropha promotion process. Local actors played the central role in the introduction and promotion of jatropha in South Sulawesi. I discussed

the central role of a local scientist, Yoel Pasae, who was well connected to the biofuels research group at ITB and also becoming the founder of the provincial chapter of the Forum Biodiesel Indonesia (Indonesian Biodiesel Forum) in South Sulawesi. Yoel was the first promotor of jatropha in South Sulawesi. He was a key figure in connecting the national discourse on jatropha that was developed by his biofuels research network in ITB with his local networks in South Sulawesi.

Before the national government endorsed the national biofuels development blueprint in 2006 and the existence of various jatropha projects by the government and private investors, Yoel had started his research works on jatropha biofuels potential and engaged many key stakeholders in South Sulawesi in the series of jatropha activities that he was leading. Using his role in the Forum Biodiesel Indonesia and his own company PT Energi Indonesia Timur, Yoel initiated several jatropha projects in collaboration with the members of the Forum, such as with the Indonesian Cereals Research Institute and PT PLN.

However, it is noted that the influence of Yoel's works on jatropha was mostly limited to his own circle of people. In my research, I did not find the engagement of other jatropha projects with Yoel other than the project of PT PLN that was a member of the Forum Biodiesel Indonesia. This is probably because the other projects had established their own networks that supplied them with knowledge and technology. For example, PT JBS established a jatropha biodiesel processing plant using the technology that probably was sourced from Japan.[185]

Moreover, the activities of Yoel were mostly focusing on the processing of jatropha into biodiesel. This then also explained the absence of a connection between his activities with the other jatropha projects that mostly were still at the cultivation level and that had not yet started any complex processing of jatropha seeds into biodiesel.

Aside from the central role of local scientists, the role of local figures who were recruited as managers and coordinators of the projects with key responsibilities to find land and to recruit and mobilize farmers was also essential. Those who were recruited as managers and coordinators were people with influences in the systems of social, economic or political relations in order to facilitate access to valued resources - such as political influences with government and politicians that were used to access land in the projects of PT JOP and PT Luwu Agro Raya; and those who already had reputation and influences in agriculture, as shown in the projects of Green Light Biofuel and PT JOP where the two projects utilized the influences of their agronomy staff who were known as cacao experts to influence cacao farmers to shift to jatropha.

Access to land, farmers and government officials requires sufficient knowledge on the local land use and agricultural practices and good networking with the local figures who are essential to support access to the targeted resources. The actors recruited for these purposes acted as brokers or middlemen who connected and provided crucial links to the

[185] As written in Chapter 6, the jatropha biofuel processing plant of PT JBS was officially operated in September 2009. In January and February 2010, the company was reported to export eight barrels or 1,600 kilolitres of jatropha biofuel to Japan.

investors to access the targeted resources – which in the jatropha projects consisted of land, farmers, and policies.

Despite the existence of the actors who acted as brokers for the projects, the success of the projects to access resources, especially land to establish jatropha plantations was very limited. Most of the jatropha cultivation projects were only small-scale. The lands for the projects were leased from the farmers for a short trial period of one to two years and involved farmers through the payment of wages for their labor to prepare the plots and cultivate the seeds/seedlings and the provision of agro inputs, as can be seen in the projects of Green Light Biofuel and PT Luwu Agro Raya. However, when the investors were interested to establish big scale jatropha plantations, they found it difficult to find approval from the local governments.

While the government's data on the total of potential area suitable for jatropha cultivation in South Sulawesi seemed very promising for an extensive development of this plant,[186] the reality on the ground showed many difficulties for jatropha investors to find lands for their investment, including the hesitation of the local governments to endorse big scale jatropha investment in their districts because they were not convinced of the viability of the plant as a commercial agricultural crop to be grown by farmers.

At the time of the jatropha hype in South Sulawesi, some key commodities of South Sulawesi, especially cacao experienced a setback. Jatropha investors, such as PT JOP and Green Light Biofuel used the downfall of cacao to introduce jatropha as a new cash crop potential to the cacao farmers. The reactions of the government, especially in the cacao producing districts were very cautious. They were concerned about the risk exposed by the plant to the livelihood of farmers in their districts if the farmers would shift to this new crop. After several years of jatropha hype, local governments were also suggested to learn from their own failure experiences in implementing the government funded jatropha projects and became more cautious in providing permits as well as in monitoring the existing jatropha projects in their districts.

There were two jatropha projects that categorized as large-scale: PT JOP and PT JBS. Both were operating in the same period. However, in terms of the success to access resources PT JOP achieved better results. The company utilized both the Golkar Party network and the extensive Halid family network, in order to draw on contacts from high-ranking politicians, down to farmers at the village level who were recruited to its outgrower scheme.

The connectedness of the company to key individuals through the social and political networks of the Halid family who managed the company became its key advantage in comparison with the limited network of PT JBS. As I have argued in the conclusion section of Chapter 5, the pre-existing networks as well as the connectedness to key individuals (as demonstrated in the

[186] According to the data on the distribution of suitable areas for jatropha cultivation in Indonesia (*penyebaran lahan yang sesuai untuk jarak pagar di Indonesia*) issued in 2006, South Sulawesi had approximately 435,483 hectares land suitable for jatropha cultivation (Mulyani *et al*. 2006).

case of PT JOP) were the key advantages to access the desired resources. Those with limited networks would have to rely mostly on the official channels to access resources.

In Indonesia, key individuals in the social and political sphere are very central in the control of access to the state's economic and financial resources. Under Indonesia's decentralized system, the political class at the regional level holds control over the resources, which they share with allies, relatives and clients. The strong influence and control of patrons over their clients and resources have been the main reason for outsiders to connect with them to further their specific interests and goals, especially with regard to ensuring access to the targeted resources.

The role of a patron as gatekeeper or intermediary is not new in business, especially in agribusiness. When companies aim at establishing large-scale production of an agricultural crop, they need access to land and labor. The company's management needs the services of intermediaries to get in touch with local landowners, farmers and laborers. Companies identify these local patrons and try to coopt them by integrating them in the supply chain, either in their role as representatives of their farmer-clients or as intermediate traders. Baumann (2000: 16) in his working paper on contract farming, writes that traditional middlemen who are commonly also playing a role as social patrons can serve as reliable representatives of the local farmers in contract scheme if a company finds it difficult to implement contract farming in areas characterized by communally owned land. Instead of establishing production contracts with farmers in such areas, it will be better for the company to contract the middlemen for the supply of products, thus avoiding the need to disturb the traditional land tenure. According to this view, patronage is effective for both mobilizing people and controlling resources.

Yet, the existence of political connections and influences for a venture itself is not a solid guarantee of success. Chapter 6 presents a village level analysis of jatropha project implementation in Moncongloe in which where I comparatively analyze the non-commercial intermediaries (political elite network) adopted by PT JOP for its jatropha investment and the commercial intermediaries (trader network) adopted by PT EN3 Green Energy for its cassava investment.

The comparison demonstrates that the role of the traditional patronage system still remains influential for the success of a venture to access farmers and their resources in South Sulawesi. The perception over personal quality of a patron built on the traditional and religious values as well as the social and economic dependency of clients becomes the key foundation for farmers' loyalty and trust towards the patron figures. This explains why the modern patronage system which is characterized by less feudal forms, which are more impersonal, rational, less dependent and non-permanent, as represented by the political actors, government officials, and NGOs, can be ineffective to ensure the loyalty of farmers in places where traditional patron-client system is still prominent. Against this background, I argue that the intermediary analysis in explaining why certain investments fail or why they are successful is crucially important, not only because it can serve as a complementary element to the conventional supply chain analysis, but also because

it reveals many other aspects that are often undermined in the conventional analysis, especially aspects related to the local culture and politics.

Lastly, back to the discussion on land, the village level discussion has also demonstrated that the introduction of a new crop is significantly influenced by the status of land tenure and land use practices. The case of Moncongloe has shown that there was rapid land selling that affected the availability of land for farmers to cultivate. While farmers were still allowed to use the plots of land that they have sold for farming activities but they already had limited freedom in deciding on the types of crop to cultivate on that land and also in committing to certain business models. Land use and tenure analysis are interrelated with the business models analysis. The selection of land to be incorporated in jatropha investments is influenced by the type of land use and tenure, which determines the feasibility and accessibility of land by the investors under the adopted business model. In the case of Moncongloe, the rise of land prices had made farmers to be very concerned in securing their land rights and very cautious in entering any legal commitment with other parties that may affect the security of their land rights, including in joining and committing to a business model, such as the outgrower scheme that requires a long-term commitment and involves unforeseen consequences for their land rights.

The understanding of land use and land tenure (and how they work in practice) is very important when considering to apply a business model in a certain locality. Scholars have argued not to focus only on property rights when considering the ability to access. Ribot (1998: 312) argues that access has a broader term than property rights since the latter is only linked to the *de jure* factors of legalistic or rights-based concepts of ownership, title and tenure. Yet, rights and laws only partly determine who benefits from things and how. Legal ownership, tenure and title are just a few mechanisms among many that people use to support their ability to benefit. On the other hand, an access analysis is empirical or *de facto*: it is concerned with who has the `ability to obtain or make use of' benefits and how. `Access' does not replace the term `property', but rather it encompasses property, putting property (and other forms of) rights in their place among the whole array of mechanisms, structures and relations at work. In this regard, a business should not only rely on the normative land rights provided by the state but should consider any applicable customary rights and practices that exist regarding access to land.

The case study of the JOP outgrower system has clearly indicated the incompatibility of the plasma or outgrower system to secure the raw materials supply for the venture. This then raises a question on what would be the other option for the jatropha production system?[187] The reflection of the former management of PT JOP in the case study suggests

[187] The topic of business models has been central in the arguments of both the opponents and proponents of jatropha on the current failure as well as the prospect of jatropha. Opponents of jatropha suggest the absence of viable business models to ensure the profitability of this crop both for the industry and the farmers. On the other side, the proponents of jatropha, as well as some other more neutral views, argue that the absence of long-running jatropha projects has become the cause of problem to identify the most suitable business model(s) for jatropha based on the empirical cost-benefit analysis (Van Eijck *et al*. 2014). Yet, they believe that jatropha is still feasible to be developed under certain smallholders oriented business models (GEXSI 2008, Nielsen et al. 2013, Van Eijck e*t al*. 2014).

that a mix model of out grower and plantation: the nucleus-plasma model is probably the most suitable model of production for jatropha. Nucleus (establishing its own plantation) is designed to supply the minimum amount of raw material for the processing facility to ensure that it can operate without being affected by the uncertain supply from plasma farmers. However, this alternative model had never been tested for jatropha and there are still many questions to be answered to realize this model: What is the minimum size of nucleus for commercial jatropha investment considering the actual low yields? How realistic is the idea to establish a nucleus plantation for a not yet commercially proven crop such as jatropha? How to cover the expensive operational costs for such unproven commercial crop? And so forth.

Farmers growing jatropha face significant revenue uncertainty due to both production and price uncertainties. Production uncertainties are inherent in agriculture, and more prevalent in newly developed crops, such as jatropha. More importantly, jatropha fuel prices are largely undetermined and highly influenced by the volatile diesel fuel prices and the fuel price subsidy policies of the government. The price volatility is likely to be aggravated as biodiesel alternatives, such as jatropha are heavily burdened by their label as the cost effective fuel substitutes for the diesel fuel. This will always push down the raw material (jatropha seeds) prices to the level that industrially efficient but not feasible for the farmers to earn income to cover their production costs and to earn a decent profit.

In my research, I found that farmers are actually still interested in jatropha as long as there is certainty and guarantee on the price and the market. If they can be provided with a clear price and market, not only that they can become outgrowers but they will also be prepared to grow jatropha with their own investment to supply any jatropha processing factory through the open market system - as suggested in the frequent statements of the farmers that I encountered in the field: ‘No need to provide us with incentives, as long as the price is profitable and market is clear we will find our own ways to plant jatropha’.

7.2 Final remarks: what can we learn from the jatropha stories about other miracle crops?

Much has happened since the end of jatropha hype at the end of last decade, including the emerging of new potential biofuel crops, such as *kemiri sunan* (*Reutalis Trisperma*) and *nyamplung* (*Calophyllum Inophyllum*). Policy support that encourages the production and use of biofuels also remains in place, providing a mandate and strong incentives for biofuel production to continue.

Advancing on the findings of this study, the following are the key recommendations to be considered when introducing new biofuel crops.

The introduction should be in the framework of long-term planning with clear phases. Any successful domestication and commercialization of new crops will take a long-term process and requires a long-term commitment by all key actors. The progress towards the

development of commercially proven biofuel crops will take time and series of trials. As stated by Baker and Ebrahim (2012: 4), if jatropha, or any biofuel, is to pass beyond pilot stage for example, it needs to pass a number of tests, environmental, social and economic. Sufficient resources should be devoted towards research trials both for the plant and biofuel as well as the co-products development technologies.

Until any biofuel crops can become a sound investment for smallholder farmers, none should be promoted as a monoculture or intercropped plantation crop beyond the trial modality. This is crucial to be able to make solid promises to farmers and other investors. In other words, the introduction should be transparent and clear about the current state of the technology and plan development so that farmers and other investors can make their own risk assessment. Farmers also should be compensated for their opportunity costs in testing the new crop, and provide a clear guarantee of the accessibility of inputs (improved varieties and other technologies) and a concrete market guarantee.
Learning from the experiences of jatropha introduction in this research, the selection of business models to be applied in any biofuels development should incorporate the local social, political and cultural context because not all underlying theoretical assumptions of a model will work in certain locality. Many analyses and implementations of business models tend to fall into the risk of generalization of theories and assumptions without acknowledging the existence of necessity for local adaptations of the models with the local contexts.

Government should develop a proper land classification system that identifies land suitable for biofuels crops. According to Tjeuw (2017: 30 and 145) the allocation of land is a complex subject and has raised the issue that a complete ban on using arable, irrigated land for biofuel crops to avoid conflict between food requirement and fuel requirement. However, for commercial production of biofuel, soil fertility will play an important role if the yield potential is to be realized.[188] Therefore, suitability may imply land with characteristics allowing for large crop yields, which may be on the current fertile crop land, grazing land, irrigated areas or nature areas. Suitability may also imply land that is suitable because it has no or low productive land use, such as 'marginal or underutilized' lands. Dillon *et al.* (2008: 62) point out that if such 'degraded land' is secondary tropical forest, then conversion to oil palm or jatropha will have negative environmental impacts that resemble conversion of primary forest, particularly for carbon release and biodiversity. However, if these lands are bare and eroding, conversion to biofuel crops cultivation areas could stabilize soils and result in a net uptake of CO2, as well as a profitable crop.
A well developed land classification and allocation for biofuels development is importance to protect community, environment and investors. Learning from the experiences of jatropha, the land that the government indicated as suitable for jatropha cultivation is

[188] She presents a strong logical argument based on a well-established fact from the jatropha experiences, that it fails to produce high yields on marginal lands. To be able to do so, it will require extensive inputs. The question then why should we exclude biofuel crops from fertile soils? Biofuel crops, such as jatropha has the potential to be a cash-crop like cotton or rubber, which are both equally inedible but seem to be well accepted and not seen as a threat to food production. The same could be argued for all non-food crops grown on fertile land (Tjeuw 2017: 145).

often forest or customary community land, making it unclear for investors with whom to negotiate, and who is entitled to represent the community to do the land lease transcation. It is also noted that land allocation for biofuels development when it is fueled by economic incentives may cause careless concession allocation, causing land misappropriation, deforestation and creating injustice for the local population. To prevent and address this problem, it will require a strong political will of the government especially in improving the land governance and law enforcement.

One of the bottlenecks in the current Indonesia biofuels development is the incoherence of supportive economic policy instruments such as subsidies, tax incentives, financial support for biofuel compatible vehicles, and cheap credit schemes to make the cultivation, processing and consumption of biofuel more economically competitive with other alternatives. Learning from the experience of jatropha introduction, the available supportive policies did allow researchers, engineers and businessmen to create their own jatropha projects but, at the same time, the commercial viability of jatropha biofuel was ruined by the other policies. In particular, the fossil fuel subsidies that have set such a low price ceiling for alternative fuels that cultivating feedstock for biofuel production became unattractive (Govers *et al.* 2014: 106). Meanwhile, the weak implementation of biofuels development subsidies is still a problem. In Indonesia, it was only researchers, government officials, NGOs and broker companies, rather than farmers or plantation companies that were the major recipients the subsidies. It is advised to apply a targeted subsidy distribution strategy, focusing on specific actors and their needs that are relevant for biofuels development. For example, to subsidize the costs of catalyst which is essential in the jatropha biodiesel refinery process. The subsidized catalyst cost is essential in reducing production costs of jatropha biodiesel.[189]

The government must be able and willing to stimulate and facilitate market conditions. This is crucial for a new sector where the market is still growing. Lessons from the jatropha experience show that while the national government provided budget support for its cultivation, research and credit subsidies, there was little attention for creating a well-functioning marketing channel. A clear link with the market should be established where market involvement in the whole process from research and development up to the marketing should be encouraged. The commercial viability of biofuels is significantly determined by the prices of fossil fuels (gasoline and diesel). The government should continue its policy to remove subsidies from the fossil fuels to increase the price ceiling for biofuels to make biofuels commercially attractive for investors. However, experiences also suggest that biofuels are consistently more expensive that fossil fuels, therefore the availability of long-term government support is important to make them remain competitive (Dillon *et al.* 2008: 62). Such long-term support should include government's consistency in enforcing the biofuels consumption targets, especially the biofuels blending content targets of PT Pertamina and PT PLN that until now are the biggest domestic market potential for biofuels production in Indonesia. The market development for biofuels should also be cautious of the negative impacts of the non-market drivers, such as

[189] The necessity to subsidize the catalyst costs was raised by Yoel Pasae.

the carbon credit scheme. Learning from the jatropha hype experience, the sustainability of biofuel investments is questionable when their economic feasibility is dependent on the future financial value of a legally constructed commodity like carbon credits (Vel *et al.* 2013).

The opportunistic actors will always find their short-term projects in the next biofuel hypes. Tjeuw (2017: 143) points out that it is inevitable that there will always be those who are prepared to face the risks in an effort to capitalize on the rewards associated with new crops and early entry no matter how much caution is advised. The national policy makers should be aware about the existence of the subsidy harvesters from the national biofuel subsidy schemes, or the investors who are only interested in quick gains from land speculation. Government should establish policy and regulations to prohibit such speculative investments.

Biofuels are likely to remain at the forefront of strategic debates over how to meet human needs for food, energy and materials without compromising ecosystem functions and services (Hunsberger 2012: 274). Biofuel feedstocks are in many areas promoted as cash crops. As such they are likely to compete with other forms of land use aimed at the production of food crops or live stock. The large-scale promotion of any biofuel crops bears the risk of out-competing the food crops while the future prospects of biofuels are as yet unclear. Productivity, markets, prices, and the type of trade relations are as yet difficult to predict. Just as in some other cases of 'miracle crops', distorted markets, disappointing yields, falling prices or unfair business models may eventually lead to frustration among farmers who may feel mistreated by companies, traders or extension workers. Therefore, future efforts should focus on the threats and opportunities for agricultural systems that are resilient and socially, economically and ecologically sustainable.

Summing up, as coined by Hunsberger (ibid) the implementation of technological innovation, such as biofuels development will only be successful if it takes into account the local socio-cultural, political and economic contexts. Therefore, further research is needed to understand the complexity of ecological, political, economic and social interactions in this system. There is a particular need for work that links the international macro-level with place-specific investigation of specific biofuel projects. This dissertation is one of such research and has contributed to present an explanation of what had happened at the ground level in the failed introduction of jatropha curcas as a biofuel crop.

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Summary

Deconstructing a Biofuel Hype

The Stories of Jatropha Projects in South Sulawesi, Indonesia

Keywords
Jatropha Curcas, *jarak pagar,* biofuel, biodiesel, hype, non-market drivers, Indonesia, South Sulawesi, Indonesia

Jatropha Curcas is a perennial succulent shrub native to Central America. In Indonesia, jatropha is popularly known as *Jarak Pagar.* The name jatropha comes from the Greek *iatros,* meaning doctor, and *thrope,* meaning food, which alludes its applications in traditional and folk medicines. Aside from its medicinal applications, all parts of the crop have some beneficial applications for humans and/or animals. Jatropha is used by farmers for boundary hedges, or to protect crops from browsing animals. Jatropha plants grown from seedlings are effective in reducing soil erosion. Jatropha oil can be used directly as a fuel for lamps and stoves. The technology is very simple, however for its use as biodiesel it needs a modified engine or blending with fossil diesel fuel or transesterification to jatropha methyl ester or jatropha biodiesel. Under the concept of the bio-based economy, the non-fuel applications of jatropha for other valuable products are explored, such as the production of high-value cattle feed from the press-cake residue of jatropha oil extraction by detoxifying the material. Jatropha can also be used to produce a soap that has very high anti-bacterial qualities. Finally, all waste parts (press seed cake, fruit husk, seed shell) generated by the oil extraction process can be used for biogas production or as source of organic fertilizer.

In the early of 2000s, jatropha emerged as a popular focus of both research and investment in biofuels sector. At that time, jatropha was introduced worldwide as a 'wonder crop' for the claim that it is a low maintenance crop suitable to most climatic and soil conditions with an ability to withstand drought. The promotors of jatropha had framed the potential benefits of the plant in terms of environment, energy security, and rural development. Jatropha was described as an energy plant that can lead to energy independence, alleviate rural poverty and make use of marginal land not suitable for food production. In various reports, jatropha was praised as a wonder crop and farmers, biofuel producers, consumers, and the environment would all benefit from growing and processing jatropha.

In 2006, the Government of Indonesia issued the national biofuels´ development blueprint, which provided a promising future for biofuels sector in the country. This blueprint set up a very ambitious plan to replace up to ten percent of the national fossil

fuel consumption with biofuels by 2010 and also to create employment for 3.5 million people by the same year on 5.25 million hectares of unused land. Further, this blueprint was used as a basis to issue various supporting regulations and policies to boost the development of this sector with specific focuses on the provision of incentives and market guarantee. In the blueprint and the subsequent regulations, specific attention was given to *jatropha curcas* as the most preferable biofuel option. Jatropha was endorsed by the government as the most suitable plant for biofuel production not only for the product itself but also for the claim that it could contribute to wasteland rehabilitation and income generation in marginal areas. During its hype years, it was estimated that there were hundreds of jatropha investment projects in Indonesia. They consisted of investments and projects by various actors: governments, universities, state-owned enterprises, private sector, and NGOs; and covered various types of projects: nurseries, plantations, oil productions, equipment and machineries (e.g. pressing machines and stoves), as well as the production of other jatropha-based products.

However, despite the existence of a great deal of optimism and supporting regulations, the biofuels sector faced a serious downfall. The downfall of jatropha was caused by a combination of market pull (blending targets, subsidies, land allocation, and incentives to investors) and technology push factors (plant breeding, oil processing and value adding) that were not sufficiently well prepared or developed, and implemented within the framework and guidelines necessary for a realistic commercial development. Essentially these factors were either absent or weakly implemented and there were many mismatches in timing and aligning of push and pull factors. Combined with the lack of any long-term commitment or legal framework to protect industry participants, the confidence in jatropha eroded.

This research took place in South Sulawesi in order to investigate the implementation of jatropha projects in the period of 2006-2011. This research aims to understand the key factors that were influential in the rise and fall of jatropha projects. The existence of various jatropha projects in South Sulawesi in those years has raised a question on why jatropha as an entirely new sector with no established players, an untested product and market, and unproven business plans was able to become a hype in South Sulawesi. It is noted that while jatropha in specific was promoted and prioritized as a crop suitable for marginal areas, the findings in my research show that jatropha had been introduced into the commercial agricultural setting of South Sulawesi at a significant scale through various projects in the period of 2006-2011. This research also presents an analysis about the failure of the projects to understand what opportunities and benefits that were pursued by the involved actors and how the achievements of the opportunities and benefits redefined the failure of the projects.

The analysis of jatropha promotion in Indonesia was started with the examination of the national context of jatropha promotion in order to understand why and how jatropha received heightened attention and support from various actors. For this national level analysis, I examined the background of the jatropha hype and the roles of key actors during the hype period: governments, scientists, state-owned companies, private

investors, NGOs and farmers, by focusing on their backgrounds, activities and results. This dissertation has shown that the jatropha development in Indonesia was to a very large extent built on spectacular positive claims and promises. The hype was created and maintained by the key actors to influence policies and to create various opportunities around jatropha other than the production of the biofuel itself.

Despite the positive objectives behind the promotion of jatropha, it has been evident that most of the research claims were premature and not yet supported by scientific evidence for a successful empirical implementation. The promotion of jatropha outpaced both the development of the market for end products, and more fundamentally, the evolution and spread of knowledge that might have helped to fulfill some of its potential. In the last decade, in a wave of enthusiasm for the plant, the hype won out over common agronomic sense, and both myth and capital were quickly dissipated as the plant struggled in hostile growing environments. There was a serious disconnection between the laboratory assumptions made by the technical scientists on the one hand and the social and economic realities on the other hand. The absence of knowledge had created conditions of uncertainty. Inaccurate or wrong information was widely spread and this resulted in negative impacts both for the investors and the farmers.

One of the crucial gaps was the historical aspect of the plant. There has been a misleading claim on the history of jatropha. While a substantial number of people in Indonesia retained a collective memory that was associated the term of *jarak pagar* with the Japanese occupation, very few Indonesians actually have clear knowledge about the plant. The limited knowledge on the true history of jatropha has caused farmers to fall easily into the trap of overwhelming promises and claims on the jatropha potentials at the time of the hype. In Chapter 2, I specifically focused on the reconstruction of the actual history of the cultivation and the use of jatropha in Indonesia. I conclude that there was no record available to support the claims that jatropha had been widely cultivated and applied as biodiesel during the Japanese occupation. All references that I used as my source of verification clearly indicate that it was castor, and not jatropha, that was cultivated under the mandatory instruction of the Japanese colonial administration. The examination also found that the cultivation of castor in that period was aimed at addressing the shortage of fossil based lubricant and not as diesel fuel replacement in the war period. This finding explains why there is so little knowledge among farmers about the cultivation technique and the actual yield result that can be expected from the plant. The limited knowledge has contributed to the failure of jatropha. There was little knowledge on the best agricultural practices, such as spacing, pruning, and the correlation between fertilization of trees and yields.

The study further shows the important role of the biofuel scientist groups in the jatropha hype creation in Indonesia. The scientists, especially those from the biofuels research groups in ITB played a central role in the creation of the idea of jatropha as a miracle energy crop and in the translation of global discourses on jatropha to national and local levels, mediating the jatropha hype circulation between scientists from international level down to the local research labs, bridging the hype to policy makers and business

institutions, and providing access to production factors on the ground for investors. Meanwhile, the government became the locomotive for the other actors in the national scale implementation of jatropha projects via the issuance of the biofuels development blueprint and its supporting policies and regulations, the allocation of budgets for the government's led jatropha projects in various formats, the provision of market guarantees through the role of the state-owned companies, and the issuance of biofuel consumption mandates to be met by the private companies.

In the analysis on the actor networks in this thesis, I explained that the social networks of the actors played an important role in providing intermediary services for them to have access to capital, grants and budget allocations as well as to access key production factors such as the technology, land and labor. Each project exhibits the personal network of the key actors from where they gained access to capital or funding as well access to human resources, technologies and land. They utilized their social networks to provide them with intermediary services to access various resources upwards and downwards. Many of the actors were able to access budgets for their projects by influencing policy makers through their networks, such as the jatropha related research projects in the local universities, and the CSR projects.

The pre-existing networks as well as the connectedness to key individuals were the key advantages for most of the projects to access the desired resources. Those with limited networks had to rely mostly on the official channels to access resources. The results difference between the two can be significant, because it is more likely that those who are well connected to political, financial and/or social power, have better chances to achieve their associated objectives. However, the existence of political connections and influences for a venture itself is also proven not to be a solid guarantee of success. The story of PT JOP, which was owned by the Bakrie Group, a politically influential business group and operated by the locally influential Halid family, is an example of this case. The combination of the business objectives and the political interests in the operations of the venture failed to go hand in hand.

In my description on the twelve projects, I found that the overall motivation for the emergence of these projects in South Sulawesi was driven by the high expectations of jatropha, and the availability of a large amount of funding from investors, companies and governments for these projects. However, the incomplete value chain for jatropha in South Sulawesi (as also happened elsewhere) with very little processing of jatropha oil and no clear marketing of end products taking place, had caused a strong pursuance of non-oil objectives in these projects.

The availability of funding, such as the CSR itself, research grants, and government budget allocation for jatropha related activities had become another key driver of many of the observed projects. These non-oil drivers had attracted actors, such as government officials, university researchers, the private sector, and NGOs to implement various jatropha projects and they apparently perceived them as end goals of their interests in jatropha instead of the production of biofuel itself. Both drivers attracted various actors, including

those who had no experience in agribusiness but decided to promote jatropha for commercial investments even with very limited knowledge about the plant. They spotted relevant opportunities for them to benefit and contributed to shaping the enabling environment for their own interests. This is a condition that generated opportunistic behavior, as they designed their activities to match to the conditions of the funding with further implications on the unsustainability of the projects after the available funding expired.

The opportunistic behavior of the actors and the short life of the projects were closely related to how the actors defined and perceived the jatropha projects in which they were involved. The analysis of these factors indicates that the term 'project' in the twelve jatropha projects had been widely understood in the way Indonesians in general define *proyek*, a specific connotation of 'easy money'. Focusing on this specific connotation helps to explain why little attention has been paid to fostering a market for jatropha, why there has been so little long-term financing of jatropha projects, why the opportunistic behaviors of the actors were considered as 'a common sense' and why the short life of the projects was 'easily accepted'.

The research also points out that for the observed jatropha investment projects, while there were high expectations on jatropha, the reality that jatropha was not yet a commercially proven crop made actors very cautious about getting involved. Formal project proposals mentioned well-established business models for collaboration between companies and farmers, such as 'nucleus-plasma', land-leasing agreements and joint ventures. However, in the implementation of the projects, activities were predominantly guided by the informal common understanding between the project actors that their cooperation was just a *proyek* or a pilot project, emphasizing its short-term and trial nature. This understanding therefore minimized the expectations of the actors, limiting them to the benefits they had gained during the implementation of the project. Against this background, it could be argued that the word 'project' had been understood as a type of business model for testing jatropha on the ground, and was instrumental for actors, such as companies or research institutes to test jatropha in field settings in a way that transferred the costs and risks to others, especially to the farmers.

The common understanding of the short-term and trial nature of the project made it easier for the actors, including the project partners (especially the farmers and workers), to accept and agree upon the sudden termination of the projects for a variety of reasons, including the absence of a market, the end of subsidies and the lack of additional funding. This was explicitly demonstrated by most actors who played roles as project initiators, operators and managers. Their involvement in the jatropha projects was dominantly driven by the strong pursuance of non-oil objectives, such as land lease income, employment and agro-inputs provision. They perceived these objectives as their end goals to get involved in the projects instead of in the production of biofuel itself. Therefore, those who managed to find specific opportunities to benefit within their projects would not perceive the failure as their loss. This *proyek* mentality is an unpleasant reality faced by many development initiatives, including jatropha development, and can be seen as a cause of its failure.

The short-term and trial nature of the observed projects also explains why there was no fundamental change in the agrarian structures in the projects' locations. Despite the existence of land allocation for jatropha in the locations where the observed projects were operating, the crop conversion was only temporary, relatively small-scale and there was no long-term land transfer.

In my actors´ analysis on the patron-client pattern in relation to the role of middlemen or brokers in the supply chain of jatropha and cassava, I found that the role of the traditional patronage system still remained influential for the success of a venture to access farmers and their resources in South Sulawesi. The case of jatropha and cassava in Moncongloe, in Chapter 6, shows how JOP adopted exclusively a non-commercial patronage system, consisting mostly of local elites, in intermediating their relationship with plasma farmers. On the other hand, cassava companies used the intermediary services of the village collectors who supplied them through the open market system and who were significantly influential in motivating farmers to cultivate cassava.

The results of each strategy, appeared to be very different. The story of JOP shows the chaotic implementation of their plasma scheme for their full reliance on the mediation of village elites. In the story of the cassava company, EN3 also experienced a disappointing result when they relied on the support of the elites reflecting the fragility of reliance on elites. On the other hand, the partnership with village collectors has proven to be more effective. Their relation was purely commercial, where village collectors were engaged using attractive prices and incentives for cassava that they delivered. Attractive prices and incentives, in turn motivated collectors to deliver positive information and to invest by providing loans to their farmers to improve their production, both in terms of quantity and quality as desired by the company.

In analyzing the intermediary role of patrons, I distinguish the intermediary patrons into two types: commercial and non-commercial intermediaries. Commercial intermediaries are those with reliability and competence in commercial activities and linked to their constituents through related commercial activities, such as village level collectors/ middlemen and senior farmers. Non-commercial intermediaries, on the other hand, are those who have no previous experience in relevant commercial activities but they have social and political influence on their constituents. They are usually people who have worked either in development projects (*proyek*), in NGOs, or in election committees in the villages. These were the previous experiences that they could use as a base for building a network. The perception over personal quality of a patron built on the traditional and religious values as well as the social and economic dependency of clients, became the key foundation for farmers' loyalty and trust towards the patron figures. This explains why the modern patronage system which is characterized by less feudal forms, which are more impersonal, rational, less dependent and non-permanent, as represented by the political actors, government officials, and NGOs, can be ineffective to ensure the loyalty of farmers in places where traditional patron-client system is still prominent. Against this background, I argue that the intermediary analysis in explaining why certain investments fail or why they are successful is crucially important, not only because it can serve as a

complementary element to the conventional supply chain analysis, but also because it reveals many other aspects that are often underexposed in the conventional analysis, especially aspects related to the local culture and politics.

With regard to the discussion on land, the village level analysis has also demonstrated that the introduction of a new crop was significantly influenced by the status of land tenure and land use practices. The case of Moncongloe has shown that there was rapid land selling that affected the availability of land for farmers to cultivate. While farmers were still allowed to use the plots of land that they have sold for farming activities but they already had limited freedom in deciding on the types of crop to cultivate on that land and also in committing to certain business models. Land use and tenure analysis are interrelated with the business models analysis. The selection of land to be incorporated in jatropha investments was influenced by the type of land use and tenure, which determined the feasibility and accessibility of land by the investors under the adopted business model. In the case of Moncongloe, the rise of land prices had made farmers to be very concerned about their land rights and very cautious in entering any legal commitment with other parties that could affect the security of their land rights, including in joining and committing to a business model, such as the outgrower scheme that required a long-term commitment and involved unforeseen consequences for their land rights.

Lastly, as the aim of this research is to study and to gain valuable insights from the past experience of jatropha for the future improvement of the biofuels development, we can conclude that successful domestication and commercialization of new crops will require a long-term process and will demand a long-term commitment by all key actors. Sufficient resources should be devoted towards research trials both for the plant and biofuel as well as the co-products development technologies. A clear link with the market should be established where market involvement in the whole process from research and development up to the marketing should be encouraged. More importantly, coherent and consistent biofuels development policy instruments should be in place.

Samenvatting

Deconstruering van een biobrandstof hype

Het verhaal van jatropha projecten in Zuid-Sulawesi, Indonesië

Kernbegrippen
Jatropha Curcas, *jarak pagar,* biobrandstof, biodiesel, niet-marktbepaalde factoren, externe factoren, hype, Zuid-Sulawesi, Indonesië

Jatropha Curcas is een meerjarige struik die afkomstig is uit Centraal-Amerika. In Indonesië is jatropha in het algemeen bekend als jarak pagar. The naam jatropha komt van het Griekse woord iatros, dat doctor betekent, en thrope, dat voedsel betekent, en verwijst naar de toepassingen in traditionele medicijnen. Behalve de medicinale toepassingen, hebben alle delen van het gewas enkele gunstige toepassingen voor mensen en/of dieren. Jatropha wordt door boeren gebruikt als heg of erfafscheiding, of om de gewassen tegen grazende dieren te beschermen. Jatrophaplanten die groeien vanuit zaailingen zijn effectief bij erosiebeperking. Jatropha-olie kan direct gebruikt worden als brandstof voor lampen en ovens. De technologie is erg eenvoudig, echter het gebruik ervan als biodiesel vereist een aangepaste motor of vermenging met fossiele dieselbrandstof of omzetting naar jatropha methyl of jatropha biodiesel. Onder het concept van een bio-based economy, worden de niet-brandstof toepassingen van jatropha voor andere producten onderzocht, zoals de productie van waardevol veevoer gemaakt van de geperste koeken, vervaardigd uit het residu van de productie van jatropha-olie door middel van detoxificatie van het materiaal. Jatropha kan ook gebruikt worden om een zeep te maken met sterke antibacteriële eigenschappen. Tenslotte kunnen alle restproducten die genereerd worden bij het extractieproces van de olie, gebruikt worden voor de productie van biogas of als bron van organische kunstmest.

In de beginjaren van 2000 kwam jatropha op als een populair onderwerp voor onderzoek en investering in de sector van de biobrandstoffen. In die tijd werd jatropha wereldwijd geïntroduceerd als een ´wondergewas´ vanwege de claim dat het een gewas is dat weinig verzorging behoeft en dat geschikt is voor de meeste klimatologische omstandigheden en bodems en dat ook nog eens goed droogte kon overleven. De promotors van jatropha hadden de potentiële voordelen van de plant beschreven in termen van het milieu, energiezekerheid en rurale ontwikkeling. Jatropha werd beschreven als een energieplant die kan leiden tot energie-onafhankelijkheid, die rurale armoede kan opheffen, en die gebruik kan maken van marginaal land dat niet geschikt is voor voedselproductie. In verschillende rapporten werd jatropha aangeprezen als een wondergewas, en boeren, producenten van biobrandstof, consumenten en het milieu zouden allemaal profiteren van het verbouwen en verwerken van jatropha.

In 2006 gaf de regering van Indonesië een nationale blauwdruk uit voor de ontwikkeling van biobrandstoffen, dat een veelbelovende toekomst schetste voor de biobrandstofsector in het land. Deze blauwdruk zette een ambitieus plan op om tien procent van de consumptie van fossiele brandstoffen te vervangen door biobrandstoffen in het jaar 2010, en het zou werkgelegenheid scheppen voor 3,5 miljoen mensen in datzelfde jaar op 5,25 miljoen hectare ongebruikt land. Dit plan werd verder gebruikt als een basis om ondersteunende regelingen en beleid uit te vaardigen om de ontwikkeling van deze sector te stimuleren met specifieke aandacht op het verschaffen van voorzieningen en marktgaranties. In de blauwdruk en de daaropvolgende regelingen, werd specifieke aandacht gegeven aan jatropha curcas als de meest veelbelovende optie voor biobrandstof. Jatropha werd door de overheid als de meest geschikte plant voor biobrandstof aangeprezen niet alleen vanwege het product zelf maar ook op basis van de claim dat de plant kan bijdragen aan de rehabilitatie van braakliggend land en vanwege inkomensverwerving in marginale gebieden. Gedurende de hypejaren werd geschat dat er honderden projecten in Indonesië waren waarin in jatropha werd geïnvesteerd. Zij bestonden uit investeringen en projecten door verschillende actoren: overheden, universiteiten, staatsbedrijven, de private sector, en NGOs. En ze besloegen projecten over de hele keten: zowel kweekplaatsen, plantages, olieproductie, instrumenten en machines (zoals persmachines en ovens), als projecten voor de producten die waren afgeleid van jatropha.

Echter, ondanks het bestaan van optimisme en ondersteunende maatregelen, ging de sector van de biobrandstoffen een serieuze terugval tegemoet. Deze terugval van jatropha werd veroorzaakt door een combinatie van de vraag van de markt (doelstellingen op het gebied van bijmenging, subsidies, toewijzing van land, en stimulering van investeerders) en de technologische mogelijkheden (kweken van planten, bereiding van de olie en toevoegen van waarde) die niet voldoende waren voorbereid of ontwikkeld en uitgevoerd binnen het noodzakelijke raamwerk en de richtlijnen voor een realistische commerciële ontwikkeling. In wezen waren deze factoren of afwezig of zwak uitgevoerd en er waren ook veel gevallen van slechte planning en het niet goed verbinden van de push en pull factoren. Gecombineerd met het ontbreken van lange termijn verplichtingen en het juridische raamwerk om de deelnemers uit de wereld van de industrie te beschermen, erodeerde het vertrouwen in jatropha.

Dit onderzoek heeft plaats gevonden in Zuid-Sulawesi en richtte zich op de implementatie van jatropha projecten in de periode 2006-2011. Dit onderzoek beoogt de sleutelfactoren te begrijpen die van invloed waren bij de opkomst en het verval van de jatrophaprojecten. Het bestaan van verschillende jatrophaprojecten in Zuid-Sulawesi in die jaren heeft geleid tot de vraag waarom jatropha als een volledig nieuwe sector zonder gevestigde belanghebbenden, met een niet-getest product en een niet-geteste markt, en met niet bewezen business plannen toch een hype kon worden in Zuid-Sulawesi. Terwijl in het bijzonder jatropha werd gestimuleerd en geprioriteerd als een geschikt gewas voor marginale gebieden, tonen de resultaten in mijn onderzoek aan dat jatropha op een grote schaal werd geïntroduceerd in de commerciële agrarische context van Zuid-Sulawesi. Dit onderzoek geeft ook een analyse van het mislukken van de projecten om te begrijpen

wat de kansen en voordelen waren die werden nagejaagd door de betrokken actoren en hoe de resultaten van de kansen en de voordelen het mislukken van de projecten herdefiniëren.

De analyse van de promotie van jatropha in Indonesië was begonnen met het onderzoeken van de nationale context ervan om te begrijpen waarom en hoe jatropha de enorme aandacht en ondersteuning kreeg van verschillende actoren. Voor de analyse van dit nationale niveau, heb ik de achtergrond onderzocht van de jatropha hype in Indonesië en de rollen van de sleutelactoren gedurende de hype periode: overheden, wetenschappers, staatsbedrijven, private investeerders, NGOs en boeren, door me hierbij te richten op hun achtergrond, activiteiten en resultaten. Deze dissertatie heeft aangetoond dat de ontwikkeling van jatropha in Indonesië voor een heel groot deel gebaseerd was op spectaculair positieve claims en beloften. De hype werd geschapen en in stand gehouden door de sleutelactoren door het beleid te beïnvloeden en door verschillende kansen rondom jatropha te scheppen anders dan de productie van de biobrandstof zelf.

Ondanks de positieve doelen achter de promotie van jatropha is het duidelijk geworden dat de meeste claims van het onderzoek prematuur waren en nog niet gebaseerd op wetenschappelijk bewijs om een succesvolle feitelijke implementatie mogelijk te maken. De promotie van jatropha verliep sneller dan zowel de ontwikkeling van de markt voor de eindproducten en meer fundamenteel, de evaluatie en de verspreiding van kennis die nuttig geweest zouden kunnen zijn bij het vervullen van de potentie van jatropha. In het laatste decennium in een golf van enthousiasme voor de plant, kreeg de hype de overhand boven het gangbare agronomische denken, en zowel de mythe als het kapitaal vervlogen terwijl de plant het moeilijk had in zeer ongunstige groeiomstandigheden. Er is een serieuze kortsluiting ontstaan tussen de veronderstellingen gemaakt door de technische wetenschappers vanuit de laboratoria aan de ene kant en de sociale en economische realiteiten aan de andere kant. De afwezigheid van kennis had condities van onzekerheid geschapen. Onjuiste en verkeerde informatie werd wijd verspreid en dit resulteerde in negatieve gevolgen zowel voor de investeerders als voor de boeren.

Eén van de cruciale hiaten was het historische aspect van de plant. Er was een misleidende claim over de geschiedenis van jatropha. Hoewel een flink aantal mensen in Indonesië een collectieve herinnering heeft die was verbonden met de term jarak pagar ten tijde van de Japanse bezetting, hebben maar heel weinig Indonesiërs een goede kennis over de plant. De beperkte kennis over de werkelijke geschiedenis van jatropha heeft er toe geleid dat boeren snel in de val liepen van fantastische beloften en claims over de potentie van jatropha ten tijde van de hype. In Hoofdstuk 2 richt ik me specifiek op een reconstructie van de feitelijke geschiedenis van het verbouwen en het gebruik van jatropha in Indonesië. Op basis van mijn historische analyse van jatropha kan ik concluderen dat er geen materiaal beschikbaar was om de claims te bevestigen dat jatropha wijd verbouwd en gebruikt werd als biodiesel gedurende de Japanse bezetting. Alle referenties die ik gebruikt heb als bronnen voor deze verificatie tonen duidelijk aan dat het castor en niet jatropha was dat werd verbouwd onder dwangbevel van de Japanse koloniale overheid.

Het onderzoek heeft ook gevonden dat de verbouw van castor in die periode bedoeld was om het tekort aan fossiele brandstoffen op te lossen en niet als vervanging van de dieselbrandstof in de oorlogsperiode. Dit gegeven verklaart waarom er zo weinig kennis onder boeren was over de teelttechnieken en de feitelijke opbrengst die verwacht kon worden van de plant. De beperkte kennis over jatropha onder de boeren heeft bijgedragen aan het huidige mislukken van jatropha. Er was weinig kennis over de beste agrarische praktijken, zoals plantafstand, snoeien en het verband tussen bemesting van de bomen en de opbrengst.

De studie toont verder de belangrijke rol aan van de groepen wetenschappers die zich bezig houden met biobrandstoffen in het ontstaan van de jatropha hype in Indonesië. De wetenschappers, met name die van de biobrandstofgroepen aan ITB, speelden een centrale rol in het vormen van het idee van jatropha als een wondergewas voor energie en in de vertaling van de wereldwijde discussie over jatropha naar de nationale en lokale niveaus. Ze brachten de jatropha hype vanaf het internationale niveau naar de lokale onderzoekslaboratoria, en sloegen daarmee een brug voor de hype naar beleidsmakers en bedrijven, en ze verschaften daarmee toegang tot productiefactoren aan investeerders. Ondertussen werd de overheid de drijvende kracht achter de andere actoren bij de implementatie op nationale schaal van jatrophaprojecten via het uitgeven van de blauwdruk voor de ontwikkeling van biobrandstoffen en het ondersteunende beleid en de bijbehorende regelingen, de toewijzing van budgetten voor jatrophaprojecten van de overheid, het verschaffen van marktgaranties via de rol van staatsbedrijven en de uitgifte van normen voor het gebruik van bijmenging van biobrandstof waaraan private bedrijven moesten voldoen.

In de analyse van de actornetwerken verklaar ik dat de sociale netwerken van de actoren een belangrijke rol speelden bij het verschaffen van faciliterende diensten om zodoende toegang te hebben tot kapitaal, subsidies en budgettoewijzingen evenals toegang tot belangrijke productiefactoren zoals technologie, land en arbeidskracht. Ieder project toont het persoonlijke netwerk van de sleutelactoren aan op basis waarvan ze toegang kregen tot kapitaal en financiering evenzeer als toegang tot arbeidskracht, technologie en land. Ze gebruikten hun sociale netwerken om hen diensten te verlenen zodat ze de beschikking kregen over verschillende hulpbronnen. Veel van de actoren waren in staat om toegang te krijgen tot budgetten voor hun projecten door het beïnvloeden van het beleidsmakers via hun netwerken, zoals de onderzoeksprojecten op het gebied van jatropha binnen de lokale universiteiten en de CSR projecten.

De reeds bestaande netwerken evenals de relaties met sleutelindividuen waren de belangrijke voordelen voor de meeste van de projecten om toegang te krijgen tot de verlangde middelen. Mensen met beperkte netwerken moesten voornamelijk rekenen op de officiële kanalen om deze toegang te krijgen. De verschillen tussen deze twee groepen kunnen zeer aanzienlijk zijn, omdat het waarschijnlijk is dat zij die wel de relaties hebben met de politieke, financiële en sociale macht, betere kansen hebben om hun doelen te bereiken. Echter het hebben van politieke relaties en invloed voor een onderneming is ook gebleken geen garantie te zijn voor succes. Het verhaal van PT JOB die eigendom was van

de Bakrie Group, een politiek invloedrijke zakengroep en die onder leiding staat van de lokaal invloedrijke Halid familie, is hiervan een voorbeeld. De combinatie van zakendoelen en politieke belangen in de uitvoering van een onderneming faalde in praktijk.
In mijn beschrijving van de twaalf projecten heb ik gevonden dat de belangrijkste motivatie voor het ontstaan van deze projecten in Zuid-Sulawesi werd gevormd door de hoge verwachtingen dat jatropha, als biobrandstof, een waardevol alternatief voor dieselolie zou worden en de beschikbaarheid van een groot bedrag aan fondsen van investeerders, bedrijven en overheden voor verschillende jatropha-gerelateerde projecten. Echter de incomplete waardeketen voor jatropha in Zuid-Sulawesi (net als elders) met heel weinig verwerking van jatropha-olie en zonder duidelijke marketing van de eindproducten, heeft geleid tot een nastreven van niet-olie doeleinden in deze projecten.

De beschikbaarheid van financiering, zoals de CSR zelf, onderzoeksubsidies en toewijzing van overheidsbudget voor jatropha-gerelateerde activiteiten waren andere belangrijke factoren geworden in veel van de bestudeerde projecten. Deze niet-olie gerelateerde factoren hadden actoren aangetrokken zoals ambtenaren, onderzoekers aan universiteiten, de private sector en NGOs om verschillende jatrophaprojecten te implementeren en zij beschouwden deze factoren als einddoelen van hun belang in jatropha in plaats van de productie van de biobrandstof zelf. Beide factoren trokken verschillende actoren aan, inclusief mensen die geen ervaring hadden in de agribusiness maar besloten om jatropha te stimuleren voor commerciële investeringen met zeer beperkte kennis van de plant. Ze zagen belangrijke kansen voor zichzelf om te profiteren en droegen bij aan het scheppen van een gunstige omgeving voor hun eigen belangen. Dit was een situatie die opportunistisch gedrag genereerde, omdat zij hun activiteiten zo ontwierpen dat zij aan de voorwaarden voor financiering voldeden met verdere implicaties met betrekking tot het niet-duurzame karakter van de projecten nadat de beschikbare financiering afliep.

Het opportunistische gedrag van de actoren en de korte duur van de projecten zijn nauw verbonden aan hoe de actoren de projecten waarbij zij betrokken waren definieerden. De analyse van deze factoren geeft aan dat de term ´project´ in de twaalf jatrophaprojecten breed opgevat werd op de manier waarop Indonesiërs in het algemeen proyek definiëren, een speciale betekenis van ´easy money´. De aandacht richten op deze specifieke betekenis van projecten helpt te verklaren waarom er weinig aandacht is besteed aan het bevorderen van een markt voor jatropha, waarom er zo weinig lange termijn financiering voor jatropha projecten is geweest, en waarom het opportunistische gedrag van actoren werd beschouwd als ´normaal´ en waarom de korte duur van projecten zo snel geaccepteerd werd.

Het onderzoek toont ook aan dat voor de bestudeerde jatropha-investeringsprojecten, hoewel er hoge verwachtingen waren voor jatropha, de realiteit was dat jatropha nog geen gewas was dat zich commercieel bewezen had en dat maakte actoren voorzichtig om erbij betrokken te raken. Formele projectvoorstellen vermeldden gevestigde businessmodellen voor samenwerking tussen ondernemingen en boeren, zoals ´nucleus-plasma´, landverhuur overeenkomsten en joint ventures. Echter bij de implementatie van

de projecten, werden activiteiten vooral gedomineerd door het informele en gedeelde begrip tussen de projectactoren dat hun samenwerking slechts een proyek of een pilot project was, met nadruk op de korte termijn en het aspect van een proefproject. Dit begrip minimaliseerde daarom de verwachtingen van de actoren, en beperkte de voordelen die ze hadden gekregen gedurende de uitvoering van het project. Tegen deze achtergrond kan beargumenteerd worden dat het woord ´project´ vertaald werd als een type businessmodel voor het testen van jatropha in het veld, en dat het instrumenteel was voor actoren, zoals ondernemingen en onderzoeksinstellingen om jatropha te testen in het veld op een manier die de kosten en de risico´s overdroeg aan anderen, speciaal aan de boeren.

Het gedeelde begrip van de korte termijn en van de aard van het project als proefproject maakte het eenvoudiger voor de actoren, inclusief de projectpartners (speciaal de boeren en arbeiders) om het plotselinge aflopen van de projecten te accepteren en ermee in te stemmen. Dit aflopen van de projecten gebeurde vanwege een variëteit aan redenen, inclusief de afwezigheid van een markt, het einde van de subsidies en het ontbreken van aanvullende financiering. Dit werd expliciet gedemonstreerd door de meeste actoren die een rol speelden als initiator van projecten, operators en managers. Hun betrokkenheid bij de jatropha- projecten werd vooral gestimuleerd door de sterke nadruk op de niet-olie doelen, zoals een inkomen uit landhuur, werkgelegenheid en het verkrijgen van agro-inputs. Ze beschouwden deze doelen als hun einddoelen om betrokken te raken bij de projecten in plaats van de productie van biobrandstof zelf. Daarom beschouwen zij die erin slaagden om specifieke kansen te vinden binnen hun projecten om te profiteren, het mislukken van projecten niet als hun verlies. Deze proyek mentaliteit is een onplezierige realiteit die zich voordoet bij veel ontwikkelingsinitiatieven, inclusief jatropha-ontwikkeling, en kan gezien worden als een oorzaak van het huidige mislukken.
De korte termijn en het proefaspect van de bestudeerde projecten verklaren ook waarom er geen fundamentele verandering was in de agrarische structuren in de projectlocaties. Ondanks het bestaan van de toewijzing van land voor jatropha in de locaties waar de bestudeerde projecten werden uitgevoerd, was de conversie van gewassen slechts een tijdelijke, en deze was betrekkelijk kleinschalig en er was geen overdracht van land voor de lange termijn.

In mijn analyse van actoren in patroon-cliënt verhoudingen in relatie tot de tussenpersonen in de aanbodketen van jatropha en cassave, heb ik gevonden dat de rol van het traditionele patronagesysteem nog steeds van invloed blijft op het succes van een onderneming om toegang te krijgen tot boeren en hun hulpbronnen in Zuid-Sulawesi.
De case study van jatropha en cassave in Moncongloe zoals beschreven in Hoofdstuk 6, toont aan hoe JOP een explicit niet-commercieel patronagesysteem hanteerde, dat vooral bestond uit lokale elites, om hiermee relaties te leggen met de zgn. plasma-boeren. Aan de andere kant gebruikten de bedrijven die in cassave handelden, de diensten van de dorpsinkopers die hen bedienden middels het open marktsysteem en die zeer invloedrijk waren in het motiveren van boeren om cassave te verbouwen.

De resultaten van iedere strategie lijken zeer verschillend te zijn. Het verhaal van JOP toont de chaotische implementatie van hun plasma plan doordat ze volledige vertrouwden op

de bemiddeling van de dorpselites. In het verhaal van de cassave-bedrijven, ervaarde EN3 ook een teleurstellend resultaat toen zij vertrouwden op de steun van de elites. Hun relatie is zuiver commercieel, terwijl de dorpsinkopers betrokken zijn en aantrekkelijke prijzen hanteren voor de cassave die ze leveren. Aantrekkelijke prijzen en stimulerende acties motiveren de inkopers om positieve informatie te verzamelen en om te investeren door het verstrekken van leningen aan boeren om hun productie te verbeteren, zowel in termen van kwantiteit als kwaliteit, zoals verlangd door het bedrijf. In de analyse van de bemiddelende rol van de patronen maak ik een onderscheid tussen twee typen tussenpersonen: commerciële en niet-commerciële tussenpersonen.

Commerciële tussenpersonen, zoals de dorpsinkopers en de oudere boeren, zijn vertrouwenswaardig en competent en zij zijn verbonden met hun boeren via commerciële activiteiten. Niet-commerciële tussenpersonen aan de andere kant zijn mensen die geen eerdere ervaringen hebben in relevante commerciële activiteiten maar zij hebben sociale en politieke invloed op de dorpelingen. Gewoonlijk zijn dit mensen die hebben gewerkt in ontwikkelingsprojecten (proyek), in NGOs, of in verkiezingscommissies in de dorpen. Dit zijn de eerdere ervaringen die zij kunnen gebruiken als basis voor het opbouwen van een netwerk. De perceptie van de persoonlijke kwaliteit van een patroon die gebaseerd is op de traditionele en religieuze waarden en de sociale en economische afhankelijkheid van cliënten, vormt de basis voor de loyaliteit en het vertrouwen van boeren jegens deze patronen. Dit verklaart waarom het moderne patronagesysteem, dat gekarakteriseerd wordt door minder feodale vormen, die onpersoonlijker, rationeler, en minder afhankelijk en niet-permanent zijn, zoals bij politieke actoren, overheidsfunctionarissen en NGOs, minder effectief kan zijn bij het winnen van loyaliteit van boeren op plaatsen waar traditionele patroon-cliënt verhoudingen nog sterk aanwezig zijn. Tegen deze achtergrond geef ik aan dat de analyse waarom bepaalde investeringen mislukken of waarom zij succesvol zijn, van cruciaal belang is, maar ook omdat deze analyse veel andere aspecten aan het licht brengt die dikwijls onderbelicht blijven in de conventionele analyse, in het bijzonder de aspecten die gerelateerd zijn aan de lokale cultuur en de politiek.

Met betrekking tot de discussie over land heeft de analyse van het dorpsniveau ook gedemonstreerd dat de introductie van een nieuw gewas behoorlijk beïnvloed wordt door de status van het landeigendom en de praktijk van het landgebruik. De case study van Moncongloe heeft aangetoond dat er een snelle verkoop van het land plaats vond die invloed had op de beschikbaarheid van land voor boeren om te verbouwen. Hoewel boeren nog steeds het land dat ze verkocht hadden mochten blijven gebruiken, hadden ze al minder vrijheid in het nemen van beslissingen over de typen gewassen om te verbouwen en over het aangaan van bepaalde typen verplichtingen. De analyse van landgebruik en landbezit is nauw verbonden met de analyse van businessmodellen. De keuze van land dat gebruikt wordt voor jatropha-investeringen wordt beïnvloed door het type landgebruik en landbezit. Die mogelijkheden bepalen de toegang tot land voor de investeerders. In het geval van Moncongloe leidde de stijging van grondprijzen er toe dat de boeren zeer gericht werden op het veilig stellen van hun landrechten en ze werden zeer voorzichtig bij het aangaan van verplichtingen met andere partijen waardoor de zekerheid over hun land zou kunnen worden aangetast, inclusief de deelname aan een

businessmodel zoals het *outgrower scheme* dat een lange termijn toezegging vereist en dat onvoorziene gevolgen kan hebben voor hun landrechten.

Tenslotte, omdat het doel van dit onderzoek is de ervaringen van jatropha in het recente verleden te onderzoeken om hiermee waardevolle inzichten te verkrijgen voor de toekomstige verbetering van de ontwikkeling van biobrandstoffen, kunnen we concluderen dat we geleerd hebben dat de succesvolle verbouw en de vercommercialisering van nieuwe gewassen een lange termijn proces vergen en dat het een lange termijn inzet van alle actoren vereist. Voldoende middelen moeten worden toegekend aan onderzoeksinitiatieven voor zowel de plant en de biobrandstof als ook voor de ontwikkeling van technologieën voor de bijproducten. Een duidelijke relatie met de markt moet gelegd worden waarbij de betrokkenheid van de markt in het hele proces van onderzoek en ontwikkeling tot aan de marketing gestimuleerd moet worden. Bovendien zouden coherente en consistente beleidsinstrumenten voor de ontwikkeling van biobrandstoffen aanwezig moeten zijn.

Biography

Henky Widjaja was born on 24 June 1978 in Ujung Pandang, South Sulawesi, Indonesia. He earned his degree in economics from Universitas Hasanuddin in Makassar, Indonesia (2001). After graduating from the university, he worked as a project assistant at JICA-Regional Development Planning for Local Government Project in Makassar, Indonesia from 2001-2004. In 2004-2005, he joined UNDP for the post conflict management program in Central Sulawesi as the local economic development officer and the head of the United Nations Programs Coordination Office-Central Sulawesi. From there he moved to the World Bank's Decentralization Support Facility Eastern Indonesia for one year. He later on joined the AusAID's Smallholder Agricultural Development Initiative as a staff and also as a consultant during his Master's study.

In 2008-2009, Henky received the STUNED Scholarship for his Master's study at the Institute of Social Studies in The Hague, the Netherlands. In 2010, he received a PhD scholarship from the KNAW/NWO - Agriculture beyond Food Program, where he joined the JARAK Research Cluster and becomes a PhD candidate in anthropology at the Van Vollenhoven Institute and Faculty of Social Sciences, Leiden University. He returned to Indonesia in 2014 to work as a knowledge management and green economy consultant for the UKCCU's Support to Spatial Planning and Low Carbon Development Program in Papua Province. In 2016, he joined the Global Green Growth Institute as the knowledge management specialist. He is currently the chief field office of UNICEF for Sulawesi and Maluku Regions in Indonesia.