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Final Report of the Scoping Studies on

# Improving the Sustainability and Competitiveness of Agricultural Export Commodities in Indonesia

**Bustanul Arifin**
*barifin@uwalumni.com*

Research Report prepared for the World Bank

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Bustanul Arifin is professor of agricultural economics at the University of Lampung, professorial fellow at the International Center for Applied Finance and Economics in Bogor Agricultural University (InterCAFE-IPB) and senior economist with the Institute for Development of Economics and Finance (INDEF) in Jakarta, Indonesia. The author could be reached at his email *barifin@uwalumni.com* and cell-phone +62-812-940-1150.

# 1. INTRODUCTION

## 1.1 Different stages in sustainability and competitiveness

The roles of agriculture in the Indonesian economy remain important even though the structural transformation process does not occur smoothly as outlined in the textbook of economic development. The share of agriculture in the country's Gross Domestic Products (GDP) has been declining to 15.7 percent in 2011, but the share of agricultural labor in the total labor force in 2011 was 42.5 percent. The slow declining rate in labor share is an indication of incomplete structural transformation in the Indonesian economy, including the slow absorption process in the industry and service sector. Limited efforts of value addition in the agricultural products and slow diversification in agricultural export base are among contributing factors of such imbalanced structural transformation. The strong primary export base and favorable production system of major agricultural commodity exports have not been utilizing in their full capacity, which might be at risk for the future of the Indonesian economy at large. There are also issues with the sustainability of this development, from an economic as well as social and environmental perspective, mostly because of the differences in the degree of policy response and incentive system to major agricultural export commodities.

The Indonesian agricultural export commodities have different stages in competitiveness and sustainability. The level of competitiveness of crude palm oil (CPO) is the highest among all agricultural export, which is a logical consequence of the fast growing performance of production and export and the first position in the world. The CPO production in 2011 was about 24 million ton, growing at 5.1 percent per year, which is far away ahead of that of Malaysia of less than 20 million ton. However, the productivity gap between smallholders and large-scale plantations, induced land-conflicts in the fields and accusation of carbon emitter and declining natural forests have contributed to the sustainability challenges of the CPO industry in Indonesia. Some major palm oil businesses in Indonesia have been a member, Roundtable Sustainable Palm Oil (RSPO), a major certifying body of palm oil trade system. Interestingly, the Indonesian Palm Oil Association (IPOA or locally known as GAPKI) has withdrawn its membership in RSPO, but become co-promoter with the Indonesian Government of new and mandatory certification system of Indonesia Sustainable Palm Oil (ISPO).

Other agricultural export commodities are not as advanced as palm oil in terms of both competitiveness and sustainability principles. Coffee ranks the second in terms of export earnings from agriculture, but the growing coffee consumption and changing lifestyles among urban communities will shape different stages of competitiveness and sustainability. Major buyers and actors of the world coffee supply chains have been aggressively promoting some new conducts of corporate environmental governance in the coffee industry. The rising concerns on the sustainability standards emerge very rapidly in the last two decades, probably because of the dynamics of private sectors and multinational corporations. Certification and labeling systems are also expanding rapidly in the global food sector as the

environmental and social standards in the coffee economy have serious and long-term implications for the sustainability of natural ecosystems in the tropics and the livelihood of coffee producers who are mostly small-holder farmers. Supply chain verification schemes currently operating in Indonesian coffee trade include 'Organic', 'Fairtrade', 'Rainforest Alliance', 'Utz Kapeh', and 'Starbucks CAFÉ Practices', all of which attempt to address environmental (and social) concerns at sites of production through market signals sent by buyers along the supply chain. The latest certifying partnerships introduced to the Indonesian coffee sector is the 4C (Common Code for the Coffee Community), which intends to foster sustainability in the 'mainstream' green coffee chain and to increase the quantities of coffee meeting basic sustainability criteria of economics, environment, and social. Nevertheless, these global partnerships in the coffee sector are sometimes viewed as a competition among coffee partnership buyers in the North to ensure the sustained coffee supply from the producing countries in the South.

The Indonesian cocoa sector has been in the stages of revitalizing process to restore its major roles in export earnings for the small-scale cocoa farmers such as in the late 1990s. The National Movement (Gernas) to increase cocoa production, initiated in Sulawesi in 2009, by developing tissue culture for cocoa seedling, increasing the farmers' capacity building, improving agricultural practices in the field, and increasing the cocoa bean quality might provide better avenues to improve the competitiveness of the cocoa industry in the future. Sooner or later, the global certification partnerships cocoa will extend their operation in Indonesia as the market demand on cocoa would require higher sustainability standards and other requirements of global environmental governance. However, when the current administration of Indonesian government imposes export tax on cocoa to develop downstream processing industries domestically, the net outcome to improve the competitiveness might not be as good as the initial intention, mostly because of limited efforts to improve the marketing structures and domestic supply chains of cocoa markets.

The competitiveness of rubber economy has not developed as commonly required for the major source export earning and farmers' livelihood in Indonesia. Although it has been known by the academics and policy makers alike, the Indonesian rubber exports are dominated by primary products of latex and slab, taped directly from the rubber tree. These primary products suffer from the facts of low quality, sometimes mixed with sands and debris of woods, causing in the economic returns by rubber farmers are quite small. Domestically, the harvested area of rubber has been under pressure, partially due to land competition with fast-growing and more profitable crops such as palm oil. The Government has been trying to solve these quantity and quality problems of rubber production by providing subsidized credit for rubber replanting since 2007 and enforcing a quality control on rubber products since early 2000. However, after more than a decade of implementation, the product quality efforts are partially responded by farmers who have grown clonal rubber seedling, not by the majority of rubber farmers who have been dependent on traditional seedling. Efforts to increase the added value have not been quite successful as the development of rubber downstream industries have been hindered by the investment climate and business environment in general. These are also associated with the government policy strategies to promote investment in such prospective sectors and to contribute to the industrial development in general. The rubber-based industrial

development is obviously related to many segments of economic policy, including the technological advancement, information system and financial institutions and legal issues and enforcement structures in general.

The Indonesian experience in commercial cashew and its important in generating export earning are quite new, although the crops have been grown for over hundred years. Cashew was initially developed as conservation trees, in conjunction of reforestation and rehabilitation of critical land, especially in dry upland areas in Eastern Indonesia. More than 60 percent of cashew production is exported to the world market, generating about US$ 60 million. The cashew export tends to decrease steadily in recent years, more probably because the domestic market has also developed more significantly. In the world market of cashew, Indonesia is small player, supplying about 8 percent of the world in-shell cashew trade. The export volume and value has been increasing in the last decade, one of the sign of improving competitiveness in the cashew industry. Domestically, the cashew economy contributes significantly to the rural economy of poor soil and dry areas, which are very potential as important tool to alleviate rural poverty. However, there is only limited shelling of cashews within Indonesia, implying ample opportunities to increase the added value of cashew that could generate additional income in rural areas. About 40 percent of the world cashew crop is shelled outside the country of origin. India and Vietnam are the major importers of in-shell cashew and use the imports to run their shelling plants throughout the year. If Indonesia could perform such simple post-harvest activities, together with sorting and grading, the competitiveness of cashew industry could increase to the next level.

The competitiveness of mango industry in Indonesia is quite low, mostly because mango production fluctuates depending on the seasonal patterns of production. Domestic demand for mango has increased significantly as many societal efforts to promote local fruits in recent years. In July 2011, some community and stakeholders of horticulture, pioneered by the Alumni of Bogor Agriculture University have declared that Friday as the “Day of Local Food” where the fellow citizens are encouraged to consume domestic fruits only. This declaration also endorsed by the Government which also encourages government officials to consume local food, including mango, at least every Friday. This movement somehow would increase the demand for local food, which may serve as incentive systems to improve the mango production – and other horticultural products. The uniqueness of horticultural products include that fresh fruits are more preferred than the processed foods, either extracted, dried, and fermented. Thus, efforts in upstream development, at farm level, are more relevant to improve the competitiveness of mango, rather than downstream development at manufacturing level. Nevertheless, value-adding activities at post-harvest level are necessary to prevent the decrease in economic value due to perishable nature of horticultural products as well as to anticipate a significant increase in mango production.

Table 1 presents the production performance of major agricultural commodities or cash crops in Indonesia from 2000 to 2010. Generally the performance of these commodities is quite good, showing increasing trend of production, except coffee and natural rubber in 2009. A decline in rubber production in 2009 is due to “adjustment process” in the world market after a record high price of oil and gas during the world economic crisis in 2008. The demand for synthetic rubber was back to normal in 2009, so that the price of rubber dropped significantly to record low of US$ 1.61/kg. This low price level of rubber, couple with

pressure to convert rubber trees to oil palm, contribute significantly to the decline in rubber production in 2009. After, the international price rebound to over US$ 3 in 2010 and above US$ 4/kg in 2011, the production of natural rubber increased steadily.

**Table 1. Production of Major Agricultural Commodities, 2000-2010 (ton)**

| Year | Coffee | Cocoa | Tea | Rubber | Cashew | Mangoes |
|---|---|---|---|---|---|---|
| 2000 | 554,574 | 421,142 | 162,576 | 1,501,428 | 69,927 | 876,027 |
| 2001 | 569,234 | 428,263 | 166,867 | 1,607,460 | 91,586 | 923,294 |
| 2002 | 682,019 | 571,155 | 165,194 | 1,630,360 | 110,232 | 1,402,910 |
| 2003 | 663,571 | 572,640 | 169,821 | 1,792,350 | 106,931 | 1,526,470 |
| 2004 | 647,385 | 641,700 | 167,136 | 2,065,820 | 131,020 | 1,437,670 |
| 2005 | 640,365 | 642,900 | 167,276 | 2,270,890 | 135,070 | 1,412,880 |
| 2006 | 682,158 | 769,386 | 146,858 | 2,637,230 | 149,226 | 1,622,000 |
| 2007 | 676,475 | 740,006 | 150,623 | 2,755,172 | 146,148 | 1,818,620 |
| 2008 | 682,938 | 792,761 | 153,971 | 2,751,286 | 156,652 | 2,105,090 |
| 2009 | 791,000 | 800,000 | 156,901 | 2,440,347 | 145,000 | 2,243,440 |
| 2010* | 684,076 | 844,626 | 150,342 | 2,591,935 | 145,082 | 1,287,287 |

Note: 2010* is preliminary figure

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

Similarly, a sudden decline in coffee production in 2009 is also associated with the global crisis and price signals received by coffee farmers in producing countries. However, increasing world price of these commodities since 2010 has been responded by production increase since then. The strong world demand of coffee and increasing price that reached US$ 2.25/kg for Robusta and US$ 4.95/kg for Arabica coffee shall provide significant incentives for farmers to increase coffee production and productivity. Similarly, increasing price trend of natural rubber of US$ 4/kg and a rebound of cocoa price of US$ 2.36/kg, after a significant decline in 2011, would increase the production of agricultural export commodities this year. The price of rubber reaches US$ 4.32/kg in the early 2012, a significant decline compared to the average US$ 4.82/kg in 2011. However, the Indonesian agricultural export commodities remains facing various challenges, most of them are very structural in nature, such as low-yielding smallholder crop systems, sustainability pressures, low-quality of production, underinvestment, inadequate infrastructure, underdeveloped agricultural practices and restrictive government policies.

The master-plan to accelerate and expand the Indonesia economy (MP3EI) proposed by the current administration of government is trying to overcome the above challenges. If the master plan is implementing as it should be, the domestic demand for coffee, cocoa, rubber, cashew nuts and mango will increase significantly in the near future. The roles of

domestic demand for affordable food and agricultural products from the middle and lower income segments as well from the manufacturing sectors in the country might compete directly with the efforts of promoting exports of these agricultural products. In a fair setting of economic environment, the competitiveness of these products will increase significantly, hence the future of Indonesian agriculture at large.

The following Table 2 presents competitiveness level of Indonesia's agricultural export commodities, by calculating the revealed comparative advantage (RCA) of each commodity. RCA is a comparison between ratio of commodity export of a specific commodity in Indonesia to the total export of Indonesia **and** the ratio of commodity export of a specific in the world to the total export of the world. The higher the RCA value, the higher the competitiveness of such a particular commodity. Table 2 clearly shows that natural rubber has RCA value 36.6, far higher than the RCA of cocoa, cashew, coffee, tea, and let alone mango. As a comparison, the RCA of crude palm oil (CPO) is well above 40 (not shown in the table), implying that CPO has the most competitive agricultural export commodity in Indonesia. Conversely, the RCA of mango in 2009 was 0.12, indicating that competitiveness level of mango is also very small. Indonesia is not a big player of mango market in the world, even at Asia's level.

**Table 2. Revealed Comparative Advantage (RCA) of Major Agricultural Export Commodities in Indonesia, 2000-2009**

| Year | Coffee (Green) | Cocoa (Bean) | Tea | Rubber (Natural Dry) | Cashew (with shell) | Mango* |
|---|---|---|---|---|---|---|
| 2000 | 3.80 | 10.84 | 7.43 | 26.81 | 7.98 | 0.11 |
| 2001 | 3.66 | 11.98 | 7.48 | 30.05 | 11.43 | 0.08 |
| 2002 | 4.85 | 14.83 | 7.14 | 31.03 | 13.99 | 0.77 |
| 2003 | 5.29 | 11.30 | 6.93 | 31.92 | 19.69 | 0.10 |
| 2004 | 5.17 | 10.95 | 7.88 | 37.83 | 19.73 | 0.46 |
| 2005 | 6.20 | 12.84 | 7.21 | 39.00 | 18.53 | 0.19 |
| 2006 | 6.05 | 15.55 | 6.94 | 42.03 | 15.39 | 0.18 |
| 2007 | 5.53 | 14.86 | 5.79 | 37.94 | 21.75 | 0.13 |
| 2008 | 7.29 | 16.70 | 6.21 | 46.93 | 10.79 | 0.20 |
| 2009 | 6.05 | 14.00 | 5.43 | 36.61 | 11.59 | 0.12 |

* = Mangoes, mangosteens, and guava

RCA is calculated using the following formula:
(Export Commodity i Indonesia/Total Export Indonesia)/(Export Commodity i World/Total Export World)

Source: FAOSTAT, 2012 (www.fao.org)

In terms of improving the competitiveness and sustainability, the factor of world commodity price is only a factor that contributes to the production performance. High commodity prices are still not enough to encourage smallholders to invest in farms,

especially in the estate crops where economic return periods are long. Investments in agriculture are required for management practices, land and technology development in order to produce better yields and replenish old plantations. The issues become more complicated because the majority of actors in these agricultural commodity markets are smallholders, with their own characteristics. Smallholders are sometime more concerned with farm-gate prices and immediate economic returns, instead of long focus to increase investment for better production in the future. For example, the export taxes to increase value addition in the country imposed on specific commodities such as cocoa (and palm oil) might not be viewed as profitable for farmers, because export taxes usually reduce farm-gate prices directly received by the farmers. This intervention could lower crop input application, hurting future production growth in such commodities at large.

Moreover, the sustainability issues imposed by the developed countries to the Indonesian agricultural export commodities might threaten the competitiveness of specific crops. For example, palm oil development has been accused as one of the main contributor to the green house gases and world carbon emission. Expansion of harvested area of palm oil is argued to occur at the expense of natural forest and peat-land area of conservations, particularly in Sumatra and Kalimantan. Also, coffee bean in Lampung is accused to contribute to deforestation, biodiversity damage and lost habitats of Sumatran tigers and elephant because some coffee farming practices take place inside the National Forest and conservation area of Sumatra. In this case, active coffee buyers in developed world are encouraged no to buy and receive Robusta coffee from Lampung or from other places with poor traceability, lack of certificate of origin, and unclear sources of the coffee beans.

The perspective of sustainability and competitiveness has somehow changed the structures and performance of supply chain of major agricultural export commodities in Indonesia. Therefore, scoping studies that identify and assess the competitiveness and sustainability of key agricultural export commodities are extremely important as the world market and domestic interests of these commodities have changed quite fast and more intensively in the last decade. Such scoping studies will lead to the policy changes and action strategies to improve competitiveness and sustainability of important agricultural export commodities in Indonesia.

## 1.2 Objectives of Scoping Study

The objectives of this scoping study are:

(1) to identify and assess the issues of sustainability and competitiveness in some key agricultural commodities,

(2) to bring international experience and best practices on the ways to address some important issues in key commodities, and

(3) to develop and present a series of policy options to improve the performance of these value chains in the future, both in terms of sustainability and competitiveness.

## 1.3 Approach and Methods

The approach and methods to conduct this scoping study use the combination of desk study, data analysis, and in-depth interviews and discussions with development partners and resource persons competent to achieve the objective of the study. First, basic data on socio-economic and relevant information on five commodities: coffee, cocoa, tea, rubber, cashew, and mango are collected and analyzed. Economic analysis and literature review on such commodities are also conducted to obtain a big picture and more specific focus of attention on particular details of the commodities. The study then examines the past and current policy strategies, project and initiatives on five strategic export commodities, particularly what has worked, what has not worked and what are the recommended approaches to solve the issues.

In-depth interviews, formal and informal discussions are conducted with key development partners, private sectors, associations of producers, processors, traders, and academics engaged in such commodities. This approach will cumulatively assess and build the current available knowledge on the issues of competitiveness and sustainability issues in coffee, cocoa, rubber, and mango. Further analysis and more advanced synthesis are conducted on the collected data and information, interview notes and previous studies available regarding the direction and policy changes to strengthen the competitiveness and sustainability of such export commodities. This scoping study will suggest possible areas for future research and further analytical works (thematic of area-based) as the Scope of Works of the Technical Assistance (TA), as well as respected potential policy notes and programs to improve development outcomes.

After this introduction, the structure of the report is organized by agricultural commodity, starting from Section 2 on coffee, and continuing to Section 3 on cocoa, Section 4 on tea, Section 5 on rubber, Section 6 on cashew and, Section 7 on mango. Because the stages of sustainability and competitiveness differ by commodities, the arguments within each section consist of at least two main entries, namely: (i) strengthening sustainability and competitiveness, covering the inclusiveness of smallholder farmers and small scale processors of respected commodities and (ii) limiting the impacts of commodity development on natural resources. Some best practices of integrated commodity development and natural resource conservations implemented in Indonesia are also explored and examined more carefully in the commodity sections. Section 8 is concluding remarks, outlining strategies to improve competitiveness and sustainability for each specific crop. Among others, strategies for coffee is improving the mechanisms of each certification scheme; for cocoa is expanding the SE (somatic embryogenesis) seedling and sustainability-based certification, for rubber is combining clonal-based development and forest protection, for cashew is introducing certification of origin and land rehabilitation, and finally for mango is promoting integrated horticulture development in upland areas

## 2. COFFEE: Growing Concerns on Certification

### 2.1 Production and Quality Perspectives

Indonesia is the fourth largest coffee producer, after Brazil, Vietnam, and Columbia, but the second largest Robusta coffee producer after Vietnam. Coffee production in 2010 was estimated to about 685 thousand tons, a significant decline from that in 2009, because of long rainy seasons in the country. The Indonesian coffee production is mostly shipped for the global market to generate export earnings of US$ 1.16 million. Coffee prices in the world market have increased significantly in 2007 because of limited amount being traded and other factors contributing to the price surge of food and agricultural products. The total area of coffee farms in the Indonesia was estimated about 1.3 million hectares, spread from the most western Province of Aceh in the island of Sumatra, Java, Sulawesi, Bali and Nusa Tenggara, and the eastern island of Papua. Provinces of Lampung, South Sumatra, East Java, are producers of Robusta coffee, while the highlands of Aceh, North Sumatra, South Sulawesi, and Bali are suitable for Arabica coffee.

**Table 3. Harvested Area, Productivity and Production of Coffee, 2000-2010**

| Year | Harvested Area (ha) | Productivity (ton/ha) | Production (ton) | Growth (%/year) |
|---|---|---|---|---|
| 2000 | 1,260,687 | 0.44 | 554,574 | - |
| 2001 | 1,313,383 | 0.43 | 569,234 | 2.64 |
| 2002 | 1,372,184 | 0.50 | 682,019 | 19.81 |
| 2003 | 1,381,730 | 0.48 | 663,571 | -2.70 |
| 2004 | 1,303,943 | 0.50 | 647,385 | -2.44 |
| 2005 | 1,255,272 | 0.51 | 640,365 | -1.08 |
| 2006 | 1,308,732 | 0.52 | 682,158 | 6.53 |
| 2007 | 1,295,912 | 0.52 | 676,475 | -0.83 |
| 2008 | 1,295,111 | 0.53 | 682,938 | 0.96 |
| 2009 | 1,266,235 | 0.62 | 791,000 | 15.82 |
| 2010* | 1,268,476 | 0.54 | 684,076 | -13.52 |

* Preliminary Figures

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

About 85 percent of coffee production in Indonesia is Robusta, which is mostly coming from the production centers in Lampung Province; while the remaining 15 percent is Arabica Coffee, produced in highland area of Aceh, North Sumatra, Toraja in South Sulawesi, Kintamani Highland of Bali and Bajawa regions of Flores islands. With the

exception of a number of large government-owned estates (PTPNs) in East Java, coffee is predominately grown by smallholder farmers. The average coffee farmer cultivates the plot of ranging from 0.5 to 2 hectares, in an isolated region with poor access to social services, and with an income that causes them to oscillate either side of the poverty line (depending on conditions in world commodity markets). Coffee farming performs an important social security function across Indonesia by injecting cash into many otherwise impoverished rural areas with few other employment options.

Increasing coffee prices in global market would provide significant incentive system to improve the yield and quality of coffee, hence increasing foreign reserves from coffee exports. Because of increasing demand from the global market, some coffee producers and traders are currently developing specialty coffee, such as Mandailing, Toraja coffee bean. Improved security situation in a torn-conflict coffee regions such as in Aceh is expected to have positive impacts on the Indonesian coffee economy, as Arabica specialty coffee is recently growing its share in foreign reserve earnings. Global buyers and large corporations such as Starbucks have developed its pilot projects of sustainability regulations in South Sulawesi and North Sumatra, known as CAFÉ (Coffee and Farmer Equity) practices, which might lead to "preferred supplier scheme". This specific code is developed in conjunction with conservation practices for coffee production, supported by international chains of non-government organizations (NGOs).

**Table 5. Coffee Production in major producing regions in Indonesia, 2007-2010**

| Year | 2007 | 2008 | 2009 | 2010* | Share** (%) |
|---|---|---|---|---|---|
| Aceh | 48,080 | 47,811 | 50,171 | 50,774 | 6.97 |
| North Sumatra | 50,158 | 54,944 | 54,355 | 54,100 | 7.56 |
| South Sumatra | 148,281 | 155,372 | 131,601 | 134,602 | 20.25 |
| Bengkulu | 56,128 | 54,267 | 55,418 | 54,948 | 7.82 |
| Lampung | 140,095 | 140,087 | 145,220 | 145,053 | 20.20 |
| Central Java | 14,991 | 15,897 | 16,412 | 16,585 | 2.26 |
| East Java | 47,000 | 51,634 | 54,012 | 55,690 | 7.37 |
| Bali | 15,653 | 13,683 | 14,909 | 14,959 | 2.10 |
| East Nusa Tenggara | 17,965 | 20,548 | 20,580 | 20,583 | 2.82 |
| South Sulawesi | 32,736 | 33,510 | 31,964 | 31,238 | 4.59 |
| Others | 105,388 | 95,185 | 216,358 | 105,544 | 18.07 |
| Indonesia | 676,475 | 682,938 | 791,000 | 684,076 | 100.00 |

* Preliminary Figures
** Average annual share to national production

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

The average yield of Robusta coffee in Indonesia is less than 600 kg/ha, far below that in Vietnam and Brazil, which has reached about 3 ton/ha. In general, the coffee harvest system varies by regions, but is mostly rudimentary. Farmers harvest, pulp, ferment, wash, dry, and sell the bean at farm gate, which is usually collected by traders. Later, these traders send the coffee bean to larger traders and exporters to be shipped to the world market. The certifying partnerships to encourage more sustainable land management practices in Aceh and Toraja have somehow affected the price structure of coffee, although the trend remains unclear. Traders selling the organic coffee could receive a slightly higher price premium, compared to non-certified Arabica coffee, because of a rather direct link with the international coffee specialty market. However, there is no guarantee that the farm-gate price of coffee received by Arabica farmers would increase because the cost of traceability systems to ensure the integrity of the 'organic' branding is quite high.

## 2.2 Coffee Exports and the Story Behind

The roles of coffee export in foreign reserve earnings of the Indonesian economy are unquestionable, even though the performance is not as good as in the 1980s and 1990s. In 2009, Indonesian coffee export was about 510 thousand ton of green coffee (about 8.3 percent of the world coffee export), which was a significant increase compared to green coffee export of 486.7 thousand ton (7.4 percent of world export) in 2008. Table 5 presents the export volume and export value of coffee of Indonesian coffee, from 2000 to 2009. As a useful guideline, most of the Indonesian coffee exports are Robusta (80 percent) and only small portion of are Arabica (20 percent). Indonesia has also exported coffee in a small amount of roasted form, which declined significantly since 2007 because Indonesia has changed to export in extract forms of coffee.

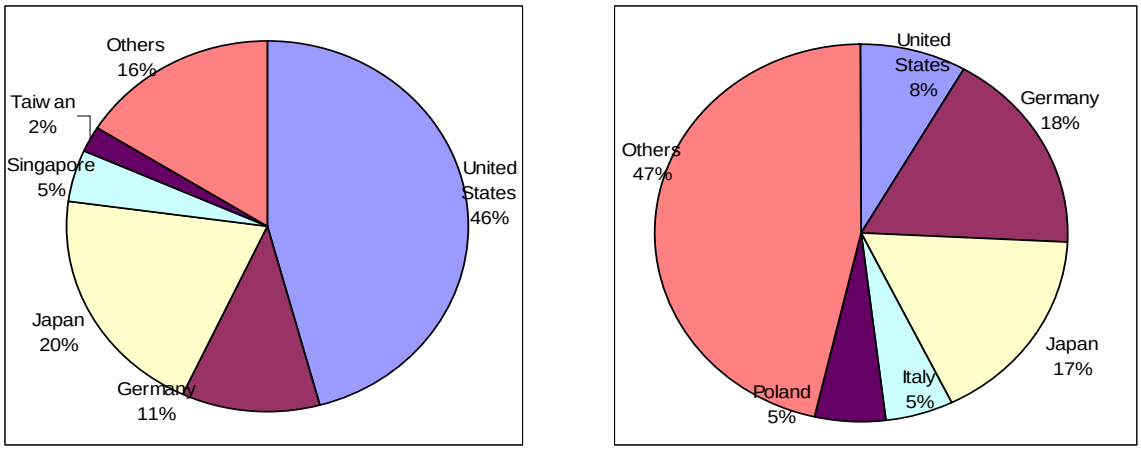
Coffee export has grown significantly since 2001 where coffee export crashed to only 250 thousand tons and export revenue was only US$ 182 million. The export value of coffee in 2009 was US$ 822 million, a very significant increase compared to that in 2001. Export destination of Indonesian Arabica is mostly for United States of America of 46 percent, Japan 20 percent, Germany 11 percent and others. The destination for Robusta coffee is mostly for Germany of 18 percent, Japan 17 percent, United States 8 percent and others (Figure 1). Recent tendencies of growing demand for coffee in domestic markets somehow change the export destination in the near future, because domestic market would demand high-quality coffee bean, instead of average and low quality. Changes in urban lifestyles, growing retail centers coffee and modern cafes in big cities throughout the country will increase the coffee consumption in the near future.

**Table 5. Indonesian Coffee Export and its Share in the World Market**

| Year | Extracts Coffee | Share (%) | Roasted Coffee | Share (%) | Green Coffee | Share (%) |
|---|---|---|---|---|---|---|
| **Export Volume (ton)** | | | | | | |
| 2000 | 6,425 | 1.81 | 1,601 | 0.43 | 337,600 | 6.14 |
| 2001 | 3,935 | 0.94 | 1,616 | 0.45 | 249,202 | 4.58 |
| 2002 | 5,385 | 1.21 | 2,252 | 0.56 | 322,758 | 5.88 |
| 2003 | 4,536 | 0.95 | 2,724 | 0.62 | 321,180 | 6.14 |
| 2004 | 4,464 | 0.84 | 4,197 | 0.91 | 339,880 | 6.05 |
| 2005 | 9,109 | 1.50 | 2,564 | 0.47 | 443,366 | 7.95 |
| 2006 | 8,087 | 1.32 | 2,385 | 0.40 | 411,721 | 6.95 |
| 2007 | 13,292 | 2.07 | 805 | 0.13 | 320,600 | 5.21 |
| 2008 | 22,758 | 3.41 | 731 | 0.10 | 468,019 | 7.37 |
| 2009 | 27,867 | 4.07 | 709 | 0.10 | 510,189 | 8.31 |
| **Export Value (US$ thousand)** | | | | | | |
| 2000 | 20,981 | 1.12 | 6,674 | 0.46 | 312,221 | 3.69 |
| 2001 | 15,033 | 0.79 | 5,591 | 0.43 | 182,900 | 3.37 |
| 2002 | 15,718 | 0.81 | 5,012 | 0.36 | 218,906 | 4.30 |
| 2003 | 15,319 | 0.67 | 7,857 | 0.45 | 251,250 | 4.40 |
| 2004 | 14,997 | 0.58 | 10,786 | 0.53 | 283,328 | 3.96 |
| 2005 | 24,909 | 0.76 | 6,035 | 0.23 | 498,372 | 5.12 |
| 2006 | 31,509 | 0.86 | 4,989 | 0.16 | 583,513 | 5.10 |
| 2007 | 51,084 | 1.16 | 2,262 | 0.06 | 634,155 | 4.66 |
| 2008 | 86,825 | 1.75 | 2,057 | 0.04 | 989,401 | 5.95 |
| 2009 | 94,479 | 1.95 | 1,702 | 0.03 | 822,313 | 5.80 |

Source: FAOSTAT, 2012 (http://www.fao.org)

Interestingly, although Indonesia ranks the fourth in coffee production and exports most of the coffee being produced, Indonesia has occasionally imported Robusta coffee, mostly from Vietnam. The level of coffee consumption in Indonesia is very small 0.4 kilogram per capita, far less than that in the USA which is 4 kilogram per capita per year and that in Belgium which is 4 kilogram per capita. By changing the lifestyles and increasing income per capita, the domestic coffee will increase significantly, by about 10 percent per year; and will increase further in the near future. A significant amount of coffee import from Vietnam in 2009 and 2010 occurred as the price differential between Vietnamese production (and freight) and Indonesian coffee production is large enough. The weather condition in 2010 was wet in a relatively long period of time, causing crop failures in some production centers in Indonesia. In addition, the consumption of instant coffee and coffee-based drink consumption have also increased, providing an indicative that more middle and lower middle income consumers are drinking coffee products.




(a) Arabica Coffee (b) Robusta Coffee

Source: International Coffee Organization

**Figure 1. Export Destinations of Arabica (Panel a) and Robusta Coffee (Panel b)**

The current policy on coffee industry development is to improve the coffee quality, both for export market and domestic consumption, and to promote the downstream coffee industries and encourage coffee industry clusters. At the upstream coffee farming, application of good agricultural practices, sustainable coffee production by growing shade trees, encouraging organic fertilizer, and chemical fertilizer only when necessary, and promoting agro-forestry for the plantation inside the protection forest and around the forest margin. At the downstream, domestic processing is also promoted as currently the industry is made up of many small players, with four established brands taking up about 46 percent of market share. The local coffee industry is trying to strengthen the domestic market by conducting intensive promotional campaigns and promoting the health benefits of drinking coffee. Availability of coffee is expected to improve due to rapid expansion of modern retailers and manufacturers' attempts to improve distribution through foodservice (Kumar, 2011)

For the export market, the government is also promoting exports of higher value-added coffee products such as high quality green beans and further processed coffee products. Specialty coffee is strongly encouraged by the government as the market share of this high-value and exotic coffee is really high and growing significance in the international market. Also included in this exotic coffee category is the well-known Luwak coffee, after the coffee bean is fermented by a digestive system of rodent animal, locally known as Luwak. Interestingly, some coffee plantations in Indonesia are currently domesticating the animal within a specific zone of coffee plantation to increase the Luwak production in order to meet the growing demand from export markets and domestic retailers as well.

The following table presents some examples of specialty coffee being promoted by the Association of Indonesian Coffee Exporters and Industry (AEKI). The list could grow in the near future as the industry has the potentials to develop higher coffee quality, as long as the incentive systems are maintain at favorable as possible.

**Table 6. Annual Production of Specialty Coffee in Indonesia**

| Arabica Specialty Coffee | Volume (ton/year) | Robusta Specialty Coffee | Volume (ton/year) |
|---|---|---|---|
| Mandailing Coffee*) | 12,000 | Lampung Specialty ALP | 20,000 |
| Gayo Coffee | 25,000 | Lampung Specialty ELB | 10,000 |
| Lintong Coffee | 8,000 | Semendo Coffee | 2,000 |
| Toraja/Kalosi Coffee | 5,000 | Washed Java Coffee | 20,000 |
| Washed Java Coffee | 4,000 | Robusta Flores Coffee | 2,000 |
| Bali/Kintamani Coffee | 2,000 | | |

Notes: *) At international market, also known as Mandheling Coffee

Source: AEKI, 2011

In addition to the AEKI strategy to promote Arabica coffee export for specific international buyers and some niche markets, the high price difference between Arabica and Robusta coffee at the international market would also encourage Arabica coffee development at the farm level. The sustainability issues in the future are very relevant to examine more carefully as Arabica coffee are also suitable in highland area, which are also associated with protection forests and national parks. Moreover, the Government and coffee industry are currently developing geographical indication (GI) of the Indonesian coffee, in order to protect the marketing rights and business practices in the international market. So far, the GI for Kintamani coffee (Bali) and Gayo coffee (Aceh) have been issues as the government is seriously protecting the uniqueness of Indonesia's specialty coffees in the international market. Sooner or later, more GIs will be issues as the coffee market is shifting towards more specific origins that shape the taste and flavor of coffee drinking, rather than cheap, bulk and instant coffee. When private sectors are aggressively putting more efforts in product development, more investment in marketing and communications, the future of coffee economy will rely on more advanced principles of competitiveness, market penetrations, new market destinations, etc.

## 2.3 Certification Schemes and Governance Perspectives

Certification schemes in the coffee sector have emerged in conjunction with growing concerns of environmental governance since the early 1990s and developed more rapidly in this century. Sustainability perspective and long-term consequences of coffee practices on natural ecosystem and social-economic dimensions of the livelihood have been discussed more widely by academic, government, private sectors and civil society or non-governmental organizations (NGOs). As the new development paradigms tend to seek alternatives for distortion effects of direct state intervention in commodity supply chain, in one extreme, these governance efforts are argued to democratize markets by increasing the role of civil society in regulating production and trade-related activities. On the other extreme, standard and certification institutions could serve simply as new vehicles of corporate control over global food production, trade and consumption.

Reynolds et al. (2007) also suggest that sustainability standards in the coffee industry have been developed for the most part within voluntary initiatives, involving collective formulation by some stakeholders, outside the framework of government organization. These groups share the common interests on specific agenda such as consumer awareness on public health, fertilizer and pesticide contamination, organic perspectives, and other interests to protect endangered species, biodiversity and other functions of the natural environment. Involvement of the stakeholders was simply based on individual interests, before expanding into more strategic agenda of civil society groups, farmer's organization, trade unions, etc. Given the increasing demand for products meeting new standards and the broad expansion of markets and competition, it has become increasingly necessary to ensure the credibility of the claims embedded in sustainability standards.

In the literature, there are number of works have been done in synthesizing major global initiatives in the coffee sectors dealing with sustainability standards and environmental governance [see for example Ponte (2004), Giovannucci and Ponte (2005), Muradian and Pelupessy (2005), Reynolds et al (2007), etc]. Based on the organization that develops the guidelines, at least there four general categories: (1) first party, (2) second party, (3) third party, and (4) fourth party "voluntary" regulatory systems. First party generally refers to "Coffee Sourcing Guidelines of Starbucks" which sets standards for good social and environmental performance. Later, the guidelines evolve into Coffee and Farmer Equity (CAFÉ) Practices, which is part of Starbuck's preferred supplier program. Nevertheless, monitoring process of the CAFÉ Practices is conducted by third parties, and the costs to comply with this standard have to be paid by farmers. In returns, farmers are supposed to obtain reasonable price premiums. Example of second party regulatory systems is Sustainable Agriculture Information (SAI) Platform, in which specific commodity guidelines for sustainable agriculture along the food chain. Monitoring process would be conducted by the third party.

By its name, the third party certification involves private sectors or NGOs in setting the guidelines and monitoring the sustainability standards in the coffee industry. There are at least four major third party certifications currently operating in the coffee sector around the

globe: Utz Kapeh, Organic, Fair Trade and Shade-grown (monitored by Smithsonian Migratory Bird Center SMBC and Rainforest Alliance). These third party certifications have similar missions and objectives to improve socio-economic and environmental conditions of coffee production and trade. Utz Kapeh originated as an initiative of Guatemalan coffee producers and the Dutch coffee company Ahold, which later become an independent Guatemalan-Dutch NGO. Utz Kapeh has developed a set of standards for third party coffee certification, formally equivalent to the EurepGAP, a certification system for the sourcing of fruits and vegetables led by European retailers (Giovannucci and Ponte, 2005).

Finally, the fourth party certification refers to the initiatives by multi-stakeholders voluntary scheme, which has been explained in the introduction as the Common Code for the Coffee Community (4C). This initiative is led by the German Development Cooperation Agency (GTZ) and German Coffee Association (DKV), where the steering committee consists of major stakeholders in the coffee industry. The 4C codes also emphasize on the social and ethical principles such as paying minimum wages to the labors, avoiding child labor, allowing trade union membership, complying with international environmental standards on pesticide and ground-water contamination. Monitoring and auditing are conducted by third party organizations, and the costs of this certification are to be covered by coffee growers.

Currently, empirical evidence whether or not these standards have achieved the above objectives is still inconclusive, although some suggest that coffee farmers receive both direct and indirect benefits from sustainability standards (Giovanucci and Ponte, 2005). Similarly, it is yet not so clear what specific impact of these standards have contributed biodiversity, although there is speculation that these sustainability standards have become the necessary conditions to preserve local biodiversity in coffee producing regions. The most significant benefits of these sustainability standards are probably the potentials to strengthen social capital and to improve community-cooperative governance structures in the producing regions as these standards generally require establishment of farmers organizations and locally adopted code of conducts. However, many of these standards, provide no guarantee that direct benefits, particularly price premiums, would reach farm laborers or local communities in general (Giovannucci and Ponte, 2005).

A simple mapping of each governance system is drawn under the frameworks of seven main dimensions of global sustainability regulation on coffee economy, namely: (1) sustainability focus of environmental governance, (2) coordination type between farmers, traders, and roasters, (3) risk management and planning capabilities, (4) target group of coffee farmers (growers), (5) market access and networking, (6) expected price premium, and (7) its compatibility with environmental services. Empirical evidence on these perspectives in the Indonesian coffee economy have been conducted by Arifin (2010). For example, under the dimension of sustainability focus of environmental governance, the first party governance system of Starbucks schemes with coffee growers and traders do not mention specific its focus, although the CAFÉ framework encourage natural conservation. The second party governance system emphasizes the principles of sustainable agriculture, using more organic input as the major interests of SAI schemes being adopted mostly in developing world of coffee producing countries. Similarly for the third party governance of Utz Kapeh, Organic, Fair Trade and Shade-grown certification system, the sustainability focus of

environmental governance is quite similar, covering a wide range of environmental conservation, biodiversity, organic input, erosion resilience, etc. Finally, the 4C governance system advocates the conservation of water, soil, biodiversity and energy, although its implementation in the field is not as simple as it is written. The other remaining dimensions of global sustainability regulation in the coffee economy are summarized in Table A-1 in Appendix.

The certification of smallholders generally requires the formation of cooperatives to facilitate product traceability. Another empirical study on the outcome of certification suggest that the process of cooperative formation is most advanced in the case of Aceh, where up to 20 separate farmer cooperatives now supply certified coffee to the market (Arifin, et al, 2008). The experience of Indonesian farmers with agricultural cooperatives in the past, however, has not been good, and there are indications that the most recent spate of international-market driven formation is little different. Cooperatives have generally been unable to secure farmer support in Indonesia due to their inability to provide the same services as traditional market mechanisms, such as hassle-free access to credit and simple marketing procedures, and to the perceived high costs of dealing with rent-seeking cooperative structures. Arabica coffee from both Aceh and Toraja is sold into similar international specialty markets, although only coffee from Aceh is currently marketed as 'organic' (but the process of organic certification is now underway in Toraja). As a result of certification, at the point of export, Aceh coffee frequently receives a slight premium above Toraja coffee. However, somewhat surprisingly, this study found farm-gate prices in Aceh to be substantially lower than those in Toraja. Even the one farmer in Aceh claiming a price premium was still only receiving the same price as the average Torajan farmer. Drawing on the insights generated from stakeholder interviews, we conclude that a primary cause of this price difference is due to additional supply chain transaction costs associated with traceability requirements, the insertion of cooperatives within an existing supply chain offering few value-added services, and the costs of the audit process itself. Price premiums are clearly not finding their way to farmers in Aceh and can not be expected to be capable of changing farmer incentive structures (Arifin, et al. 2008).

One should note that the growth in the Indonesian coffee sector has also occurred through access to cheap (forested) land, resulting in reasonable farm profits without the need to invest in agricultural technologies. However, strategies to improve the coffee productivity by applying more intensive production methods do not necessarily reduce the demand for new land. The case of coffee farming in the forest frontiers of Lampung and Aceh indicate the opposite, where increase productivity can drive deforestation as new migrants gravitate to areas of high coffee productivity. Hence, the nexus of technological change and deforestation phenomena in the coffee sector has led to misdirected policy recommendation to develop and implement rigorous chain of custody controls. A negative campaign to blame illegal coffee producers for the loss of tiger in the Bukit Barisan Selatan (BBS) National Park in the Province of Lampung, such as recommended by WWF study in 2007, is obviously not an ideal way out to promote sustainability principles of coffee farming. Without going further regarding the methods and sampling system of the study, such a negative campaign will further complicates the problems, as the current coffee supply chain cannot guarantee the workability of price transparency, asymmetric structures of coffee markets, etc. (Arifin,

2010). Econometric estimates show a quite small impact of the certifying global partnerships on the domestic market structures of coffee in Indonesia, mostly because the price transmission elasticity of global coffee price is also very small (Ogtasari, 2011). Nevertheless, the certifying partnerships have the impact potentials on strengthening the social capital and improving the community-cooperative governance in the producing regions as the partnerships generally require establishment of farmers' organizations and locally adopted conducts.

## 3. COCOA: Revitalizing the Industry

### 3.1 Production and Gernas Initiatives

Indonesia is the third largest producer of cocoa in the world after Cote d'Ivoire and Ghana. The production of cocoa in 2010 was about 844 thousand tons, just reviving the trend after the cocoa price increase since 2009. Indonesia has targeted to achieve the production over 1 million ton of cocoa in 2014, especially after the launching of the national movement to revitalize cocoa farming in 2009. About 60 percent of cocoa farms are located in Sulawesi, but recently cocoa farms are expanding rapidly in Sumatra, mostly because of increasing cocoa price in the world market. Cocoa exports are currently valued at over US$ 1 billion per year and provide the main source of income and livelihood for over a half million farmers and their families.

Cocoa production centers are in Sulawesi and Sumatra, mostly for markets in Europe and the United States of America (USA). The majority (95%) is smallholders, average land-holding size 1.5 ha, which is quite small for Outside Java standard, using local varieties. Cocoa farmers in Indonesia suffer from problems related to cocoa pests and diseases, decreasing farm productivity and contributing to poor quality cocoa beans. In additions, inappropriate farm management practices, poor tree and soil management and lack of quality related market signals in the supply chain are among other factors affecting the competitiveness of Indonesian cocoa industry.

**Table 7. Harvested Area, Productivity and Production of Cocoa, 2000-2010**

| Year | Harvested Area (ha) | Productivity (ton/ha) | Production (ton) | Growth (%/year) |
|---|---|---|---|---|
| 2000 | 749,917 | 0.56 | 421,142 | - |
| 2001 | 821,449 | 0.52 | 428,263 | 1.69 |
| 2002 | 914,051 | 0.62 | 571,155 | 33.37 |
| 2003 | 961,107 | 0.60 | 572,640 | 0.26 |
| 2004 | 1,090,960 | 0.59 | 641,700 | 12.06 |
| 2005 | 1,167,046 | 0.55 | 642,900 | 0.19 |
| 2006 | 1,320,820 | 0.58 | 769,386 | 19.67 |
| 2007 | 1,379,279 | 0.54 | 740,006 | -3.82 |
| 2008 | 1,425,216 | 0.56 | 792,761 | 7.13 |
| 2009 | 1,587,136 | 0.50 | 800,000 | 0.91 |
| 2010* | 1,651,539 | 0.51 | 844,626 | 5.58 |

* Preliminary Figures

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

The productivity of cocoa farm in Indonesia is very low, just over 500 kilogram per hectare, much lower than the productivity potentials of 1.5 ton per hectare. The declining cocoa productivity in recent years is associated with the slow rate of replanting, although the cocoa plants are more than 15 years old. The following factors are usually argued as the determinants of declining cocoa productivity: lacking capitals among farmers, low priority and late response from the government in encouraging the farmers to do replanting. Recent crashes of the national cocoa industry in Brazil, due to Witches Broom disease in the late 1980s (caused by the fungal pathogens *Crinipellis perniciosa* and *Moniliophthora roreri*), and then in Malaysia during the 1990s, due primarily to cocoa pod-borer have worried the cocoa industries in Indonesia. Without strong support, it is possible that the Indonesian cocoa sector has will experience similar decline and loss of farm-based livelihoods. Cocoa pod borer (CPB) has been known as the main pest that destroys thousands of hectares of cocoa farms in Sulawesi. Recently, new disease of VSD (*vascular streak dieback*) is also spreading, providing the new threats of Indonesian cocoa industry. It is clear that some form of intervention is required for the sector to remain globally competitive. Intervention is needed to address technological issues related to pest management, replanting, information dissemination to improve farm practices, and enhanced supply chain efficiency to ensure farmers are appropriately rewarded for quality production.

**Table 8. Cocoa Production in major producing regions in Indonesia, 2007-2010**

| **Provinces** | **2007** | **2008** | **2009** | **2010*** | **Share** (%)** |
|---|---|---|---|---|---|
| Aceh | 19,249 | 27,295 | 29,130 | 30,339 | 3.32 |
| North Sumatra | 64,782 | 60,253 | 67,341 | 69,978 | 8.26 |
| West Sumatra | 20,725 | 32,183 | 33,430 | 34,806 | 3.79 |
| Lampung | 24,671 | 25,690 | 26,037 | 27,059 | 3.26 |
| East Java | 16,613 | 18,270 | 22,677 | 23,166 | 2.53 |
| East Nusa Tenggara | 11,762 | 11,928 | 12,054 | 12,569 | 1.52 |
| East Kalimantan | 24,331 | 23,894 | 12,037 | 12,552 | 2.32 |
| Central Sulawesi | 146,778 | 151,949 | 138,149 | 144,049 | 18.33 |
| South Sulawesi | 119,293 | 112,037 | 164,444 | 171,443 | 17.78 |
| West Sulawesi | 88,436 | 149,458 | 96,860 | 101,002 | 13.72 |
| South-East Sulawesi | 135,113 | 116,994 | 132,189 | 137,833 | 16.46 |
| Papua | 11,547 | 11,305 | 11,050 | 11,522 | 1.43 |
| Others | 56,706 | 51,505 | 54,602 | 68,308 | 7.27 |
| **Indonesia** | 740,006 | 792,761 | 800,000 | 844,626 | 100.00 |

* Preliminary Figures
** Average annual share to national production

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

There have been several programs established by government and non-government institutions to overcome these problems, including Gernas (the national movement to revitalize cocoa production mostly in Sulawesi) which was launched in 2009. The movement will provide a unique opportunity to address critical short term challenges, such as rejuvenation of planting material and management of pests and disease, while also developing a long-term strategy that seeks to develop a truly sustainable industry that enjoys a positive reputation for quality in global markets. The movement of revitalizing Sulawesi cocoa is made possible after the introduction of SE (*somatic embryogenesis*) technology, developed by the Indonesian Coffee and Cocoa Research Institute (ICCRI) in Jember of East Java. This technology is expected to improve the cocoa yield significantly in the future, and contribute to the revival of cocoa industry in the country.

Technically, GERNAS adopts a series of achievable targets in the area of soil management, tree management, shade and farm diversity, access to farm inputs and finance, marketing, quality and monitoring and evaluation systems, and the creation of a supportive regulatory environment. All aspects of the implementation should be kept as simple as possible but encourage commercial engagement of the farmers to underpin sustainable change. Farmer enterprises should be encouraged to perform / and be paid for the services they provide (either in cash or in kind) for the provision of the necessary farm machinery (work), organic fertilizer, clonal seedlings, technical support etc. Additional alternate income and value added streams should be developed and implemented as part of a broader cocoa farming system. However, since the increase in cocoa productivity has been quite small since the initiation of Gernas in 2009, the government should improve the roles of extension services and farmers' capacity building and empowerment programs for cocoa farmers, at the field level. Exploring more complete story on the degree and magnitude of incentive system driven by increasing world cocoa price and farmers' capacity building is among important research for the future of cocoa competiveness.

In addition, the government of Indonesia provides subsidized credits for cocoa replanting and rehabilitation (together with oil palm and rubber) as much as Rp 9.72 trillions. Farmers only have to pay the interest rates of 6 percent, so that the subsidized interest rate as about 8 percent, since the commercial interest rate is about 14 percent. This revitalizing cocoa farming set targets for replanting of over 70,000 hectares, rehabilitation of 235,000 hectares, land-use intensification of 145,000 hectares and pest control of over 450,000 hectares. However, the realization of such credit disbursement by December 2011 was only Rp 3.26 trillion (33.5 percent of the total allocated fund). Some constraints regarding these disbursements in the field are mostly related to administrative requirements by the banking sector as channeling institutions. Cocoa farmers generally do not have land certificate, tax identification, land mapping, etc so that the funds are not disbursed easily to the farmers. The total cocoa farms being replanted were only 13.1 thousand hectares, far below the targets. The government is currently revising the requirements and proposed better banking guarantee so that the total cocoa replanting could meet the targets. The main emphasis here is that the momentum of high growth in cocoa production should remain robust in the near future, so that the Indonesian cocoa industry does not meet the opportunity to capture an increasing share of the world market.

### 3.2 Traditional Export vs. Added Value Strategy

The Indonesian economic policy on cocoa industry is at the cross-roads between promoting export as an immediate effort to increase the foreign earnings and increasing the added value domestically by industrial deepening and downstream development. Most of the cocoa produced in Indonesia is exported, as the domestic market for cocoa beans is small due to a relatively underdeveloped cocoa processing industry. The issues of fermented cocoa vs. non-fermented cocoa are actually more complex than simply about the dimension of cocoa quality and farmers' unwillingness to do the fermentation. This relates to several dimensions such as the case of asymmetric information, competition among local traders to attract and to control the farmers to be dependent on specific marketing channels, disguised incentives to generate economic benefits from the quality differences, etc. Consequently, the farm-gate price of cocoa in most production centers in Indonesia is very low, leaving the farmers do not enjoy the decent economic returns from cocoa farming.

In 2009, Indonesia exported 439 thousand ton of cocoa beans (14 percent of the world share), 42 thousand of cocoa butter (6 percent), 1,6 thousand ton of cocoa powder (0,4 percent) and 1,1 thousand ton of cocoa husks-shell (0.8 percent of the world share). These exports have generated foreign earnings US$ 1.5 billion, which should determine the level of competitiveness of the cocoa industry (Table 9). About 78 percent of the export volume was in bean or raw form. Cocoa butter, paste and powder together constitute 19 percent of the export volume. The figures in the last two years increased significantly due to the export price increases (18 percent) per year since the booming in 2006.

As mentioned briefly above, the Indonesian government announced a new policy to adopt an Indonesian National Standard for cocoa beans and powdered cocoa to improve the quality of exports. In 2005, Indonesia had 16 cocoa processing companies. The number has since declined to 13 companies, and not all of them are actively producing (Kumar, 2011). Lack of incentives for domestic processing contributed to the declining condition of the industry as the government removed a value-added tax (VAT) of 10 percent on cocoa beans traded on the domestic market, resulting in higher prices to be paid by the processing factories. In 2010, the government imposed an export tax of up to15 percent, hoping to reduce exports and encourage domestic processing. Due to the export tax, Indonesia's grinders processed about 180,000 ton of cocoa beans in 2010, up 38.4 percent from the previous year, but still below capacity of 350,000 ton per year. Indonesia expects to grind 280,000 tons of beans in 2011, a jump of 56 percent from 2010 (Kumar, 2011). After the imposition of the export tax, some of the global cocoa companies have expressed investment interest in Indonesia's cocoa processing industry. Increased capital inflow and strong foreign direct investment will result in continuous improvements in the domestic cocoa-processing industry. The deepening strategy and export promotion could go together as long as the cocoa value chain system is more efficient and the market structure is more open to new market entries. Investments in processing plants will lead to greater value-added, processed content in future cocoa export flows.

**Table 9. Indonesian Cocoa Export and its Share in the World Market, 2000-2009**

| Year | Cocoa Beans | Share (%) | Cocoa Butter | Share (%) | Cocoa Paste | Share (%) | Cocoa Husk-shell | Share (%) |
|---|---|---|---|---|---|---|---|---|
| **Export Volume (ton)** | | | | | | | | |
| 2000 | 333,619 | 13.33 | 32,072 | 6.47 | 2,614 | 0.93 | 3,069 | 3.01 |
| 2001 | 302,670 | 12.67 | 33,180 | 6.54 | 4,637 | 1.43 | 4,685 | 4.10 |
| 2002 | 365,650 | 14.97 | 38,768 | 7.24 | 5,632 | 1.73 | 722 | 0.57 |
| 2003 | 265,838 | 11.06 | 43,354 | 7.79 | 1,955 | 0.60 | 454 | 0.29 |
| 2004 | 275,485 | 9.05 | 43,226 | 6.54 | 863 | 0.24 | 1,575 | 0.67 |
| 2005 | 367,426 | 12.32 | 40,388 | 5.75 | 948 | 0.25 | 1,252 | 0.82 |
| 2006 | 490,778 | 16.21 | 49,503 | 7.10 | 2,005 | 0.49 | 3,269 | 2.49 |
| 2007 | 379,829 | 13.75 | 51,149 | 7.31 | 2,055 | 0.49 | 1,860 | 1.25 |
| 2008 | 380,513 | 13.69 | 55,584 | 7.93 | 1,448 | 0.36 | 2,164 | 1.49 |
| 2009 | 439,305 | 14.08 | 41,606 | 6.03 | 1,640 | 0.39 | 1,102 | 0.80 |
| **Export Value (US$ thousand)** | | | | | | | | |
| 2000 | 233,052 | 10.51 | 55,438 | 4.90 | 4,328 | 1.11 | 2,667 | 12.58 |
| 2001 | 272,368 | 11.02 | 58,985 | 5.49 | 6,559 | 1.34 | 4,229 | 10.23 |
| 2002 | 520,672 | 13.16 | 88,789 | 6.18 | 9,900 | 1.36 | 585 | 0.74 |
| 2003 | 410,278 | 9.40 | 118,340 | 6.72 | 5,163 | 0.59 | 187 | 0.16 |
| 2004 | 369,863 | 8.38 | 108,404 | 4.89 | 1,804 | 0.21 | 380 | 0.33 |
| 2005 | 467,827 | 10.60 | 144,427 | 5.11 | 2,006 | 0.24 | 451 | 0.50 |
| 2006 | 619,017 | 13.12 | 179,073 | 6.41 | 3,930 | 0.42 | 1,269 | 1.45 |
| 2007 | 622,600 | 12.54 | 230,160 | 7.01 | 4,612 | 0.40 | 681 | 0.52 |
| 2008 | 854,585 | 13.64 | 326,447 | 7.62 | 4,256 | 0.30 | 1,441 | 0.82 |
| 2009 | 1,087,490 | 13.42 | 230,056 | 5.68 | 5,666 | 0.35 | 652 | 0.39 |

Source: FAOSTAT, 2012 (http://www.fao.org)

In addition, the government and Indonesian Cocoa Council (Dekaindo) is promoting domestic consumption of cocoa products. Domestic annual per capita consumption of cocoa is 0.2 kilogram per capita per year, far lower than the cocoa consumption in Europe of 10 kilograms per capita. Consumption of chocolate confectionary in countries such as China, India and Korea has grown at 20 percent per year on average, offering Indonesia an opportunity to tap into a growing market. Domestic consumption is argued to serve as main stimulant and incentive system to increased production in cocoa bean and cocoa butter. It is expected that the chocolate confectionary segment will grow above 3 percent per year in the next five years.

## 4. TEA: Removing Structural Problems

### 4.1 Declining Area and Production

Indonesia is a small player of the world tea economy, contributing only 4 percent of the world production of tea, and producing only 150 thousand ton in 2010. Indonesia ranks number 7 in tea producing countries, far lower behind China (producing about 1.56 million ton), India (978 thousand ton), Kenya (514 thousand ton), Sri Lanka (290 thousand ton), Vietnam (250 thousand ton), and Turkey (200 thousand ton). This rank is a decline from the fifth rank in 2005, mostly due to the decline in tea production. In general, the declining of Indonesia's tea production about 1 percent per year in the last ten years is mostly due to declining harvested area of 1.9 percent per year. Harvested area of tea plantation has declined from 153 thousand hectares in 2000 to only 124 thousand hectares in 2010 (Table 10). Low farm-gate price and high demand for agricultural land and other uses have contributed to the structural problems of the tea economy in the last decade.

These structural problems provide a serious threat for 320 thousand workers involved in the tea industry, where about 1.3 million people dependent on the tea economy are really in critical livelihood condition. Should there be no policy actions in the years to come the amount of US$ 110 million of annual contribution of foreign earnings of tea would disappear in a relatively short time. Similarly, the contribution of Rp 1.2 trillion of the tea economy to the Indonesia's Gross Domestic Product (GDP) would vanish, unless there are serious and systematic strategies to revitalize the tea economy, from upstream to downstream businesses. Under a relatively constant productivity, increasing the cost of tea production, economic revenue of tea faming and processing seem not in a high potential to boost the local economic development, let alone contributing to poverty alleviation in rural areas.

**Table 10. Harvested Area, Productivity and Production of Tea, 2000-2010**

| Year | Harvested Area (ha) | Productivity (ton/ha) | Production (ton) | Growth (%/year) |
|---|---|---|---|---|
| 2000 | 153,675 | 1.06 | 162,587 | |
| 2001 | 150,872 | 1.11 | 166,867 | 2.63 |
| 2002 | 150,707 | 1.10 | 165,194 | -1.00 |
| 2003 | 143,604 | 1.18 | 169,821 | 2.80 |
| 2004 | 143,965 | 1.16 | 167,136 | -1.58 |
| 2005 | 140,538 | 1.19 | 167,276 | 0.08 |
| 2006 | 135,590 | 1.08 | 146,858 | -12.21 |
| 2007 | 133,734 | 1.13 | 150,623 | 2.56 |
| 2008 | 127,712 | 1.21 | 153,971 | 2.22 |
| 2009 | 123,506 | 1.27 | 156,901 | 1.90 |
| 2010* | 124,573 | 1.21 | 150,342 | -4.18 |

* Preliminary Figures
Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at May 20, 2012

Different from coffee and cocoa, the share of smallholder farmers in tea plantation is only 44 percent, while the majority (56 percent) of tea farming is controlled by large-scale plantation. The share of state-owned enterprises (SOEs) in tea plantation is 31 percent of the total harvested area, while the share of private large scale plantation is 25 percent. Table 11 shows that all of these types of plantation are experiencing a pressure of land conversion, where the rate of decline in smallholder tea plantation is the highest (3.6% per year), followed by private large-scale plantation (1.6% per year) and state-owned enterprises (0.9% per year). The declines are due to conversion to mostly non-agricultural uses, infrastructures, housing and industrial real-estates, and other agricultural crops and land use system. Economic revenues of agro-ecotourism from tea plantation are also in a threat as the best land of tea plantation and located in a strategic area is usually taken first and converted to other uses. Palm oil, natural rubber, coffee and cocoa are among crops that substitutes for the tea plantation, mostly because the price level and stability of as well as expected economic returns from these crops are generally more favorable compared to those of tea. Incentive systems to implement the policies of replanting and new investment in tea plantation are really low, causing some uncertainties in the future of the Indonesian tea economy.

**Table 11. Harvested Area of Tea Farming by the Type of Plantation, 2000-2010**

| Year | Private (ha) | Share (%) | SOEs (ha) | Share (%) | Smallholder (ha) | Share (%) | Total (ha) |
|---|---|---|---|---|---|---|---|
| 2000 | 67,100 | 43.66 | 44,263 | 28.80 | 42,312 | 27.53 | 153,675 |
| 2001 | 67,580 | 43.98 | 44,554 | 28.99 | 38,738 | 25.21 | 150,872 |
| 2002 | 66,289 | 43.14 | 44,608 | 29.03 | 39,810 | 25.91 | 150,707 |
| 2003 | 64,742 | 42.13 | 41,988 | 27.32 | 36,874 | 23.99 | 143,604 |
| 2004 | 61,902 | 40.28 | 44,768 | 29.13 | 35,878 | 23.35 | 142,548 |
| 2005 | 60,771 | 39.55 | 44,066 | 28.67 | 34,284 | 22.31 | 139,121 |
| 2006 | 60,990 | 39.69 | 46,661 | 30.36 | 27,939 | 18.18 | 135,590 |
| 2007 | 60,948 | 39.66 | 42,579 | 27.71 | 30,207 | 19.66 | 133,734 |
| 2008 | 60,539 | 39.39 | 38,946 | 25.34 | 28,227 | 18.37 | 127,712 |
| 2009 | 57,126 | 37.17 | 38,564 | 25.09 | 27,816 | 18.10 | 123,506 |
| 2010* | 56,264 | 36.61 | 40,158 | 26.13 | 28,151 | 18.32 | 124,573 |
| **R (%)** | **-1.57** | | **-0.87** | | **-3.60** | | **-1.87** |

* Preliminary Figures

Source: Directorate General of Plantation at the Ministry of Agriculture, 2012

The majority of tea plantation is located in West Java (97,000 ha), followed by Central Java (9,000 ha), North Sumatra (5,100 ha), West Sumatra (4,900 ha), Jambi (2,600 ha), and others. In terms of production, the share of West Java in national tea production is the highest (72.6%), followed by North Sumatra (8.9 %), Central Java (7.5%), West Sumatra (3.5%), East Java (2.6%), Jambi (1.9%) and others (see Table 12). These regions are usually known as major destinations for eco-tourism, family and group gathering and known as resort areas and recreational facilities that provide multiplier effects for employment generating activities and local economic development.

**Table 12. Tea Production in major producing regions in Indonesia, 2007-2010**

| Year | 2007 | 2008 | 2009 | 2010* | Share** |
|---|---|---|---|---|---|
| West Java | 109,957 | 113,882 | 111,721 | 108,520 | 72.59 |
| North Sumatra | 13,388 | 13,463 | 13,747 | 13,886 | 8.91 |
| Central Java | 10,888 | 11,489 | 11,868 | 11,417 | 7.46 |
| West Sumatra | 4,343 | 4,263 | 7,815 | 5,190 | 3.52 |
| East Java | 3,653 | 3,655 | 4,143 | 4,146 | 2.55 |
| South Sumatra | 2,371 | 2,371 | 2,527 | 2,552 | 1.61 |
| Jambi | 2,625 | 2,925 | 3,363 | 2,954 | 1.94 |
| Others | 3,398 | 1,923 | 1,717 | 1,677 | 1.43 |
| **Indonesia** | 150,623 | 153,971 | 156,901 | 150,342 | 100.00 |

* Preliminary Figures
** Average annual share to national production

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at May 20, 2012

About 65 percent of tea production is to fulfill the export market, while the remaining 35 percent is marketed to domestic market. At least there are 143 tea companies and estates operating in Indonesia, including four companies under the State-Owned Enterprises (SOEs). Among these companies, eleven companies are known as The Big Eleven of Tea Plantation are as follows: (1) PT Perkebunan Nusantara (PTPN) VIII in West Java, (2) PTPN IV in North Sumatra, (3) PTPN VI in West Sumatra and Jambi, (4) PTPN XII in East Java, (5) PT Tata Anyar Indonesia in West Java, (6) PT Hasfarm in South Sulawesi, (7) PT Melania Indoensia in West Java, (8) PT Lam Teh in West Java, (9) PTPN VII in Lampung and South Sumatra, (10) PT Mitra Kerinci in West Sumatra and Jambi, and (11) PTPN IX in Central Java. The majority of Indonesian tea production is processed in tea processing unit or tea factory to produce the downstream tea products such as black tea, green tea, and extract tea.

In terms of consumption, Indonesia is the lowest tea consumption in the world, with annual per capita of 0.31 kg. Indonesians consume tea at home (90.5%) and outside (hotels, restaurants, and the like). Despite the annual growth, tea consumption does not contribute significantly to domestic tea sales. Lack of information on the health benefit of drinking tea may have been the main cause to the low consumption. Bottled tea industry is competing severely with bottled mineral water and soft drink industries, taking 30 percent of the market share. Mineral water, carbonated soft drink and other products – such as juices – take 40%, 20% and 10% share of the market, respectively (Kustanti and Widiyanti, 2008).

The structure of domestic tea market is characterized towards monopsony in the upstream and monopoly in the the downstream normally where smallholder growers are put in a weak bargaining position to define tea process. Domestic market prices of tea depend

very much on the international prices, which are set through auction. Three top auction venues that hold strong influence on the international tea prices are Mombassa (Kenya), Colombo (Sri Lanka) and Kolkata (India) (Kustanti and Widiyanti, 2007). The tea auction venue of Indonesia, known as Jakarta Tea Auction (JTA) has been around for a while in the last half decade, but the price level has declined significantly since the 1980s. Nevertheless, JTA is the barometer of Indonesia tea price, that determines both farm-gate price at the upstream and company price at the downstream. Auction is held every Wednesday, which currently only 7 companies are active in tea trading, including: Lipton, Elink Schuurman BV, and Van Rees BV. A large propotion of the tea auction are from state-owned enterprises. For example, all premium tea products from PTPN VII, is marketed through JTA, with five buyers include Lipton, Elink Schuuurman, PT Sariwangi, PT Rijasa and Vanrees. Tea products of off-grade are marketed to the Agro-commodity Acution in Bandung on every Tuesday of the forth week of the month.

### 3.2 Exports and Imports of Indonesian Tea

The export performance of Indonesian tea is not as good as that was in the 1990s. The volume of export has declined significantly since 2005, from 102 thousands ton to 92 thousands ton in 2009. The share of Indonesian tea export to the world market has also declined from nearly 6 percent in 2005 to only 5.2 percent in 2009. As explained earlier, the decline in production has contributed to the decline in the tea export performance. The export earning increased from US$ 121.5 thousand in 2005 to US$ 171.6 thousand in 2009, due mostly because of exchange rate. The majority (86 percent) of Indonesia's tea export is in the form of bulk black tea, showing that the development of downstream tea products in Indonesia is very slow. In fact, the share of bulk black tea products is declining in the world market, except for some countries such as: United Arab Emirates, Russia, Japan, and Poland.

**Table 13. Indonesian Tea Export and its Share in the World Market**

| Year | Volume (ton) | Share (%) | Value (US$) | Share (%) |
|---|---|---|---|---|
| 2000 | 105,581 | 7.21 | 112,106 | 3.83 |
| 2001 | 99,797 | 6.88 | 99,967 | 3.54 |
| 2002 | 100,185 | 6.34 | 103,426 | 3.61 |
| 2003 | 88,176 | 5.76 | 95,816 | 3.26 |
| 2004 | 98,572 | 6.03 | 116,018 | 3.53 |
| 2005 | 102,294 | 5.95 | 121,496 | 3.39 |
| 2006 | 95,339 | 5.85 | 134,515 | 3.59 |
| 2007 | 83,659 | 4.89 | 126,615 | 3.13 |
| 2008 | 96,210 | 5.07 | 158,959 | 2.88 |
| 2009 | 92,304 | 5.20 | 171,628 | 3.20 |

Source: FAOSTAT, 2012 (http://www.fao.org)

In addition, the development of downstream industry and tea processing sector in Indonesia has been quite slow partly due to poor investment incentives, value-added tax of 10 percent for any processing activities, lack of consistent governmental support. The VAT 10% discouraged the proper development of the downstream sector, to the effect that producers opted more for exporting bulk tea rather than processed/packaged tea. Although the VAT of 10 percent was revoked in January 2007, the distorted effects remain, because the Provincial Tax Offices have not issued the implementation guidance of the policy.

Global economic crisis since 2008 has also contributed to the declining performance of Indonesian tea export. The average world price of tea declined from US$ 2.92 per kilogram in 2011 to US$ 2.69 per kilogram in 2012, although the price shows an increasing trend since March 2012. By the time of this writing in May 2012, the average price of tea auctions in three major markets of Mombasa, Colombo and Kolkata reaches US$ 2.99 per kilogram, indicating a revive of world tea market. Factors affecting the performance of Indonesian tea export include the existing demand and supply of tea at the global market, the quality of tea products, trade barriers in the destination countries (Suprihatini, 2005; Kustanti and Widiyanti, 2007).

Meanwhile, tea import to Indonesia has increased in recent years, mostly due to a rapid growth if Chinese, Vietnamese and Thai restaurants, especially in big cities. The imported products are mainly downstream products. During the period of 1997-2002, tea import grew by 4.2 percent per year. The main imported product is bottled green tea with annual growth of 11.8 percent and bottled black tea with annual growth of 28.4 percent (Kustanti and Widiyanti, 2007). The following Table 14 shows the high import tariffs of tea in other countries, compared to the existing 5 percent of tea import tariff in Indonesia.

**Table 14. Import tariff set by importing countries on Indonesian tea products**

| Countries | Import Tariff | |
|---|---|---|
| | **Bulk Tea 090220, 090240** | **Packaged tea product 090210, 090230** |
| Sri Lanka | 25% | 25% |
| India | 114% | 114%<br>30% (instant tea) |
| China | 15% (MFN)<br>100% (out of MFN) | 15% (MFN)<br>100% (out of MFN) |
| Kenya | 25% | 25% |
| Malawi | 50% (black tea)<br>10% (green tea) | 50% (black tea)<br>10% (green tea) |
| Jepang | 3% (black tea)<br>17% (green tea) | 12% (package black tea)<br>10% (instant tea) |
| Taiwan | 17,6% (black and green tea)<br>25% (Oolong tea) | |
| Turkey | 145% | 145% |

Source: International Tea Committee (2006), quoted in Indonesian Tea Association (2007)

At one point, the tea market in Indonesia is quite liberal compared to other tea producing countries. Turkey, Kenya and Sri Lanka have imposed a very high import tariff, aiming at protecting their domestic tea industries. The Indonesian Tea Council once proposed to impose a 34 percent tariff of tea import to Indonesia, although the Government has so far not made a significant decision regarding the tariff and protection. The Indonesian Tea Council (ITC) also proposes a specific policy to develop further the downstream products by harmonizing import tariff of tea to Indonesia and to other countries. This specific policy could be in the forms of non-tariff barriers for tea imports such as: (a) compliance with the Indonesian National Standard (SNI), (b) halal Certification for tea, (c) specific permit from the ITC regarding the tea quality and any other requirements.

### 3.3 Partnership and Sustainability Challenge

On April 19 of 2007, stakeholders of the Indonesian tea industry have established the Indonesian Tea Council (ITC) or *Dewan Teh Indonesia* (DTI) to "control" the Indonesian tea industry. The council is facilitating and promoting the interests of tea industry to improve the competitiveness, inclusiveness, and sustainability of the Indonesia tea agribusiness. The founders of ITC are, among others: the Indonesian Tea-Farmers' Association (Aptehindo), the Indonesian Tea Association (ATI), the Indonesian Tea-Cooperatives Association (AKTI), OPS Teh Wangi, officers from state-owned enterprises and private sectors, and relevant government officials at central and provincial level.

In 2008, the Indonesian Tea Council acknowledges the new schemes of sustainability of global partnership for global, starting from traceability system of tea origin and compliance on social and environmental sustainability. Having experience with coffee certification, UTZ Certified has also been developing pilot project on tea partnership, involving Sara Lee as a buyer, L. Eling Schuurmann as tea buying agency, the Business Watch as an NGO implementing partner, and PT Perkebunan Nusantara VIII as tea producer. The Council suggests the partnership to work more closely in improving tea quality, protecting the small-scale tea farmers and tea workers, and preparing for the national tea certification (CSR Review, 2008 http://csrreview-online.com).

Some private companies also develop CSR initiatives in the tea sector to share similar concerns on global environmental governance, improving the work of tea workers and their environment. Tea farming on the steep slopes is usually associated with incentive systems, policy design, accessibility of technology, and alternative sources of income for smallholder farmers. For example, PT Unilever Indonesia takes part in the Ethical Tea Partnership (ETP) which is established to promote CSR in the tea sector, with the long-term objectives that its member will produce tea in socially responsible ways. ETP covers six issues related to living and employment standards: (1) employment (including minimum age and wage levels), (2) education, (3) maternity, (4) health and safety, (5) housing, and (6) basic rights. The ETP scheme monitors and grades suppliers according to (performance on) these issues. ETP members can but are not obliged to source tea from ETP graded suppliers.

A study conducted by Kustanti and Widiyanti (2007) suggests that the compliance of ETP is yet to improve in the future. Business practices in the Indonesian tea sectors (both of in auction and in directly buying) are concerned mostly on product quality, price and timely delivery, instead of ETP principles. The practices of tea buying in auction market, for example, are based on the two criteria: first quality and secondly, price. Compliance to social and environmental standard is not yet a criterion for its tea buying. Most of Indonesian tea plantations do not comply with ETP standard. The reasons are mainly because the process of ETP has not given significant effect to improve income of actors in supply chain, let alone smallholders. The Indonesian Research Institute for Tea and Cinchona (RITC) at Gambung of West Java have surveyed ETP in 17 plantations and come up with the findings that six plantations comply with ETP, three plantations fail to comply, three plantations are under review, and five plantations have not been reviewed. Unfortunately, they RITC do not survey the other Indonesian plantations which have adapted ETP. Notwithstanding, business practices in the Indonesian tea industry would move to the right direction as they mostly planned to include certification on social and environment in buying criteria in the future.

The Government of Indonesia and the Indonesia Tea Council (ITC) has recently announced the National Movement for Tea Agribusiness Development (GPATN=*Gerakan Pengembangan Agribisnis Teh*). GPATN was aimed at improving competitiveness of the Indonesian tea, through the following action plans: (1) revitalizing promotion and marketing strategy, (2) replanting, rejuvenating, and rehabilitating tea plantation, (3) intensification of tea plantation through good agricultural practices, (4) increasing the product quality from upstream to downstream, (5) empowering farmers' organizations and extension services, (6) improving research and development (R&D) and (7) strengthening institutions to improve competitiveness. The main principle promoted under the GPATN movement is the public-private partnership approach, where all stakeholders in the tea industry have equal chance and opportunities to contribute to the success of tea agribusiness development in Indonesia. One should note that the implementation GPATN movement would be more effective if it is also connected with the future challenges on sustainability for the tea industry, policy making process in central and local governments, and agribusiness system in general.

### 3.4 Innovation and Technology Development

The Indonesian Research Institute for Tea and Cinchona (RITC) in West Java has developed some new innovation and applied technology in tea industry (Suprihatini, 2011). Theoretically, this new technology shall contribute to the improved competitiveness and sustainability of the Indonesian tea industry. However, this innovation could not be easily applied and implemented at the field level, mostly because the policy response to adopt this technology is quite slow. Moreover, the Research Institute does not have enough power and political access to speed up the application and implementation of new innovation and technology development. Some of this innovation and technology development will be explained below:

### *(a) Rejuvenating tea plantation*

Rejuvenating tea plantation is really crucial given that the majority (65 percent) of tea plantation is very old and not in the economies of scale. The RITC has produced new tea seedling, known as Gambung series (GMB 1 to 11) which could yield the tea leaves up to 5 ton/hectare annually, insect and pest resistance, and high quality tea leaves. One should note that this technology should be complemented with credit schemes of subsidized interest rate at least for the first 2-3 years. These schemes are some forms of economic incentives for tea growers, both small-scale and large-scale to rejuvenate their tea plantations in order to increase the production and productivity of tea in Indonesia. In addition, tea plantation has been known as employment generating industry, absorbing workers of 2-3 man-days per hectare annually. This ratio is far higher than other plantations which generate 0.5 – 1 man-days per hectare annually.

### *(b) Reducing production cost*

Researchers have produced alternative energy packages to substitute for the use of fossil fuels in the production of tea. The Research Institute has consistently compiled the data base of financial and economic feasibility of Nitrogen-fixing tree and fast-growing species for fuel-wood in the tea processing plant. Alternative energy sources from coal, palm-oil shells, residues of cinchona and jatropha have been identified, but not yet adopted by tea companies. At the farm level, the RITC has recommended the application of tablet-fertilizer which could increase fertilizer effectiveness up to 40 percent, especially in the steep slopes and in tea trees of 3-4 harvests.

### *(c) Sustainable tea practices*

The Research Institute for Tea and Cinchona (RITC) has conducted surveys to observe the sustainable tea practices on 15 tea plantation in Indonesia. There are at least 10 indicators of sustainable tea practices, namely: (1) improving soil health, (2) controlling soil erosion, (3) maintaining plant nutrients, (4) controlling and managing pest and disease on tea farming, (5) increasing biodiversity, (6) improving product values, (7) increasing the use of renewable thermal energy for tea processing, (8) using the water more wisely and efficiently both for drinking water and irrigation, (9) maintaining good relationship between employers, workers, neighborhood, customers, suppliers, local and central government, and (10) improving the local economy. The study results could be summarized as follows: the indicator of maintaining plant nutrients is the most intensively applied in tea plantation, scoring 3.69 out of ideal 5; while the indicator of increasing biodiversity is the least intensively applied in tea plantation, scoring 2.51 out of 5. The next most intensively applied indicator is improving product values (2.69), and the next least intensively applied indicator is improving soil health (2.52). The Research Center in fact has developed the innovation and technology on increasing biodiversity and improving soil health, which unfortunately not widely-applied in tea plantation across the country.

***(d) Improving tea-quality system***

There are several requirements of tea-quality system, such as good agricultural practices (GAP), good handling practices (GHP), good management practices (GMP), hazard analysis and critical control point (HACCP), and ISO 22000. The main reason of low compliance of the above requirements of tea-quality system is financial constraint as the cost to employ HACCP is approximately Rp 450 million (US$ 50,000), which increases the production cost of Rp 519 per kilogram or about 5.1 percent higher. The commitment from top-management of tea factories in Indonesia is really needed, while the Government of Indonesia and respected research institutes could provide training programs and capacity building, technical assistance for laboratory analysis, etc to comply with HACCP requirements. In additions the RITC has produced bio-pesticides, primarily bio-fungicides (Ragi R11) to control the blister-blight disease, which is known as environmental friendly.

***(e) Improving the added-value of tea***

Improving the added-value of tea could be achieved through product diversification and branding strategy as the price of downstream tea products is higher and more stable. The processing technology for product diversification has been well-developed, even some are still in the laboratory scales, such as: (1) white tea, (2) Oolong tea, (3) instant tea, (4) tablet effervescent green tea, (5) decaffeinated tea, (6) high cetacean green tea, and (7) extracted cetacean using membrane technology. In addition, cosmetic products using extracted tea have also been developed, such as anti-acne, sun-block, scrub, anti-aging, antiseptic etc will soon be among tea-based pharmaceutical products in a commercial scale.

## 5. RUBBER: Wave of Agroforestry

### 5.1 Production and Replanting Issues

Indonesia is the second largest natural rubber producer behind Thailand, but ahead of Malaysia since the last decades. In 2010, the rubber production of Indonesian was over 2.6 millions ton or about one million ton lower than the rubber production in Thailand. The growth of natural rubber production in Indonesia is about 6.2 percent per year, a slightly behind the rate of Malaysia, but higher than that of Thailand. The production estimate is not only because the growing demand of world market, hence the high rubber price in the last three years, but also because of growing attention on high yielding clonal rubber and positive externalities brought about by agroforestry system in natural rubber production.

**Table 15. Harvested Area, Productivity and Production of Rubber, 2000-2010**

| Year | Harvested Area (ha) | Productivity (ton/ha) | Production (ton) | Growth (%/year) |
|---|---|---|---|---|
| 2000 | 3,372,421 | 0.45 | 1,501,428 | - |
| 2001 | 3,344,767 | 0.48 | 1,607,460 | 7.06 |
| 2002 | 3,318,359 | 0.49 | 1,630,360 | 1.42 |
| 2003 | 3,290,112 | 0.54 | 1,792,350 | 9.94 |
| 2004 | 3,262,267 | 0.63 | 2,065,820 | 15.26 |
| 2005 | 3,279,391 | 0.69 | 2,270,890 | 9.93 |
| 2006 | 3,346,427 | 0.79 | 2,637,230 | 16.13 |
| 2007 | 3,413,717 | 0.81 | 2,755,172 | 4.47 |
| 2008 | 3,424,217 | 0.80 | 2,751,286 | -0.14 |
| 2009 | 3,435,270 | 0.71 | 2,440,347 | -11.30 |
| 2010* | 3,445,121 | 0.75 | 2,591,935 | 6.21 |

* Preliminary Figures

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

The performance of rubber production in Indonesia is very much dependent on harvested area, which experienced an increase from 3.3 million hectare in 2003 to estimated 3.4 hectare in 2004. In 2003, about 90 percent of 1.8 million ton of rubber production is exported, generating foreign reserves US$ 1.7 million. The production and export figures are expected to increase in 2004 and the following year 2005. Unless some changes in policy strategy to rejuvenate the old rubber trees and sharpening the area targeted for the intensive rubber production system, Indonesia could not fulfill the fast growing world demand of natural rubber and other rubber-based products.

Moreover, the quality of raw rubber materials from Indonesia is generally not as good as the natural rubber from Thailand and Malaysia. There are no incentive systems and quality controls for smallholder growers to produce good quality rubber. Rubber buyers such as traders and processing factories do not treat significant price differences between good and bad quality rubber from rubber growers or share-tappers. These farmers often mix bark and other debris along with the latex to increase the weight of rubber slabs. After harvest, the rubber slabs are soaked in the water for many days, especially during dry season between May and September each year.

**Table 16. Rubber Production in major producing regions in Indonesia, 2007-2010**

| Year | 2007 | 2008 | 2009 | 2010* | Share** (%) |
|---|---|---|---|---|---|
| Aceh | 89,378 | 90,705 | 80,857 | 84,636 | 3.28 |
| North Sumatra | 447,202 | 443,519 | 382,073 | 413,597 | 15.99 |
| West Sumatra | 93,348 | 93,777 | 84,984 | 88,949 | 3.43 |
| Riau | 366,781 | 365,542 | 325,109 | 345,611 | 13.31 |
| Jambi | 306,026 | 305,828 | 273,173 | 290,439 | 11.16 |
| South Sumatra | 542,538 | 543,698 | 484,000 | 515,965 | 19.80 |
| Bengkulu | 52,174 | 52,063 | 46,215 | 48,688 | 1.89 |
| Lampung | 70,403 | 70,207 | 62,070 | 64,188 | 2.53 |
| West Java | 59,058 | 59,203 | 49,463 | 52,681 | 2.09 |
| Central Java | 30,480 | 30,476 | 27,106 | 28,163 | 1.10 |
| West Kalimantan | 266,643 | 266,144 | 237,848 | 252,604 | 9.71 |
| Central Kalimantan | 198,384 | 198,064 | 177,374 | 188,243 | 7.23 |
| South Kalimantan | 109,368 | 108,992 | 98,479 | 103,563 | 3.99 |
| Others | 123,389 | 123,068 | 111,596 | 114,608 | 4.49 |
| **Indonesia** | 2,755,172 | 2,751,286 | 2,440,347 | 2,591,935 | 100.00 |

* Preliminary Figures

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

For more than a 90 percent share of Indonesian rubber to fulfill the export market, Indonesia could play a very important role in the international market. Similarly, there are growing concerns among the rubber community to develop domestic markets. Indonesia is really in needs to encourage downstream industry investment, deepening industrial strategy, and improving the rubber-product quality. The downstream industry development could face a very serious problem because the incentive systems and quality controls for smallholder growers to produce good quality rubber are very weak. The majority (about 84 percent) of

rubber producers in Indonesia is small-holder growers and concentrated mostly (more than 72 percent) in five production centers: North Sumatra, Jambi, Riau, South Sumatra and West Kalimantan.

However, the concerns to develop downstream rubber-based agro-industry are not only about how to establish the mutual linkages between upstream production system and downstream industry, the location preferences of improving added value of the industry, but also related to how to promote investment in such prospective sectors and to contribute to the industrial development in general. The rubber-based industrial development is obviously related to many segments of economic policy, including the technological advancement, information system and financial institutions and legal issues and enforcement structures in general. Therefore, the development of domestic rubber industry needs more strategic approach and policy to better support a high quality of economic recovery in the country.

## 5.2 Clonal Rubber, Export and Processing

The Government of Indonesia has introduced clonal variety under more intensive rubber production systems for the last two decades. Several government programs have been initiated at local level to support the intensive production systems, such as PRPTE (the development, rehabilitation and rejuvenation of exportable crops), SRDP (small scale rubber development program), etc. However, the majority of small holder rubber growers have not yet adopted the high latex production system. The recommended technologies are inappropriate for most farmers because of limited capital and land available for intensification. These small farmers are more interested in continuous income from the same plots, instead of substituting the rubber trees having provided adequate income for years. However, the clonal production system has also been prone to vertebrate pest damage, especially in the plots of forest margin (Joshi *et al.*, 2002).

The average yield level of Indonesian natural rubber ranges from 550 to 600 kilograms of dry rubber contents (DRC) per hectare, which is quite low compared to that of neighboring countries such as Thailand and Malaysia. There are major productivity differences between old rubber trees and new intensive clonal rubber trees. Old trees could yield an average of 1.2 ton of slabs or about 540 kg of DRC per hectare, while the clonal rubber could reach about 3 ton of slabs or 1.35 ton of DRC per hectare. Because of this low yield, Indonesia now ranks the second world producing natural rubber after Thailand, even though the harvested area of rubber is the highest in the world.

As mentioned previously, the Government of Indonesia has been trying to solve the problems of rubber production quality by enforcing a quality control on rubber products though a ministerial decree of industry and trade number 616/MPP/Kep/10/1999 in October 2000. The decree sets quality specifications rubber products and for some other agricultural products, which is generally known as the Indonesian National Standard (SNI) 06-2047-1998. The SNI for rubber suggests that the maximum thickness for slabs for categories I, II and III are 50 mm, 100 mm and 150 mm respectively. In this case, no contaminant is accepted and only recommended coagulants are permitted in rubber processing system. Crumb rubber factories (CRF) are strongly suggested to buy rubber products that meet this

standard, from licensed traders and brokers equipped with special trading license. The regulation puts strong sanctions for rubber traders and brokers of revoking the trading license, and for factories of canceling the product certificate and ISO 9002 certificate.

After four years of implementation, the decree has not improved significantly the rubber quality in Indonesia, and the overall outcome of the decree is mixed. Studies by Wibawa *et al.* (2002) suggest that in the short run the overall quality of rubber production improved quickly as farmers reacted positively to the decree. However, the production of rubber has decreased significantly in the first few years. For a decrease of 10 percent or less, the farmers' income from rubber sales still increases because the revenues are proportional to the intensity of contamination prior to the decree of SNI. In other words, small-scale rubber growers who produced relatively clean slabs are benefited from the new regulations. At village level, the slab transaction became more transparent, the rate of reduction due to low quality has decreased as the collective traders and village-level middlemen only accept good quality slabs. As a result, the transportation of rubber was easier because of less time required for sorting and grading. Farmers using high quality seedling and intensive system are really in favor of the new regulation, but traditional farmers relying on jungle rubber of agroforestry systems have experienced a decrease in farm revenues because they traditionally have produced dirty slabs.

Evidence at local level also shows that these jungle rubber farmers such as commonly found in Bungo District in Jambi Province of Sumatra has suffered from reduction in the slab production by 22 to 44 percents, resulting in a decrease of 1 to 23 percents of their income (Wibawa *et al*, 2002). However, for those who have accustomed to producing high quality rubber, even before the SNI decree, the production of slabs has not experienced a decline significantly. In shorts, rubber production areas with high productivity prior to SNI were suffered less from the regulation. On the other hand, areas with low initial productivity had a significant reduction in slab production after SNI. Farmers using clonal planting experience a decrease in slab production by 14 percent, which is only a half of the 28 percent decrease in slab production using traditional seedling of rubber. The decline is also presumably high in the areas using extensive system of jungle rubber agroforestry system such as in Bungo District in Sumatra.

A yield factor, age of trees, and tapping management have also explained the differences between traditional jungle rubber and more intensive system using clonal high yielding rubber varieties. While traditional seedling rubber could only produce 640 kg dry rubber equivalent per hectare per year, the clonal rubber farmers could produced at 990 kg dry rubber/ha/year, especially during the live of PRPTE or SRDP projects of rubber intensive systems. A very old rubber tree of more than 20 years are not in the productive stages anymore, implying that these trees are really in needs of rejuvenation and replanting. However, the rubber yield is also influenced by tapping management of latex, where clonal rubber requires less frequent tapping, i.e. every two days using a half spiral cut. When farmers tapped the latex of clonal rubber very intensively, such as they are used to tap for 4-5 days per week in seedling rubber or jungle rubber, the latex production declines significantly. Technically, intensive tapping in clonal rubber would cause a fast consumption of bark, deceleration of tree growth, sub-normal yield and a shorter tree life compared to the recommended tapping management explained above.

In this case, the property rights and security system of household economy would influence the yield level of rubber production and plantation productivity in general. Large scale rubber growers who could employ workers and share tappers usually maintain rubber tree quality as it becomes the most important assets in the rubber economy. While small scale farmers with limited resources for crop diversifications are also tempted to tap the rubber tree more intensively without knowing the risks of declining yield, hence the sources of income in the long run. The immediate needs for subsistence incomes and limited opportunities and capital for substituting the traditional seedling rubbers obviously influence the farm-income level and the life-long of rubber trees. In additions, few options of supply chain in rubber marketing, the level of price transmission from consumers to rubber growers and the magnitude of transaction costs in rubber marketing are among important subjects needing further elaborations.

**Table 17. Indonesian Natural Rubber Export and its Share in the World Market**

| Year | Volume (ton) | Share (%) | Value (000 US$) | Share (%) |
|---|---|---|---|---|
| 2000 | 1,370,520 | 27.12 | 881,416 | 26.01 |
| 2001 | 1,443,010 | 29.42 | 779,018 | 27.64 |
| 2002 | 1,487,350 | 27.98 | 1,031,580 | 27.53 |
| 2003 | 1,648,390 | 28.27 | 1,482,520 | 26.55 |
| 2004 | 1,862,510 | 28.46 | 2,166,520 | 28.96 |
| 2005 | 2,019,770 | 32.97 | 2,577,560 | 32.22 |
| 2006 | 2,277,660 | 35.87 | 4,307,830 | 35.46 |
| 2007 | 2,399,150 | 37.33 | 3,858,270 | 32.02 |
| 2008 | 2,286,910 | 37.74 | 6,041,180 | 38.33 |
| 2009 | 1,982,120 | 37.05 | 3,231,160 | 35.09 |

Source: FAOSTAT, 2012 (http://www.fao.org)

At the downstream level, domestic consumption of natural rubber in Indonesia is still very low at between 400,000 ton and 500,000 ton annually. However, domestic consumption continues to increase significantly, at a rate of 15 percent per year. The domestic tyre industry accounts for between 65 percent and 70 percent of the domestic natural rubber consumption. Indonesia currently exports about 2.4 million ton of natural rubber. Exports within Asia almost doubled between 2004 and 2010 while exports to Europe, the US and Australia declined significantly. Much of the growth in the exports to Asia has been due to the growth of natural rubber imports in China, Japan, Singapore, Republic of Korea and India.

Natural rubber is unique in terms of price stability. The International Tripartite Rubber Council (ITRC), which is made up of Indonesia, Thailand and Malaysia has agreed on certain manual price controls they will put in place if the price of natural rubber falls

below favorable level. The ITRC has agreed that if the price of rubber drops below USD 1.6 per kilogram they will cut exports for a period of time to allow price recovery. Since the regulations are relatively lax for this industry, the high rubber prices will attract more new players. The rubber industry in Indonesia faces challenges in the form of poor cultivation practices, which result in 50 percent to 70 percent less productivity, and poor tapping practices, which reduce the tapping lifespan by around 50 percent. There is still room for private players to enter the rubber industry. At the moment, smallholder plantation yields are about 667 kilogram per hectare, much less than government-owned estates and private estates, which produce yields of around 900 kilogram to 1,000 kilogram per hectare. Under private management with adequate funding and expertise, the land currently owned by smallholders could potentially yield much more and generate higher returns. However, managing private plantations is a bigger challenge due to security issues faced by plantation companies.

In addition to meeting demand from domestic processors, growth of Indonesia's natural rubber industry will be driven by exports to China and India as demand for tyres for new vehicles in these regions continues to grow. Consumers in China and India are becoming more affluent and are purchasing more vehicles for personal use. The tyre industry accounted for over 70 percent of the global natural rubber demand in 2009 and further growth is expected to be driven by strong demand from the automobile industry, particularly in countries like China, India, the Association of Southeast Asian Nations (ASEAN) and South America (Kumar 2011).

### 5.3 Social Benefits of Sustainability Principles

Concerns over positive environmental and social benefits in rubber production system have emerged recently because the development process tends to move towards more intensive practices in rubber production. The old rubber trees under extensive system and jungle rubber agroforestry have not been able to solve the problems of low productivity or latex, poor quality of slabs, hence low income returns for rubber growers. A tendency in monoculture rubber of intensive system using clonal rubber variety poses a threat to new dimensions of biodiversity issues, especially in the forest margins of Sumatra, Indonesia. The major challenge for natural rubber production system in the future is how to integrate a high productivity promotion of new clonal rubber varieties and a decision for land use practices that satisfy sustainable resource management and ensure acceptable quality of environments in the forest margin.

This section expands previous works on the positive benefits of jungle rubber agroforestry systems both in terms of providing biodiversity services and developing fruitful development strategies contributing to the welfare of marketing agents in rubber marketing and production systems (Wibawa, 2001, Joshi *et al.* 2002, Van Noordwijk *et al.*, 2002, Arifin, 2004a etc.). The arguments on keeping the traditional system of rubber agroforest, especially in the forest margins such as in Bungo District of Jambi Province, are not only

about the measures of biodiversity conservation, but mostly about the facts that small farmers are more interested in continuous income from the rubber trees. The emotional relationships between rubber growers and their lands, the property rights components in each decision on latex and slab production and tapping managements, as well as social dimensions in providing considerable amount of rural employment. Hesitation among rubber smallholders to substitute rubber intensive system for the old traditional system is associated with income security from the jungle rubber agroforestry as well as the capacity to adjust the farming practices with the methods of clonal monoculture rubber, requiring a larger amount of farmland.

The existence of jungle rubber agroforestry system is preceded with lashing and burning of previous vegetation, followed by planting of rubber seedlings with rice and other food crops based on shifting cultivation practices in the first few years (de Foresta, 1992). The shifting cultivation systems generally allow the shrubs or secondary forests to regenerate, along with the planted rubber trees from local quality of rubber seedling. After about six years, when the rubber has reached the tappable size, farmers could rely on the subsistence livings from the plots, and such land use practices are generally known as a complex multi-strata system. The system has very high potentials to provide a range of harvestable products - timber, fruits, rattan, bamboo, vegetables and medicinal plants, in additions to latex from rubber trees. The forest-like structure provides environmental benefits such as soil fertility replenishment, water catchments protection and biodiversity conservation.

The positive environmental benefits such as biodiversity services could be maintained and developed further as this jungle rubber, hydrologic system of the protection forests has provided a more prosperous habitat for exotic and medicinal plants, extinct species of animals and belowground biodiversity. The complexity of institutional structures of the communities managing or controlling biodiversity-rich ecosystems is mostly related to the issues of stakeholder interests. Because the scale of biodiversity services is mostly regional and global, the development strategy should also focus on the prospective buyers or institutions interested in conserving biodiversity in a specific site and on the potential sellers of small-holder jungle rubber and share-tappers involved in the production and marketing of natural rubber, such as in Indonesia. Some issues need to be addressed include the area under threats or where the conservation activities should be implemented, the stakeholders who can effectively influence conservation uses in the area, and the level of compliance, trust, guarantee, and specific outcome of conservation efforts of the sellers or community living the area.

Rubber agroforestry system has been established either as a relatively short cyclical system or long term or “permanent” system having different social-economics and agro-ecosystem consequences (Joshi *et al*, 2002). The cyclical system involves clearing existing vegetation at a whole plot level, often through slashing and burning, followed by replanting of rubber seedlings. Annual crops are cultivated along with some weeding and cleaning, normally in the first two to three years, until rubber trees start causing significant shade. The plot is then “abandoned” until rubber trees reach tappable size, generally when the trees are six to ten years old. Meanwhile, in the long term near-permanent system, rubber seedlings are planted as enrichment planting (or gap rejuvenation) whenever sufficiently large enough

gaps are formed inside a rubber garden. Management decision is at tree or gap level rather than whole plot level. Locally, the system is known as *sisipan*. It leads to permanently vegetated plots with mixed age trees of rubber and ample natural vegetation canopy in rubber agroforestry system, with forest like vegetation. Inside such agroforestry plot, various stages of rubber, from young seedlings to mature and over-mature trees are normally encountered.

Local smallholders might not be aware of that the maintenance of existing rubber agroforestry system has contributed to the preservation of biodiversity in the humid tropics such as in Jambi. The jungle rubber system is an example of complex agroforestry system based on production of an economically important commodity - latex that provides on average 70% of the household income in the area (Wibawa *et al*., 2001). This existing system has obtained pressures of land-use changes either to more permanent food crop system or rubber monoculture having higher yields, especially during a high level of world price of rubber. Equally important in regards to biodiversity conservation is a pressure coming from mining industries and oil-palm expansion on the very same limited upland, becoming very serious issues in Jambi Province for the few years.

The issues of social benefits of the sustainable practices of rubber agroforestry systems should be addressed more properly as the involvement of poor share-tappers – involving only on the harvest or tapping activities to collect latex – as important agents in the overall rubber production and marketing systems. Share-tapping is common arrangement between villagers with few or no tappable rubber trees, but with surplus labor. Share tapping is also common for rubber owners with surplus rubber trees for tapping but they cannot tap themselves for a number of reasons. In Jambi and in most places in Indonesia, share tapping is implemented without prior writing consent or agreement, but generally very strong commitment based on verbal agreements between the rich and the poor in the area.

Most rubber farmers in Jambi own an area of rubber field between 2 and 4 hectares; while the remaining farmers have larger areas of rubber fields. In general, farmers with more than 5 ha of mature rubber require external help, either as paid laborers or share tappers (Joshi *et al.*, 2002). Farmers with clonal rubber, due to its higher productivity and tree density generally require more share tappers per unit area. An average tapper can tap around 400 trees in a day or about one hectare for a clonal rubber plantation. On the other hand, seedling plantations have a lower rubber tree density; hence large area may be covered. However, this is also influenced by rubber tree distribution and ground vegetation. The sharing of yield from tapping in all share-tapping systems depends on productivity of rubber gardens, which may again be influenced by the planting material –clonal material.

In a share-tapping practice, such as commonly found in Jambi and most rubber producing areas in Indonesia, the tappers provide labors, but control only limited capital, and the land lords or rubber owners experience a lack of labor force to tap the latex by themselves. The common share for the results from latex is usually 75 percent for tappers and 25 percent for owners for old jungle rubber. A share of 50-50 is also found in a high variety of clonal rubber, because of its high yield or latex productivity. The arrangements on who has to burden the production costs between the tappers and the owners are generally not written, instead based mostly on verbal agreement. Sometimes psychological factors and feeling of dependence or patron-client relationship between the two have caused the labor

market of share-tapping is not very flexible. Tappers have a strong tendency that they have to work for certain landlords, not for others, because these landlords sometimes provide assistance in a form of cash advance and other daily needs.

Positive environmental and social benefits could be developed based on the participatory conservation practices of biological diversity through careful formulation of a better reward mechanism for those conserving the rubber agroforestry system or the jungle rubber for years. Because local smallholders and rubber share-tappers are generally not aware of their contribution to the conservation of biodiversity, rewarding properly these lowest quintile income groups could increase the opportunities to improve their livelihood. As these poor people are also engaged with several norms and conventions at local level, involved with societal collective actions, and important determinants of more formal collective actions on biodiversity conservation, developing participatory approach to encourage the long-term permanent jungle agroforestry systems would be an option (Arifin, 2004a). Therefore, efforts to build the capacity of these share-tappers, to provide opportunities to improve their welfare would be an important step towards more systematic reward mechanisms for those have contributed to the conservation of bio-diversity such as in rubber agroforestry system. Local government in Indonesia shall play important roles in the capacity building of poor share-tappers, instead of simply giving permissions to mining industries and oil-palm plantation that would contribute to the pressures of threatening biodiversity services in jungle agroforest.

Indonesia has passed the Law 5/1994 on ratification of the United Nations Conventions on Biological Diversity, acknowledging that "the provision of new and additional financial resources and appropriate access to relevant technologies can be expected to make substantial difference in the worlds' ability to address the loss of biological diversity". The Convention intends to develop national strategies, plans or programs for the conservation of biodiversity or adapt for this purpose existing strategies, plans or programs which shall reflect the measures set out in this Convention, and integrate, as far as possible and as appropriate, the conservation and sustainable use of biodiversity into relevant sectoral or cross-sectoral plans, programs and policies.

In shorts, formulating good rewards to the providers of biodiversity services such as smallholder rubber and poor rubber share-tappers is expected to reduce the harmful effects of biodiversity losses and to contribute to positive environmental and social benefits. Disseminating proper information and knowledge to local government officers and other stakeholders from private sectors, universities and local communities could improve common understanding on the importance of biodiversity values for human life, as well promoting sustainable rubber production managements in the forest margins. For a concern on reward mechanisms, these important stakeholders in the country could serve as intermediaries in the formulation of payment mechanism for the biodiversity services. Finally, potential buyers such as conservation organizations or even multinational corporations need to be convinced that "the market" for biodiversity service would work well, providing future streams of benefits of their own interests.

## 6. CASHEW: From Conservation to Income Sources

### 6.1 Small-Scale Production Activities

Indonesia is a small player of the world cashew economy, contributing only 8 percent of the world export of over 1.6 million ton per year. Production of cashew has grown steadily in the last decade, expecting some increasing roles in the world market in the near future. In 2010, cashew production in Indonesia was over 145 thousand ton per year, a bit increase after a significant decline in 2009 due to a quite long-wet whether condition (Table 18). More than 70 percent of cashew production is exported to the world market, generating about US$ 82 million. The export volume and value has been increasing in the last decade, one of the sign of improving competitiveness in the cashew industry.

As mentioned earlier, cashew was initially developed as conservation trees in the 1980s, when Indonesia experienced a high rate of deforestation leading to increasing area of critical land, especially in Eastern Indonesia. The program of re-greening, reforestation and rehabilitation of critical land also used the seedling of cashew trees and distributed all over the provinces experiencing land degradation. Biologically, cashew tree can tolerate a prolonged dry season and will yield on poor soils. Cashew then provides an income in regions that might be marginal for other cash crops. After some years, the government starts putting more serious attention in cashew development, especially in its roles in contributing to increasing rural income, and poverty alleviation in marginal areas.

**Table 18. Harvested Area, Productivity and Production of Cashew, 2000-2010**

| Year | Harvested Area (ha) | Productivity (ton/ha) | Production (ton) | Growth (%/year) |
|---|---|---|---|---|
| 2000 | 561,310 | 0.12 | 69,927 | - |
| 2001 | 568,912 | 0.16 | 91,586 | 30.97 |
| 2002 | 578,924 | 0.19 | 110,232 | 20.36 |
| 2003 | 573,281 | 0.19 | 106,931 | -2.99 |
| 2004 | 566,309 | 0.23 | 131,020 | 22.53 |
| 2005 | 579,650 | 0.23 | 135,070 | 3.09 |
| 2006 | 569,931 | 0.26 | 149,226 | 10.48 |
| 2007 | 570,409 | 0.26 | 146,148 | -2.06 |
| 2008 | 573,721 | 0.27 | 156,652 | 7.19 |
| 2009 | 572,870 | 0.25 | 145,000 | -7.44 |
| 2010* | 574,358 | 0.25 | 145,082 | 0.06 |

* Preliminary Figures
Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

The cashew productivity has also increased steadily from only one quintal per hectare in the 1980s to over than 1.5 quintal in 1990s and to over 2.5 quintal per hectare in 2010. Three major provinces of cashew producers are East Nusa Tenggara, Southeast Sulawesi, and South Sulawesi, contributing to over 65 percent of cashew production in Indonesia (Table 13). These provinces generally have dry characteristics, sandy and loamy soils, dominated by upland area, and large amount of critical land. These provinces also have high percentage of poverty, reaching 21.2 percent in East Nusa Tenggara, 14.6 percent in Southeast Sulawesi, and 10.3 percent in South Sulawesi. Only South Sulawesi has a lower level poverty than the 12.5 percent poverty level of the country, because this province has been surplus of rice production, and exporting coffee and cocoa to the international market for years.

Production of cashew in the provinces of East Java, Central Java and other provinces also comes from the dry part of the regions, such as in Madura Island in East Java, northern part of coastal area of Central Java, northern part of Bali, etc. Cashew is also growing importance in the province of West Nusa Tenggara, especially in the island of Sumbawa, the dry part of the province. Since the mid 1990s, the government and private sectors has made some efforts to add value the cashew production by providing a simple tool of cashew-shelling in the rural areas. These efforts contribute not only to added value to the commodity but also to provide employment opportunities for the rural woman in the shelling units or processing centers, and/or rural cooperatives that handle the cashew business. The private sectors in the cashew business have the benefit of securing the supply of nut for their own processing business to fulfill the domestic market and some for export market.

**Table 19. Cashew Production in major producing regions in Indonesia, 2007-2010**

| Year | 2007 | 2008 | 2009 | 2010* | Share** (%) |
|---|---|---|---|---|---|
| Central Java | 8,314 | 8,538 | 8,804 | 8,655 | 5.79 |
| East Java | 14,161 | 14,554 | 14,910 | 14,567 | 9.83 |
| Bali | 2,971 | 3,943 | 3,966 | 3,904 | 2.49 |
| East Nusa Tenggara | 37,331 | 39,429 | 40,018 | 39,339 | 26.36 |
| Central Sulawesi | 5,315 | 3,552 | 4,088 | 4,018 | 2.87 |
| South Sulawesi | 24,401 | 24,523 | 24,441 | 24,030 | 16.44 |
| South-East Sulawesi | 34,969 | 38,868 | 30,983 | 30,457 | 22.77 |
| Others | 18,686 | 23,245 | 17,790 | 20,112 | 13.44 |
| **Indonesia** | 146,148 | 156,652 | 145,000 | 145,082 | 100.00 |

* Preliminary Figures
** Average annual share to national production

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

Unfortunately, what have been conducted by the private sectors of cashew business in the production centers of cashew is quite limited. The majority of cashew production is exported to the world market without shelling. This tendency also occurs in other countries of cashew producers, where about 40 percent of the world cashew crop is shelled outside the country of origin. The added value of cashew economy is mostly captured by India and Vietnam, the two countries that import a large amount of cashew from Asian and African countries and perform shelling and other processing activities in their countries. However, if the business sectors have viewed that cashew shelling is a profitable business activity, sooner or later, the cashew industry in Indonesia will develop more properly, hence the competitiveness of the industry will increase significantly. The development of derivative products of shelled cashew also develop very quickly in Indonesia, as the development of food industries using cashew nuts as their inputs has been quite promising in recent years. This development is also associated with the development of supermarket and other modern retailer-chain systems which also penetrate into small town and even in rural areas.

### 6.2 Export Figures and Future Development

The Indonesian cashew export has increased significantly in the last decade, both in the form of shelled cashew and in-shell cashew (or cashew with shell). The total export earning in 2009 was US$ 82.5 million, consisting of US$ 63 million of in-shell cashew and US$ 19.7 million of shelled cashew (Table 20). This amount is really a high jump from US$ 31.5 million export value in 2000, mostly because the world demand for cashew also increases very significantly in the last decade. The share of shelled cashew export also increased from 7.8 percent in 2000 to 12.5 percent in 2009, and will tend to increase in the near future. The export generated from shelled cashew export also increased from US$ 8.7 million to US$ 19.7 million.

**Table 20. Indonesian Cashew Export and its Share in the World Market**

| Year | Cashew Nut Shelled | Share (%) | Cashew Nut With Shell | Share (%) |
|---|---|---|---|---|
| **Export Volume (ton)** | | | | |
| 2000 | 1,998 | 1.09 | 25,621 | 7.79 |
| 2001 | 1,539 | 0.83 | 39,546 | 10.84 |
| 2002 | 1,332 | 0.55 | 50,385 | 12.18 |
| 2003 | 3,341 | 1.31 | 57,087 | 13.83 |
| 2004 | 2,881 | 0.97 | 56,491 | 11.15 |
| 2005 | 3,456 | 1.07 | 65,959 | 13.38 |
| 2006 | 6,850 | 2.02 | 56,556 | 9.87 |
| 2007 | 11,745 | 3.01 | 71,901 | 12.44 |
| 2008 | 10,403 | 2.58 | 56,587 | 7.98 |
| 2009 | 7,628 | 1.83 | 60,628 | 7.13 |
| **Export Value (US$ 000)** | | | | |
| 2000 | 8,721 | 0.99 | 22,781 | 7.74 |
| 2001 | 4,983 | 0.69 | 23,946 | 10.51 |
| 2002 | 3,597 | 0.44 | 31,213 | 12.41 |
| 2003 | 6,566 | 0.74 | 36,968 | 16.38 |
| 2004 | 7,841 | 0.62 | 50,346 | 15.11 |
| 2005 | 13,361 | 0.90 | 55,611 | 15.30 |
| 2006 | 14,683 | 1.02 | 41,901 | 12.98 |
| 2007 | 24,599 | 1.44 | 58,234 | 18.36 |
| 2008 | 26,718 | 1.24 | 51,037 | 8.81 |
| 2009 | 19,671 | 0.97 | 62,979 | 11.10 |

Source: FAOSTAT, 2012. (http://www.fao.org)

A study by Fitzpatrick and Jaeger (2007) suggests that Indonesian in-shell cashew nuts are well accepted internationally in a competitive market of many origins. There are a number of comparative advantages: firstly, the kernel yield (weight of kernels/weight of in-shell nuts) is good; secondly Indonesia has a good geographic position to serve the two main buyers, India and Vietnam, of in-shell nuts; and thirdly, the timing of the crop is ideal with no other competing producers able to supply buyers in the fourth quarter period when Indonesia typically harvests. The following initiatives are necessary to increase the roles of cashew economy to rural income and poverty alleviation in the production regions, namely: production, shelling and collaborative supports.

First, the production initiative should focus initially on existing capacity with efforts directed at maximizing output from the current plantings. This will lead into rehabilitation, the development of new production and then the development of a sustainable capacity through support for growers. The planning of the production initiative will first require a full survey of the existing cashew. The development of a strategy here requires a reliable

understanding of the basis of production, the position of cashew in the household economy and the reason for low yields.

Second, the shelling initiative will engage in the development of a directed cashew industry rather than the current fragmented operations. Currently, there are three export oriented shelling operations in Indonesia and a large number of village level enterprises. The lost opportunity to add value to cashews through shelling before export is substantial, and the economic benefits of employment and extra foreign exchange are attractive. However, experience in other producing countries shows that the financial gain from shelling is not assured, and efforts elsewhere have frequently failed. One of the key features of successful shelling operations in other cashew-producing countries is the presence of a domestic demand for cashew. One option might be for the domestic industry in Indonesia to focus first on increasing domestic demand and develop local shelling that in time can be upgraded to export specifications. Currently, the domestic demand for cashew kernels in Indonesia is quite small, but there is a substantial potential to increase this.

Third, the Indonesian cashew economy should be developed under a collaborative support initiative that looks to co-ordinate all aspects of the national cashew industry to develop the earnings from cashew. An Indonesian Cashew Association could be an appropriate structure for this initiative. This stakeholder could play active roles in identifying cashew production centers in both existing and prospective provinces. The government could provide facilitation for small scale farmers and rural cooperatives who are interested in performing value addition to the cashew products. A tripartite approach could be developed, connecting the interests of the Indonesian Cashew Association, farmers groups of cashew or rural cooperatives dealing with shelling and other processing, and the government (both central and local government) with their own development targets. Academic community could serve as a liaison connecting three parties, both providing research and technical assistance for the three parties with different interests in the cashew economy.

### 6.3 Structural Problems and Competitiveness

Improving the competitiveness of the Indonesian cashew industry seems to take a longer period of time as the domestic structural problems are quite difficult to tackle. It means that the competitiveness could be improved sooner if the structural problems could be solved. *First*, attention should be given to improve the existing cashew production and productivity. Ministry of Agriculture, i.e. Directorate General for Plantation should formulate the appropriate development planning to increase cashew production, especially in the existing production centers in Sulawesi and Nusa Tenggara, rehabilitate cashew areas that have shown declining production, and develop new regions for cashew production, such as in Sumatra and some parts of Java. The Plantation Services (*Dinas Perkebunan*) at provincial and district level formulate more concrete actions to provide supports for farmers, from farmers' field schools, cultivation practices and appropriate crop cares. The viable outcome of these steps is increasing production and productivity, hence improving the household economy of cashew farmers and poverty alleviation in rural areas. Coordination with other government agencies is really required in order to avoid overlapping programs and inefficient

resources and allocation of state budgets. This action should be preceded with more rigorous studies on the nature of existing cashew production, characteristics of growing areas, socio-economic elements of the cashew farmers, and enabling conditions at local level and national level that could lead to successful program to increase production and productivity.

*Second*, improving the efficiency of cashew marketing system and if possible, the overall cashew value chain. The current cashew marketing system, whereby the bulk of production is exported in-shell, is likely to persist for some time. As mentioned earlier, India and Vietnam have advantages of added-value creation from the in-shell import from most cashew producers, including Indonesia. The existing marketing system is in favor of established cashew traders who have a direct links with in-shell cashew exports. This system does not provide reasonable benefits and marketing margins for the cashew farmers because a large portion of profits are not received by the farmers. Therefore, demand for cashew kernels should be stimulated, where special cares should be given to shelling industry in Indonesia. Cashew kernels from Indonesia have been well-known as large size, compared for example to the kernels from China and Northern Australia. These kernels could fit the demand from the food, candy and chocolate industry or directly consumed as snack and souvenirs. Changes could take place only when the shelling industry develops, especially in rural areas. In this case, the marketing issues and added-value production are closely related. The shelling industry is really in need a stable and continuous supply of cashew production in order to maintain the economies of scale and the workability of overall supply chain. Research and development (R&D) action preceded this improvement of marketing system are identifying the efficiency level of marketing system and cashew supply chain, estimating transaction costs and their changes in the marketing, and the distribution of benefits and marketing margins of cashew supply chain.

*Third*, developing the domestic markets, especially the kernels, to fulfill the growing demand from domestic food industries, using cashew as their important inputs. Under the existing policy, a cashew-sheller must export, after storing the kernels until the full container load is ready. Otherwise, this sheller will suffer from economic loss for a decreasing quality of cashew kernels. As mentioned previously, the development of shelling industry is a major opportunity to develop domestic markets of cashew. Indonesia has a resource in the form of village-based shelling involving a large number of employees, especially among rural women. This strategy could contribute to rural development, household economy and poverty alleviation. In addition, the government could play important roles in stimulating domestic demand for cashew and cashew kernels, as the country has low levels of cashew consumption. The development of a domestic market is essential for the development of an indigenous shelling industry and as a step toward export. Studies to examine the needs to develop domestic markets could focus more on the depth of cashew consumers' behavior as well as on the attributes of consumers' decision to consume cashew products domestically. Analyzing the behavior of cashew consumer both representing the household level and industry level is very helpful in formulating the policy direction towards increasing the competitiveness of cashew cluster industry.

*Fourth*, improving institutional arrangements to provide supports for cashew stakeholders. These steps shall involve increasing awareness of farmers, traders and shellers at rural and urban areas and developing farming methods, expansion of cashew production,

farmers' training and other related farmers' field school, know-how technology, innovation and finance. For example, at the farm level, farmers who grow better quality product either through larger nuts or less damaged nuts should be rewarded in the price they receive and other necessary access to relevant resources, including the banking sector. In other words, quality of cashew must be protected and developed. At post-harvest level, from sorting, grading, and processing, the private sectors need better investment climate, starting to provide facilitation for local investors, as the cashew cluster industry development is not immediately attractive to foreign investors. Studies examining existing institutional arrangements are necessary from the context of rural economy development, involvement of local farmers' groups and other civil society organizations, and business environment at sub-district and urban level, specific for cashew cluster development, and for export market. These studies might require filed surveys and in-depth interviews with resource persons in some production centers, from farmers, group leaders, village leaders, and other leaders in the field, small-scale enterprises, entrepreneurs, manufacturers, exporters, and government officials from local, regional to central level. Institutional arrangements in the cashew cluster development could only be improved after conducting these detailed surveys and exercises.

*Fifth*, providing adequate world market information for local stakeholders. At a very local level, this step shall start with providing technical assistance, training and extension services to support best agricultural practices for cashew farmers. At least, farmers should received adequate information about the roles of cashew in the world market and how strategic their products are in the global food industries. Farmers would have awareness on the quality dimensions of their products. Currently, there is no significant price difference for the cashew with high quality and low quality so that there is no incentive to improve cashew quality and appropriate post-harvest handling. Some segments in the cashew value chain do not encourage the quality improvement. Providing adequate information is the first step for the quality improvement of cashew produced by the farmers. At a more advanced level, providing market information for cashew manufacturers and exporters are also necessary to increase economic returns to the local stakeholders. Research associated with this strategy could start from examining the current cashew economic mapping and their dynamic and potential changes in business positioning at global level. Research in international marketing will provide better understanding for local cashew stakeholders regarding their immediate customers, relevant global business environment, and the customers' needs and perception in the current stage and in the future.

## 7. MANGO: Challenges of Transition

### 7.1 Production and Farming System

Mango is among the horticulture crops that could grow in almost all agro-ecological zones in the country, even in the regions having sandy soils and a bit dry are the most suitable for mango farming. Mango production has grown fast in the last decade, from 876 thousand ton in 2000 to 2.24 million ton in 2009 (Table 21). The preliminary figure of mango production in 2010 was 1.3 million ton, over 40 percent decline from the previous year. The most reliable explanation regarding the decline is the long raining season in 2010, creating damages for mango flowers before becoming the mango fruits. Mango farms are mostly small-scale and less intensive compared to other cultivation practices of upland tree crops. In Indonesia, mango production in is dependent on seasons, instead of technology application.

**Table 21. Harvested Area, Productivity and Production of Mango, 2000-2010**

| Year | Harvested Area (ha) | Productivity (ton/ha) | Production (ton) | Growth (%/year) |
|---|---|---|---|---|
| 2000 | 144,185 | 6.07 | 876,027 | - |
| 2001 | 144,208 | 6.04 | 923,294 | 5.40 |
| 2002 | 184,659 | 7.60 | 1,402,910 | 51.95 |
| 2003 | 158,894 | 9.61 | 1,526,470 | 8.81 |
| 2004 | 185,773 | 7.74 | 1,437,670 | -5.82 |
| 2005 | 176,000 | 8.03 | 1,412,880 | -1.72 |
| 2006 | 195,503 | 8.30 | 1,622,000 | 14.80 |
| 2007 | 203,997 | 8.91 | 1,818,620 | 12.12 |
| 2008 | 190,793 | 11.03 | 2,105,090 | 15.75 |
| 2009 | 215,387 | 10.42 | 2,243,440 | 6.57 |
| 2010* | 131,674 | 9.78 | 1,287,287 | -42.62 |

* Preliminary Figures

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

Since the mid 1990s, the government has launched many initiatives and programs to increase the production and productivity of horticultural products, such fruits, flower, medicinal plants, etc. Foreign agencies such as Japanese Bank for International Cooperation (JBIC), United States Agency for International Development (USAID), Australian Agency for International Development (AusAID), etc. are also contributing to the design and implementation of horticultural development programs. The following are some examples: Fruit Crops Production Center, Farm Operation in Special Area, Integrated Farm Operation in Marginal Area, Integrated Rural Agricultural Project, Integrated Horticulture Development in Upland Area, etc. For mango, the production increase occurred after 3-4 years from the

initial planting, so that the production figures increased significantly after 2002. Harvested area of mango increased from 144 thousand hectares in 2000 to 215 thousand hectares in 2009, particularly in the locations of projects above such as in Java and Nusa Tenggara.

In addition, mango production is also triggered by increasing demand, especially in recent years, after the economy has grown above five percent. Mango and other fruits are not considered as basic staple foods, so that the demand for mango is determined mostly by the growth in income level and purchasing power of the consumers. The demand for mango is also determined by the rapid development of hotel and restaurants, and tourisms sector as well as increasing awareness to consume fruits that contain vitamin C and A, especially among middle income class. Mango and other horticultural products also have unique characteristics where fresh fruits are more preferred than the processed foods either extracted dried, or fermented. Efforts to increase production and productivity, at farm level, are more relevant to improve the competitiveness of mango, rather than downstream development at manufacturing level. However, processing and other post harvest activities for horticultural are necessary to anticipate the perishable nature of mango and to serve the consumer preference, to add-value for the products, and to maintain the nutrition contents.

**Table 22. Mango Production in major producing regions in Indonesia, 2007-2010**

| Year | 2007 | 2008 | 2009 | 2010* | Share** (%) |
|---|---|---|---|---|---|
| Aceh | 25,347 | 15,212 | 22,422 | 21,281 | 1.19 |
| North Sumatra | 34,349 | 26,365 | 21,971 | 28,132 | 1.58 |
| Lampung | 17,140 | 42,846 | 15,517 | 12,480 | 1.16 |
| West Java | 447,565 | 474,777 | 398,159 | 137,104 | 18.89 |
| Central Java | 263,507 | 348,808 | 423,752 | 203,912 | 16.45 |
| DI Yogyakarta | 33,006 | 34,619 | 41,775 | 11,841 | 1.56 |
| East Java | 593,824 | 691,904 | 694,314 | 416,803 | 32.21 |
| Banten | 12,020 | 23,965 | 23,991 | 28,894 | 1.28 |
| Bali | 47,828 | 67,644 | 59,868 | 28,924 | 2.69 |
| West Nusa Tenggara | 103,015 | 61,320 | 99,360 | 104,669 | 5.28 |
| East Nusa Tenggara | 60,275 | 109,894 | 155,999 | 68,948 | 5.21 |
| North Sulawesi | 12,989 | 12,630 | 16,007 | 16,905 | 0.84 |
| South Sulawesi | 96,198 | 107,326 | 147,423 | 100,935 | 6.20 |
| Others | 71,557 | 87,780 | 122,882 | 106,459 | 5.46 |
| **Indonesia** | 1,818,620 | 2,105,090 | 2,243,440 | 1,287,287 | 100.00 |

* Preliminary Figures
** Average annual share to national production

Source: Ministry of Agriculture, 2012 (http://aplikasi.deptan.go.id/bdsp/newkom.asp) accessed at January 20, 2012

The main constraints of mango development in Indonesia include the lacks of high quality and certified mango seedling, poor access by mango farmers to financial resources, and availability of know-how technology that make mango production available all year long. Many farmers rely on their own efforts to produce mango seedling, especially to maintain some varieties that are very unique to the region and have market penetration potentials. Because the banking sector has not seen the mango cluster development and mango agribusiness as intensive and profitable industries, there is no specific program to develop such "credit for mango" as a product of banking sector. Capital sources from public agencies and foreign institutions could serve as an alternative for financing mango development in Indonesia. Some campuses have developed the technology to manage the maturity and fruiting seasons has been developed at experiment and laboratory scale, so that mango production could be harvested and available for all year long. Unfortunately, this technology has not yet been applied and spread for the farmers across the country.

Production centers of mango are in the dry areas of Java, mostly in the provinces of East java, Central Java and West Java, and in the provinces of South Sulawesi, West and East Nusa Tenggara (Table 16). The share of mango production in three provinces in Java is more than 60 percent to the national production. It means that if mango production experience a trouble in Java, the national mango production is definitely affected. The Province of East Java has shown integrated approach in the development of mango farming in northern coast of Java, near Gresik and Bojonegoro. Irrigation infrastructures will be developed in area of large-scale mango farming, where water sources will be taken from the Bengawan Solo River, in the boarder of Central and East Java, to irrigate the mango field. In addition, there are some small scale mango farms around the large-scale mango company, which has established business connection with wider mango market in Jakarta and the regional export market. The company is also planning to develop education centers, both for high school level and polytechnic that will support research and development (R&D) on mango and other horticultural products in well-known public universities.

Public-private partnership has been established to bridge the interests between the private company, government agencies, and small-scale mango farmers. The partnership and local government have provided facilitation such as organizing meetings of the partnership members with stakeholders from academic community at provincial level and national level. The national government is implementing newly announced economic development corridors (MP3EI) as a master plan for cluster development in Indonesia. This integrated approach in mango regional cluster development is currently on-going and will be in the stage of production in three-four years. The success of this development model is very much dependent on the viability of theoretical foundation, seriousness of the stakeholders involved in such integrated mango development, and the maturity of each element in the model, from biophysical and socio-economic components, property rights, land tenure, production factors such as fertilizer, pesticide etc, human resources, supporting industries, infrastructures, and policy and/or affirmation actions, if necessary. Once this model of mango integrated development is implemented successfully in East Java, some other provinces will follow to develop similar programs leading to increasing mango production in the country.

## 7.2 Export and Marketing Issues

Indonesia is a very small player in mango export, far behind the roles of Philippines and Thailand in the Southeast Asia region or far behind those of India, Mexico, and Brazil in the world market. The share of Indonesian mango export in the world market is quite small, only about 10 percent (Table 23), with the exception in 2002 and 2004, including the export of mangosteen and guava. During these years, Indonesia was able to export mango as much as 1.6 million ton and 1.9 million respectively, generating foreign earnings as much as US$ 2.7 million and US$ 2 million respectively in 2002 and 2004. In these years, the share of export market is above 20 percent, a very significant jump from the export in 2001 and 2004 respectively. Export destinations of Indonesian mango are mostly among Asian countries such as Singapore, Malaysia, and some to Taiwan, Japan, and South Korea.

**Table 23. Indonesian Mango Export and its Share in the World Market**

| Year | Volume (ton) | Share (%) | Value (US$ 000) | Share (%) |
|---|---|---|---|---|
| 2000 | 430 | 0.07 | 402 | 0.10 |
| 2001 | 425 | 0.07 | 289 | 0.07 |
| 2002 | 1,573 | 0.24 | 2,672 | 0.69 |
| 2003 | 559 | 0.06 | 461 | 0.08 |
| 2004 | 1,880 | 0.21 | 2,013 | 0.35 |
| 2005 | 941 | 0.10 | 996 | 0.16 |
| 2006 | 1,182 | 0.10 | 1,161 | 0.15 |
| 2007 | 1,198 | 0.10 | 1,004 | 0.11 |
| 2008 | 1,908 | 0.16 | 1,646 | 0.17 |
| 2009 | 1,415 | 0.11 | 1,161 | 0.12 |

Note: including mangosteen and guava

Source: FAOSTAT, 2012 (http://www.fao.org)

Stakeholders of mango industry in Indonesia have not conducted systematic marketing research regarding the preferences of mango consumers in the export destination countries. Information regarding such consumer preferences is very limited and not rigorously examined using standard econometric analysis. For example, Singaporean consumers prefer red and yellowish mango, similar to the character of the Philippines or Manila mango. Singaporeans generally do not prefer Manalagi mango from Indonesia which has dark green color of the fruit, although this mango is much sweeter compared to Manila and Pakistan mango. Actually, Indonesia has Gedong Gincu mango, similar to Manila mango in color, a bit dark-red, but very sweet. Should Indonesia also export this type of fruit, Indonesian mango might be able to compete head-to-head with Manila mango.

Another important factor affecting the demand patterns for mango is the way the consumers eat the fruit. Singaporeans prefer eating mango by cutting into two pieces, leaving the seed out, and draw line in a square shape in the flesh, and eat directly the flesh from the skin. This type of eating habit generally prefers a bit dry flesh, instead of watery flesh of mango. Similar to Indonesians, Malaysians prefer eating mango in a cut, normally in a cube shape, served on the plate, either before of after the main course of the meal. These consumers generally prefer watery fruits, although some also prefer drier fruits. Only few consumers prefer consuming mango in a stage of young, less-mature, hard flesh, together with brown sugar sauce, mixed with shrimp sauce or locally known as *terasi* or *petis*. Here, young mango is usually consumed as a snack in the afternoon or between two meals. Similarly, only few consumers prefer consuming mango in a processed or dried fruit, especially associated with souvenir and tourism activities.

The following three steps are useful strategies to improve the competitiveness of mango cluster industry in Indonesia, namely: (1) increasing production and product quality, (2) improving export, and (3) building tripartite partnership. First strategy is increasing the production and productivity of mango and improving the mango quality for longer period of time. This step will contribute to maintain the continuation of mango supply to the market. In upstream sector, farming system development of mango cluster should be directed towards more commercial and market-oriented type of production. Programs aiming at improving diversification of mango varieties and procurement of high quality and high-yielding seedling are the priorities in existing mango production centers in Java, Nusa Tenggara, and South Sulawesi. The strategy for new mango production centers in other provinces should be integrated with crop diversification and agroforestry systems so that the strategy could also contribute to poverty alleviation and regional development, in general.

Second, export volume and value of mango could be improved by effective monitoring of market behavior and consumer preferences. Research and development on mango cluster should focus on such marketing issues and examining external factors and the responses of competitors of Indonesian mango, particularly Thailand and the Philippines. New marketing tools are not only concerned with market price and consumers' purchasing power of the country destinations, but also with consumers' satisfaction on specific elements of the Indonesian mango. Under the current situation of more open global economy, these variables or attributes of mango export are more dynamics, compared to those in the last decade. Therefore, export and marketing strategies of the Indonesian mango have to adjust accordingly to internal and external environments.

Third, building tripartite partnership or usually known as public-private partnership in mango cluster development requires more openness and good governance principles among parties involved. Increased understanding the unique roles of each partnership member, the different perspective and orientation, etc should be the first step to tackle in order to establish the effective tripartite partnership. Capacity building programs to increase the knowledge of small-scale mango farmers on market-oriented farming practices, simple business and economic principles, etc are really required. This step should also include rural cooperatives or similar institutions that have experiences in empowering local stakeholders and understand the specific needs in mango cluster, from production, distribution, trade, to export practices.

## 8. CONCLUDING REMARKS: Improving Sustainability and Competitiveness

This scoping study has identified and assessed the issues of sustainability and competitiveness in some key agricultural commodities, namely: coffee, cocoa, tea, rubber, cashew and mango. Assessments cover several dimensions, from production and farming practices, trading and supply chains, marketing and marketing, added value and industrialization strategies, growing domestic demand, business environment, consumer awareness, to environmental issues such as resource degradation and climate change. These key agricultural products are unique, where the production characteristics, supply chains and competitiveness issues are very specific, different from one crop to another, although there are some similarities in terms of general challenge on increasing production and productivity and facing sustainability criteria, global partnerships, certification standards, and other principles of global corporate governance.

Structural problems in the upstream sectors remain central for all crops, the share of smallholders are very dominant with their respected issues of low yield, poor access to good agricultural practices, cropping techniques and modern technology. In the midstream sectors, the processing practices of these crops are very simple and traditional. The supply chains and marketing systems are generally not efficient where the economic benefits are not received by farmers and small-scale actors who have contributed the most in the overall value chains. In the downstream sectors, these crops are really in the middle of transition whether to continue boosting the export markets with growing sophistication in terms of consumer preferences or to develop domestic markets, performing processing, manufacturing and other added value activities for domestic industrialization. These crops have similar challenges to comply with sustainability principles, either driven by national policies to apply recent spatial planning and conserve the environment or promoted by the international communities and growing significance of non-state regulation and corporate environmental governance.

This study has applied the basic principles of competitiveness by estimating the revealed comparative advantage (RCA) to show the initial position of all five key agricultural commodities. RCA is a comparison between ratio of commodity export of a specific commodity in Indonesia to the total export of Indonesia **and** the ratio of commodity export of a specific in the world to the total export of the world. The order of competitiveness among five commodities in 2009 is summarized as follows. The RCA value of natural rubber is 36.6, far higher than the RCA of cocoa of 14.0, cashew of 11.6, coffee of 6.1, tea of 5.4 and let alone mango. RCA value of mango is 0.12, indicating that competitiveness level of mango is also very small. Indonesia is not a big player of mango market in the world, even at Asia's level. In addition, competitive assessments on the specific crops have followed, but not strictly limited, and expand the arguments using the Porter Diamond Hypothesis to examine more in-depth the existing condition of farm production factors, structure of the cluster industry and marketing system, domestic and export markets, and supporting industries for added value creation.

The following Table 24 summarizes the main findings of this scoping study on the sustainability and competitiveness of major agricultural export commodity in Indonesia.

**Table 24. Summary of Sustainability and Competitiveness of Major Agricultural Export Commodities in Indonesia**

| Elements of Sustainability and Competitiveness | Coffee | Cocoa | Tea | Rubber | Cashew | Mango |
|---|---|---|---|---|---|---|
| Position in the world market | **The Fourth** after Brazil, Columbia and Vietnam | **The Third** after Cote d'Ivoire and Tanzania | **The Seventh**, contribute only 4 percent to the world market | **The Second,** after Thailand | **Very Small**, contribute only 8 percent to the world market | **Very Small,** in Asia far behind Philippines and Thailand |
| Level of competitiveness (RCA 2009 of agro-export) | **Medium**, RCA= 6.05 | **High,** RCA= 14.00 | **Medium**, RCA= 5.43 | **Very High**, RCA= 36.61 | **High**, RCA= 11.59 | **Very Small**, RCA= 0.13 |
| Major producing provinces | South Sumatra, Lampung, North Sumatra, East Java, Aceh, South Sulawesi | Cent. Sulawesi, South Sulawesi S.E. Sulawesi, West Sulawesi North Sumatra West Sumatra | West Java, North Sumatra, Central Java, West Sumatra, East Java, Jambi | South Sumatra, North Sumatra, Riau, Jambi, WestKalimantan CentKalimantan | E.NusaTenggara S.E. Sulawesi, South Sulawesi, East Java, Central Java, Cent. Sulawesi | East Java, West Java, Central Java, South Sulawesi W.NusaTenggara E.NusaTenggara |
| Environmental governance of the world supply chain. | **Most advanced** Especially after 2004 Tsunami | **Pilot projects** Growing since the 2008 crisis | **Pilot projects** Attached with CSR strategies | **Not specific**, Agroforestry system adopted | **Not specific**, but initially for conservation | **No major issues** as tree crops are environ-friendly |
| Sustainability certification currently implemented | Starbucks CAFE Utz Certified R.F. Alliance Fair Trade Organic 4C (on-going) | R.F. Alliance Utz Certified Organic | Utz Certified ETP Ethical-Tea Partnership | None | None | None |
| Current government policy to promote sustainability and competitiveness | Agroforestry, CBMF (HKm), Social forestry SE seedling, Processing Unit | Agroforestry, CBMF (HKm), GERNAS, SE seedling Processing Unit | Agroforestry, GPATN, | Agroforestry, GNRHL, Social-forestry Envir-services Credit subsidy | SME Processing Unit, Gender program | KEK (Special Economic Area), KII (Industry Innovation Area) |

**Source: Synthesized by the author**

The existing government policies and external environment to improve the competitiveness and sustainability are also presented in order to suggest policy changes to achieve a higher level of competitiveness and sustainability. Some are outlined as follows:

### 8.1 Coffee—Improving the mechanisms of certification scheme

Improving the competitiveness of coffee should start at the very basic level of better farming practices to increase coffee production and productivity. Structural problems facing the smallholder coffee farmers need to be solved by providing technical assistance, extension services and empowerment actions at the field level. The coffee quality could be increased by encouraging smallholder farmers to apply selected picking for red cherry and strip picking for more ripen fruits. These efforts require more labor and higher costs of crop farmers, so that these farmers have to be connected with the sources of financial capital and other cash money. The coffee quality could be increased by providing access for the coffee farmers to road pavement and concrete floors to ensure a better drying process for coffee bean.

The corporate environmental governance and global certification partnerships have changed the growing tendency of exporters and domestic roasters to encourage coffee producers to organize as a group, as the monitoring system and traceability principle could be ensured. By the time of this writing, the Government of Indonesia has not yet taken any position of the growing concerns on global initiatives, facilitating the adoption of such initiatives by individual coffee roasters and exporters across Indonesia might contribute to the improved competitiveness of coffee economy. Further, the public-private partnership consisting of the government, private sectors, research institute and non-governmental organizations should collaborate to develop the national code of conduct and to establish benchmarks for such adaptation of the initiatives into domestic context of the Indonesian coffee. This new domestic standard of environmental sustainability to develop domestic markets could encourage effective demand of the society.

The roles of intermediaries in ensuring the sustainability principles are very important in providing links between sellers (smallholder farmers) and buyers (roasting companies, research institute, civil society organizations or international agencies) of the services. These intermediaries could play important roles in increasing public awareness; serving as a clearinghouse for information; training; capacity building; negotiating; monitoring and evaluation; resolving conflicts; absorbing transaction costs etc.. Intermediaries have also helped generate collective action in linking smallholder farmers with broader market, providing support for weaker members of communities to better address poverty alleviation or ensure that the poor are not made worse off.

Special attention should be given to the potential miss-links between the development of environmental service markets and global buyer-driven initiatives on environmental governance in the coffee industry. The approach of environmental service markets is designed as an alternative perspective on sustainable resource management, while global buyer-driven initiatives which are mostly concerned with brand image, security and continuation of coffee supply to the global market. Even, when coffee buyers at global level roaster companies comply with the ethical base of corporate social responsibility (CSR) to empower direct and indirect

stakeholders who are poor, this mechanism could not be considered as payment of environmental services. Therefore, economic valuation is a necessary first step to develop environmental service markets.

### 8.2 Cocoa—Expanding SE seedling and sustainability-based certification

The national movement (Gernas) to revitalize cocoa production and increase the yield is the most logical step to maintain the country status as an important cocoa producer in the world. Gernas has adopted the SE (*somatic embryogenesis*) technology of cocoa seedling to meet the immediate needs for rejuvenation of planting material and management of pests and disease, especially in Sulawesi where the farmers are struggling to practice regular pruning and grafting techniques. Since the outcome of cocoa Gernas on increased yield is quite small after nearly three years of implementation, two strategies have to be employed. First, the central government should formulate concrete actions to effectively strengthen the extension services and farmers' empowerment and capacity building programs. These programs shall connect with other initiative intensification practices addressed by provincial government and local government in the cocoa producing regions. Second, the SE technology seedling should be expanded to other cocoa producing regions across the country and to newly regions interested in cocoa development. Theoretically, this SE technology shall improve the cocoa yield significantly in the future, and contribute to the revival of cocoa industry in the country.

There has been a popular belief that farmers are not willing to improve the cocoa quality because of no incentives to perform cocoa fermentation and no price difference between fermented cocoa and non-fermented cocoa bean. Currently, this argumen might not be convincing anymore as the development of cocoa supply chain is more sophisticated. The competition among middlemen and collector traders in securing the supply of cocoa bean from farmers in rural area is getting tougher. Cocoa competitiveness could be improved by providing more relevant market information for cocoa farmers, potential economic benefits of improving the quality, alternative market destinations as well as added-value potentials of industrial deepening and downstream development. Similarly, the introduction of value-added tax and export tax of processed cocoa products might have a counter-intuitive impact to the industry if the marketing system is not efficient. Therefore, Indonesia is really in needs of greater investment in cocoa processing plants, particularly in the production centers, so that the deepening industrial strategy and added-value activities will also contributed to rural development of the country. The cocoa competitiveness will improve significantly in the near future if the cocoa cluster activities are formulated based on added value creation. In this case, the future cocoa export flows are based on the processed cocoa bean and some products of manufacturing cocoa industry.

Different from coffee, the global certification partnerships are not going to be fully implemented in the cocoa clusters in the near future, as the level of development and sophistication between coffee and cocoa is also different. However, because many third party certification systems in coffee such as Rainforest Alliance, Fairtrade, and Bird-Friendly are also involved in cocoa certification, sooner or later cocoa cluster industry will adopt such new

initiatives of corporate environmental governance. This traceability requirement has probably become an incentive system for growers and suppliers to develop a fairer and healthier relationship in cocoa trading system. However, the opportunity for better market access, enhanced returns from production, and improved social conditions in the cocoa producing industries would never come without serious efforts to materialize. Certification of origin might become a necessary requirement of market access in the future and possibly evolve into non-trade barrier, which is counter-productive to the general welfare objectives.

Similar to coffee cluster, cocoa farming also strongly is encouraged to apply agroforestry system, where farmers are also adopting cocoa multi-strata practices and implement the government program of community-based forestry management (HKm) inside the protection forests. This mechanism could be seen a significant potential to develop micro-institutions at farm level which are compatible to sustainability standard and initiatives at global level. Such sustainability-based certification might also be compatible with the approach of environmental service markets, where poor cocoa and coffee farmers who have practicing multi-strata agroforestry as provider and whoever the potential buyers of watershed services in the cocoa producing regions. Both environmental service markets and sustainability regulations in the coffee economy require continuous monitoring the compliance mechanisms that could contribute to environmental governance in general. Policy recommendation that facilitates a bridging process is really crucial to link bottom-up initiatives of institutional changes at farm-level and distribution organizations with top-down sustainability standard set private sectors at global level. In this case, intermediaries such as academic institutions, government agencies, and NGOs could play effective roles in achieving more effective sustainable-base certification system.

### 8.3 Tea – Reviving the production and marketing system

The structural problems in the tea industry could be resolved by promoting consistent policy to revive the production and marketing system. Theoretically, the policy reforms should be easier and easily implemented as the majority (56 percent) of tea plantation is controlled by large scale plantation. The characteristics of tea plantation and the management style and corporate culture between the state-owned enterprise and private sector could be different. Therefore, the incentive systems in the proposed policies to revive the production and marketing system in these large-scale plantations should be adjusted to the needs of the state-owned enterprises and the private sectors. Similarly, the policy reforms to revive the production and marketing system for the small-scale tea farming should be tailor-made, depending on the degree of openness in respected provincial and local governments where the tea-farming is located. The declines in harvested area tea farming should be halted and new investment and replanting program in tea plantation should be promoted, otherwise the revival of production system could not be achieved.

The following policy recommendations might contribute to the revival of production and marketing system of the tea economy in Indonesia.

First, tea as a national commodity. In addition to the historical background, the roles of tea in the national economy include its contribution to the nation's gross domestic product (GDP) of Rp 1.2 trillion, foreign reserve earnings of US$ 110 billion, and absorbing employment as much as 1.3 million at the farming sector. Tea could contribute to the environmental conservation, soil and water preservation and increasing sources of regional economic development. At the processing or agro-industry sector, tea could produce the value of total production of Rp 2.1 trillion, generate over 50 thousands of employment, contribute to the index of forward and backward linkages of 1.5 and 3 respectively, and income multipliers and employment multipliers of a region.

Second, subsidized credit for tea development. Nearly all major agricultural export commodities have obtained subsidized credit schemes for their development. The Government through the state-owned banks has disbursed the program credit for revitalizing agricultural export plantations, especially the biofuel feedstock (KPEN-RP) such as oil palm, sugar, and rubber. Unfortunately, the program does not include tea, especially for replanting and expansion. The subsidized credit for tea development could be extended to the processing sector or tea-agro-industry, especially for product quality improvement.

Third, revitalizing tea marketing system. Strengthening the Jakarta Tea Auction (JTA) should be one of the priorities in the revitalization of tea marketing system in Indonesia. The main reason is because the price at JTA is the barometer of tea price for direct selling at the exporter level, at distributor, processor, trader and collector level tea, and farm-gate level of large-scale plantation and smallholder farmers. The Government of Indonesia and the Indonesian Tea Council (ITC) should improve the status of JTA, or at least the price level is comparable to, instead of far below than, the Colombo Tea Auction (CTA). The tea price in JTA is 55 – 60 percent lower than that in CTA, although the difference in cost, insurance and freights to London market is less than US $ 9 cent per kilogram.

Fourth, promoting domestic tea consumption. The annual tea consumption in Indonesia as a tea producer of 360 gram/capita is very low compared to that in India of 630 gram/capita and Sri Lanka 1,300 gram/capita. The government and private sectors should improve the strategies of tea promotion and conduct more regularly in the forms of tea festival across the country, aggressively increase the advertisement budget, and branding development for some locally produced tea, etc. The tea festival that is generally held in Bandung of West Java should be upgraded to the high level comparable to the World Ocha (Green Tea) Festival in Japan, for example. A study by Suprihatini (2010) suggests that for every ton increase of domestic tea consumption will trigger the domestic price of tea in the following year by Rp 20 per ton.

Fifth, improving research and development. Currently, Indonesia rely the research and development (R&D) of tea commodities on the Research Institute for Tea and Cinchona (RITC) in Gambung of West Java. The RITC has to face their own problems, especially after the new format of organization as a research company under the management of the Minister of State-Owned Enterprise. Only few universities are interested in conducting research and development on tea, which explains part of the structural problems of declining harvest area and tea production in Indonesia. The government should improve the R&D on tea, especially to produce knowledge on tea agribusiness at the upstream (farm, land holding, plantations etc), middle (trade, distribution, certification, governance, etc), and downstream (processing, marketing,

business strategy, governance, etc) of the tea economy. The backbone of R&D development should rely on new innovation, continuous dialogues among the researchers in highly respected international journals and policy dialogues among tea stakeholders (researchers, farmers, government officers, private sectors, community and society at large) having interests on the tea economy.

Sixth, harmonizing the tea border policy. Currently, the tea border policy in Indonesia is not clear, where the import tariff of 5 percent is far below that of other tea producing countries such as Sri Lanka, Kenya, China, Japan, Turkey etc. The government should harmonize the import tariff of tea, at least comparable to other tea producing countries. The structural problems in declining harvested area and tea production could be removed by harmonizing the import tariff and downstream development of the tea industry in general. In addition, the government might require the imported tea to comply with the quality of SNI (Indonesian National Standard), halal certificates, and other requirements set by the Indonesian Tea Council (ITC).

Seventh, improving consistency of policy supports. The policy support to the tea industry should be consistent with other strategies, such as tax holiday or an exemption of income tax for 5 years, import duties tariff reduction for supporting inputs, investment tax allowance, property tax, reinvestment allowance, simplifying procedures, and infrastructure development around the tea producing regions. If possible, the government should have the national plan for tea development in short-term, medium-term, and long-term strategies.

### 8.4 Rubber—Combining clonal-based development and forest protection

Rubber has the highest competitiveness among all five agricultural commodities although the majority (84 percent) of rubber producers is small-scale farms. The level of competitiveness could be increased more significantly if these small growers are able to produce good quality rubber. The Government of Indonesia has been struggling to expand the adoption of high productivity of clonal varieties under more intensive rubber production systems for the last two decades. New regulation of the Indonesian National Standard (SNI) –where crumb rubber factories (CRF) -- strongly suggests the rubber factory to buy only rubber materials meeting the high standard. In addition, the current administration has introduced revitalizing action for rubber rejuvenation program by providing subsidized credits to tackle the problems of limited capital and land available for intensification. At the field level, farmers using high quality seedling and intensive system are really in favor of the new regulation, but traditional farmers relying on jungle rubber of agroforestry systems have experienced a decrease in farm revenues because they traditionally have produced dirty slabs. In the near future, policy intervention to provide assistance for these small farmers should be sharpened in order to broaden the limited opportunities and capital constraints to improve the income level and the sustainability of natural rubber production system.

The development of downstream rubber-based agro-industry could follow the path of establishing the mutual linkages between upstream production system and downstream industry, the location preferences of improving added value of the industry, and investment promotion in

such prospective sectors and to contribute to the industrial development in general. The rubber-based industrial development is obviously related to many segments of economic policy, including the technological advancement, information system and financial institutions and legal issues and enforcement structures in general. Therefore, the development of domestic rubber industry needs more strategic approach and policy to better support a high quality of economic recovery in the country.

Rubber supply chain in Indonesia is very much determined at least by two important factors: (1) the industrial capacity of crumb rubber factories and (2) the efficiency level of marketing systems. When the production of rubber materials cannot fulfill the factory demands, the whole marketing system tend to have problems in its efficiency level. Academic communities and government agencies are now being challenged to formulate new schemes in financial policies and investment policies to encourage new investments in both upstream and downstream rubber-based industries. Otherwise, the high potentials for Indonesia to play major roles in the world market of natural rubbers that could at the same time bring prosperity to small-scale growers and protecting the environment would vanish in the short years to come.

One should note that high commodity prices are still not enough to encourage smallholders to invest in farms, especially in the estate crops where economic return periods are long. Investments in agriculture are required for management practices, land and technology development in order to produce better yields and replenish old plantations. Smallholders are sometime more concerned with farm-gate prices and immediate economic returns, instead of long focus to increase investment for better production in the future. Another important point suggested by this report is that the changes in world price, hence the profits being accumulated by traders and rubber factories, are not transmitted properly to rubber farmers and/or share-tappers. Information asymmetry, the access over price information, and immediate response of rubber growers to the change in world price could explain this non-cointegration in price data between growers and export. In the near future, the policy reforms in the rubber cluster development should carefully address these issues in a more comprehensive manner.

Finally, in order to contribute to the positive environmental and social benefits, the major challenge for natural rubber production system in the future is how to integrate a high productivity promotion of new clonal rubber varieties and a decision for land use practices that satisfy sustainable resource management and ensure acceptable quality of environments in the forest margin. By the time of this writing, the old rubber trees under extensive system and jungle rubber agroforestry have not been able to solve the problems of low productivity or latex, poor quality of slabs, hence low income returns for rubber growers. However, a tendency in monoculture rubber of intensive system using clonal rubber variety could pose a threat to new dimensions of biodiversity issues, especially in the forest margins. Therefore, providing incentive systems and reasonable rewards for smallholder rubber growers who have contributed to the conservation of biological diversity services could be treated as a necessary step to develop a more sustainable practice of rubber production systems. The practice is expected to both improve the latex productivity and high quality rubber products and ensure adequate income level for the small-holder rubber growers and sharetappers, such as commonly found in Indonesia.

## 8.5 Cashew—Farm production and Added-Value Creation

As a small player in the world cashew market, Indonesia needs to invest in serious efforts to increase farm production and added-value creation of this prospective cashew cluster development. In the last two decades of commercial development, the cashew economy has contributed significantly to increasing rural income and poverty alleviation especially in critical land of rural areas in Eastern Indonesia. Indonesian cashew nuts are well accepted internationally in a competitive market of many origins because the kernel yield is quite large and the timing of cashew harvest in Indonesia differ from those in other cashew producing countries.

Some actions to promote cashew farm production and added-value creation could be summarized as follows:

First step is to apply good agricultural practices in the existing production centers in Sulawesi and Nusa Tenggara, rehabilitate cashew areas that have shown declining production, and develop new regions for cashew production, such as in Sumatra and some parts of Java. Supporting action in this step is identifying data and information on bio-physical and socio-economic dimension of cashew farming practices is the most logical initial step towards increased cashew production and productivity.

Second is to stimulate the development of cashew shelling industry to shift the benefits and added-value creation currently captured by India and Vietnam. Supporting action in this step is examining the efficiency level of marketing system and cashew supply chain, estimating transaction costs and their changes in the marketing, and the distribution of benefits and marketing margins of cashew supply chain.

Third is to stimulate the domestic market by improving the direct demand for cashew kernels, and their derivative products used in the food industry. Supporting action in this step is examining cashew consumer's behavior and choice attribute by the household consumers and industry consumers.

Fourth is to provide price incentives for farmers, who have produced a better quality cashew, and improving institutional arrangements for integrated upstream-downstream integration in the cashew industry. Supporting action in this step is examining and mapping the existing marketing systems, performing necessary efficiency analysis for each marketing system and overall supply chain.

Fifth is to provide adequate information regarding the cashew cluster for the production quantity and quality improvement and for processing and trading activities. Supporting action in this step is examining the existing and potential changes in business environment and customers' need and perception.

## 8.6 Mango—Integrated horticulture development in upland areas

Similar to cashew, Indonesia is a very small player in the global mango economy, as the share of mango export is far behind the Philippines, Thailand, India, Mexico, and Brazil. The demand for mango is mostly determined by the economic growth, especially the growth of hotel and restaurants, income level and purchasing power of the consumers. Because mango is consume more in fresh than in processed products, some actions to increase production and productivity are much more relevant to increase macro competitiveness in Indonesia. Processing and other post harvest activities are necessary to anticipate the damage and economic loss due to perishable nature of the fruit.

Actions towards more integrated horticulture development in upland areas could start with increasing the production and productivity of mango, both by increasing the existing harvested area and expanding new mango farms. Facilitation, empowerment, and extension services are very crucial to increase farmers' awareness towards more commercial and market-oriented type of production. Such actions should be integrated with crop diversification and agroforestry systems in mango production centers, so that the strategy could also contribute to poverty alleviation and regional development.

In additions, innovation and technology development that increase the length of mango harvest across the country would increase the product availability and ensure the continuous mango supply over the years. The application of such innovation should be integrated with regional development, spatial planning, and resource conservation so that the benefits of such actions could be captured by large number of mango farmers and other small and medium scale enterprises.

Finally, action plans such as the integrated horticulture development in upland areas require close collaboration between government officials, private sectors, academic community and civil society organization. Understanding each role and position in mango cluster development is the first prerequisite to implement the action in a more coherent way. These actors generally have their own interests, value system, and code conducts. Common denominator and understanding to increase the competitiveness and sustainability of mango cluster development should be formulated. Therefore, the action should include any capacity building programs to increase the knowledge of small-scale mango farmers on market-oriented farming practices, simple business and economic principles to support the understanding and to contribute to overall agenda of improving competitiveness and sustainability for the future.

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# APPENDICES

**Table A1. Revealed Comparative Advantage of Agricultural Export Commodities (based on FAO data)**

**RCA using Total Merchandise**

(Export Commodity i Indonesia/Total Export Indonesia)/(Export Commodity i World/Total Export World)

| Year | Coffee (Green) | Cocoa (bean) | Tea | Rubber Nat Dry | Cashew (with shell) | Mango* |
|---|---|---|---|---|---|---|
| 2000 | 3.80 | 10.84 | 7.43 | 26.81 | 7.98 | 0.11 |
| 2001 | 3.66 | 11.98 | 7.48 | 30.05 | 11.43 | 0.08 |
| 2002 | 4.85 | 14.83 | 7.14 | 31.03 | 13.99 | 0.77 |
| 2003 | 5.29 | 11.30 | 6.93 | 31.92 | 19.69 | 0.10 |
| 2004 | 5.17 | 10.95 | 7.88 | 37.83 | 19.73 | 0.46 |
| 2005 | 6.20 | 12.84 | 7.21 | 39.00 | 18.53 | 0.19 |
| 2006 | 6.05 | 15.55 | 6.94 | 42.03 | 15.39 | 0.18 |
| 2007 | 5.53 | 14.86 | 5.79 | 37.94 | 21.75 | 0.13 |
| 2008 | 7.29 | 16.70 | 6.21 | 46.93 | 10.79 | 0.20 |
| 2009 | 6.05 | 14.00 | 5.43 | 36.61 | 11.59 | 0.12 |

* = Mangoes, mangosteens, and guava

The following table includes derivative products (green coffee, roasted coffee, etc) in the RCA calculation

| Year | Coffee (Green) | Cocoa (bean) | Tea | Rubber Nat Dry | Cashew (with shell) | Mango* |
|---|---|---|---|---|---|---|
| 2000 | 2.97 | 8.10 | 7.43 | 26.81 | 2.76 | 0.11 |
| 2001 | 2.56 | 9.12 | 7.48 | 30.05 | 3.32 | 0.08 |
| 2002 | 3.20 | 11.26 | 7.14 | 31.03 | 3.68 | 0.77 |
| 2003 | 3.39 | 9.00 | 6.93 | 31.92 | 4.68 | 0.10 |
| 2004 | 3.43 | 8.24 | 7.88 | 37.83 | 4.74 | 0.46 |
| 2005 | 4.11 | 9.10 | 7.21 | 39.00 | 4.51 | 0.19 |
| 2006 | 4.04 | 11.15 | 6.94 | 42.03 | 3.82 | 0.18 |
| 2007 | 3.70 | 10.68 | 5.79 | 37.94 | 4.84 | 0.13 |
| 2008 | 4.95 | 11.98 | 6.21 | 46.93 | 3.48 | 0.20 |
| 2009 | 3.94 | 9.91 | 5.43 | 36.61 | 3.33 | 0.12 |

* = Mangoes, mangosteens, and guava

Source: FAOSTAT (www.fao.org)

**Table A2. Export Figures of (Green) Coffee Producing Countries, 2007-2009**

| Year | 2007 | 2008 | 2009 | Growth (%/year) |
|---|---|---|---|---|
| **Export Volume (ton)** | | | | |
| Columbia | 637,421 | 602,879 | 457,728 | -14.75 |
| Brazil | 1,488,260 | 1,566,920 | 1,639,390 | 4.96 |
| Vietnam | 1,232,100 | 1,060,880[R] | 991,733 | -10.21 |
| Indonesia | 320,600 | 468,019 | 510,189 | 27.50 |
| Kenya | 55,151 | 41,649* | 59,991 | 9.78 |
| Ethiopia | 158,467[F] | 179,283 | 129,833 | -7.22 |
| Others | 2,265,716 | 2,434,745 | 2,346,945 | 1.93 |
| **World** | 6,157,715 | 6,354,375 | 6,135,809 | -0.12 |
| **Export Value (1000 US$)** | | | | |
| Columbia | 1,729,160 | 1,905,310 | 1,552,440 | -4.17 |
| Brazil | 3,378,300 | 4,131,670 | 3,761,610 | 6.67 |
| Vietnam | 1,911,460 | 2,113,760 | 1,508,870[R] | -9.02 |
| Indonesia | 634,155 | 989,401 | 822,313 | 19.57 |
| Kenya | 155,019 | 148,057 | 198,103 | 14.66 |
| Ethiopia | 417,323 | 561,511 | 365,689 | -0.16 |
| Others | 5,371,936 | 6,774,662 | 5,970,179 | 7.12 |
| **World** | 13,597,353 | 16,624,371 | 14,179,204 | 3.78 |

Note:
* = Unofficial figures
F = FAO estimates
R = Estimated using trading partners database

Source: FAOSTAT, 2012 (http://www.fao.org)

**Table A3. Export Figures of Cocoa (Beans) Producing Countries, 2007-2009**

| Year | 2007 | 2008 | 2009 | Growth (%/year) |
|---|---|---|---|---|
| **Export Volume (ton)** | | | | |
| Cote d'Ivoire | 803,886 | 782,868 | 917,700 | 7.30 |
| Ghana | 506,358 | 474,706 | 498,308* | -0.64 |
| Indonesia | 379,829 | 380,513 | 439,305 | 7.82 |
| Nigeria | 174,900* | 227,303[R] | 247,000* | 19.31 |
| Cameroon | 131,075 | 178,101 | 193,973 | 22.39 |
| Netherlands | 173,119 | 155,657 | 167,521 | -1.23 |
| Others | 593,126 | 579,569 | 656,354 | 5.48 |
| **World** | 2,762,293 | 2,778,717 | 3,120,161 | 6.44 |
| **Export Value (1000US$)** | | | | |
| Cote d'Ivoire | 1,436,920 | 1,767,960 | 2,595,900* | 34.93 |
| Ghana | 895,703 | 979,098 | 1,151,370[F] | 13.45 |
| Indonesia | 622,600 | 854,585 | 1,087,490 | 32.26 |
| Nigeria | 285,100[F] | 491,923[R] | 599,000[F] | 47.16 |
| Cameroon | 214,749 | 401,914 | 540,281 | 60.79 |
| Netherlands | 314,296 | 395,536 | 466,813 | 21.93 |
| Others | 1,195,321 | 1,374,516 | 1,664,957 | 18.06 |
| **World** | 4,964,689 | 6,265,532 | 8,105,811 | 27.79 |

Note:
* = Unofficial figures
F = FAO estimates
R = Estimated using trading partners database

Source: FAOSTAT, 2012 (http://www.fao.org)

**Table A4. Export Figures of Tea Producing Countries, 2007-2009**

| Year | 2007 | 2008 | 2009 | Growth (%/year) |
|---|---|---|---|---|
| **Export Volume (ton)** | | | | |
| Kenya | 374,329 | 396,641 | 331,594 | -5.22 |
| China | 292,199 | 299,789 | 305,352 | 2.23 |
| Sri Lanka | 190,203 | 318,329 | 288,528 | 29.00 |
| India | 193,459 | 203,207 | 203,863 | 2.68 |
| Indonesia | 83,659 | 96,210 | 92,304 | 5.47 |
| Others | 577,539 | 581,803 | 553,174 | -2.09 |
| **World** | 1,711,388 | 1,895,979 | 1,774,815 | 2.20 |
| **Export Value (1000US$)** | | | | |
| Kenya | 698,790 | 934,921 | 894,027 | 14.71 |
| China | 620,432 | 700,623 | 723,933 | 8.13 |
| Sri Lanka | 544,868 | 1,258,700 | 1,175,100 | 62.18 |
| India | 469,274 | 590,226 | 583,803 | 12.34 |
| Indonesia | 126,615 | 158,959 | 171,628 | 16.76 |
| Others | 1,709,152 | 2,036,176 | 1,980,870 | 8.21 |
| **World** | 4,042,516 | 5,520,646 | 5,357,733 | 16.81 |

Source: FAOSTAT, 2012 (http://www.fao.org)

**Table A5. Export Figures of Rubber (Natural Dry) Producing Countries, 2007-2009**

| Year | 2007 | 2008 | 2009 | Growth (%/year) |
|---|---|---|---|---|
| **Export Volume (ton)** | | | | |
| Indonesia | 2,399,150 | 2,286,910 | 1,982,120 | -9.00 |
| Thailand | 2,077,770 | 1,995,520 | 1,731,790 | -8.59 |
| Malaysia | 960,241 | 870,997 | 664,306 | -16.51 |
| Vietnam | 247,331 R | 194,557 R | 213,544 R | -5.79 |
| Cote d'Ivoire | 182,397 | 199,721 | 218,555 | 9.46 |
| Germany | 40,572 | 28,113 | 56,089 | 34.40 |
| Others | 519,281 | 483,228 | 483,973 | -3.39 |
| **World** | 6,426,742 | 6,059,046 | 5,350,377 | -8.71 |
| **Export Value (1000US$)** | | | | |
| Indonesia | 3,858,270 | 6,041,180 | 3,231,160 | 5.03 |
| Thailand | 4,372,730 | 5,334,490 | 3,112,600 | -9.83 |
| Malaysia | 2,002,410 | 2,306,080 | 1,182,810 | -16.77 |
| Vietnam | 444,300 R | 448,785 R | 364,426 R | -8.89 |
| Cote d'Ivoire | 354,542 | 494,920 | 340,667 | 4.21 |
| Germany | 95,209 | 77,257 | 106,993 | 9.82 |
| Others | 923,292 | 1,056,593 | 868,455 | -1.68 |
| **World** | 12,050,753 | 15,759,305 | 9,207,111 | -5.40 |

Note:
R = Estimated using trading partners database

Source: FAOSTAT, 2012 (http://www.fao.org)

**Table A6. Export Figures of Cashew (with shell) Producing Countries, 2007-2009**

| Year | 2007 | 2008 | 2009 | Growth (%/year) |
|---|---|---|---|---|
| **Export Volume (ton)** | | | | |
| Cote d'Ivoire | 56,607 | 84,095 | 115,095 | 42.71 |
| Guinea-Bissau | 96,284 R | 88,617 R | 127,090 R | 17.73 |
| Benin | 56,607 R | 84,095 R | 15,095 R | -16.75 |
| Tanzania | 8,861 | 52,743 | 95,577 | 288.22 |
| Indonesia | 71,901 | 56,587 | 60,628 | -7.08 |
| Ghana | 22,137 | 70,032 | 53,077 R | 96.07 |
| Others | 265,716 | 272,690 | 383,632 | 21.65 |
| **World** | 578,113 | 708,859 | 850,194 | 21.28 |
| **Export Value (1000US$)** | | | | |
| Cote d'Ivoire | 101,812 | 172,304 | 170,383 | 34.06 |
| Guinea-Bissau | 54,671 R | 95,087 R | 100,974 R | 40.06 |
| Benin | 34,880 R | 69,571 R | 83,948 R | 60.06 |
| Tanzania | 5,190 | 42,871 | 68,380 | 392.77 |
| Indonesia | 58,234 | 51,037 | 62,979 | 5.52 |
| Ghana | 10,272 | 111,890 | 33,308 R | 459.52 |
| Others | 52,141 | 36,442 | 47,156 | -0.35 |
| **World** | 317,200 | 579,202 | 567,128 | 40.26 |

Note:
R = Estimated using trading partners database

Source: FAOSTAT, 2012 (http://www.fao.org)

**Table A7. Export Figures of Mango Producing Countries, 2007-2009**

| Year | 2007 | 2008 | 2009 | Growth (%/year) |
|---|---|---|---|---|
| **Export Volume (ton)** | | | | |
| India | 240,858 | 274,854 | 286,775 | 9.23 |
| Mexico | 236,004 | 226,083 | 232,643 | -0.65 |
| Netherlands | 80,598 | 94,646 | 81,932 | 2.00 |
| Brazil | 116,271 | 133,944 | 110,355 | -1.21 |
| Thailand | 61,026 | 61,608 | 144,079 | 67.41 |
| Indonesia | 1,198 | 1,908 | 1,415 | 16.71 |
| Others | 426,865 | 402,681 | 398,513 | -3.35 |
| **World** | 1,162,820 | 1,195,724 | 1,255,712 | 3.92 |
| **Export Value (1000US$)** | | | | |
| India | 163,622 | 224,979 | 210,556 | 15.54 |
| Mexico | 119,187 | 111,214 | 136,942 | 8.22 |
| Netherlands | 114,408 | 145,067 | 124,575 | 6.34 |
| Brazil | 90,102 | 119,122 | 97,686 | 7.11 |
| Thailand | 34,231 | 37,375 | 71,410 | 50.12 |
| Indonesia | 1,004 | 1,646 | 1,161 | 17.24 |
| Others | 390,922 | 348,092 | 355,441 | -4.42 |
| **World** | 913,476 | 987,495 | 997,771 | 4.57 |

*) including mangosteen and guava

Source: FAOSTAT, 2012 (http://www.fao.org)

**Table A8. Sustainability Regulations in the Indonesian Coffee Sector by the Certification System**

| Important Dimension | First Party Starbucks | Second Party SAI | Third Party | | | | Fourth Party 4C |
|---|---|---|---|---|---|---|---|
| | | | Utz Kapeh | Rainforest | Fair Trade | Organic | |
| Sustainability focus of environmental governance | Not specific, but natural conservation | Sustainable agriculture, organic input | Not specific, environmental conservation | Biodiversity, soil fertility, agro-ecology | Not specific, but close to organic input | Soil fertility, and erosion resilience | Water, soil, biodiversity and energy. |
| Coordination type, between farmers, traders, roasters | Strong | Very weak, it is a market transaction | Very weak, it is a market transaction | Very weak, it is a market transaction | Strong | Weak, close to a market transaction | Very weak, it is a market transaction |
| Risk management and planning capabilities | Risk of single buyer, farmer equity issues | Reduction of external inputs | Reduced pest management social risks | Reduced pest management social risks | personal and household needs. | Reduced inputs, no monocropping | Econ viability, sustainable livelihood |
| Target group (growers) | High quality coffee only | Not specific | In practice, large estates | Large estates | Smallholders, cooperatives | Not specific | Not specific |
| Market access, networking | Single buyer, high buying power | Niche, well-established markets | Buyers are limited but increasing | Buyers are limited but increasing | Niche, well-established markets | Niche, well-established markets | Good network. Although not operational |
| Expected price premium | Medium, flexible | Very low, flexible | Low, flexible | Low, flexible | High, fixed | Medium, flexible | Very low, flexible |
| Compatibility with environmental services | Very strong, captive buyer | Strong, need intermediary | Intermediary, buyers enter after success | Intermediary, buyers enter after success | Intermediary, public agency as buyer too | Intermediary, public agency as buyer too | Weak, unless intermediary agencies. |
| Progress and performance in Indonesia so far | Pilot project in Sulawesi and Sumatra | Not available | 15 companies have been certified | 2 companies have been certified | One in Gayo | One in Gayo | Not available, just introduced in 2006-2007 |

Sources: See Arifin (2010)