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## **The Potential of Cacao Agribusiness for Poverty Alleviation in West Sumatra**

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# The Potential of Cacao Agribusiness for Poverty Alleviation in West Sumatra

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## Abstract

The cacao industry has played an important role in terms of export earnings and employment opportunities in Indonesia since 1980s. It is the main source of income for more than one million smallholder farmers in Indonesia, who are considered poor. Most planted areas of cacao are in Eastern Indonesia; however, cacao production has developed in Western Indonesia recently, with West Sumatra designated as the area of central production. Due to the importance of cacao industry in the Indonesian economy, there is a big opportunity to explore the potential of the industry in poverty alleviation.

The study uses the participatory impact pathway analysis (PIPA) method. It is a new approach to formulate a development strategy and policies proposed by the Institutional Learning and Change. This approach is used because it: (1) covers impact analysis in order to investigate the potential contribution of cacao agribusiness development to poverty alleviation, which is not covered by other participatory approaches; and (2) can be used to identify stakeholders' relationships for cacao agribusiness development. The use of PIPA in this study involves various tools: a participatory workshop, surveys and semi-structured interviews.

Problems facing the cacao industry were identified through the workshop, including low yields and price and price instability. Lack of knowledge by farmers of agronomic practices and low quality of seedlings were considered to be the main causes of low yields by the participants. Low price of cacao beans was thought to be mainly caused by low quality of cacao beans while lack of cooperation between farmers and the village cooperative and lack of a farmers' association were considered to be the main factors affecting price instability.

Farmer survey data results show slightly different priorities from the workshop. Most cacao farmers disagreed on the problem of low yields and low price of cacao beans but a high proportion agreed on the problem of price instability and confirmed that cacao farmers face a problem of low quality of cacao beans. Most farmers do not know the cause of price instability, while improper fermentation was agreed as the main factor causing the low quality of cacao beans.

Topic codes: agribusiness economics and management; international development; farm management.

## 1. Introduction

Cacao estates comprise the fourth biggest planted area among estate crops in Indonesia in 2008. They have developed massively since the 1980s. The land area under cacao trees increased nine-fold and cacao production increased 16-fold in the period of 1985–2002 and rose gradually thereafter. Planted area of cacao in 2008 was 1,364,400 ha and output was 721,400 tonnes (BPS-Statistics Indonesia 2009) of which about 70 per cent was exported.

The significant increase in production led Indonesia to be the third largest cacao producer in the world after Côte d'Ivoire and Ghana in the period 2002 to 2007. It is forecast to retain that rank until 2012 (ICCO 2008a). Consequently, it plays an important role in Indonesian export earnings with a significant increase from US\$0.67 billion on average in 2000–2005 (WCF 2007a) to US\$0.92 billion in 2007 (World Bank 2009).

Most planted areas of cacao are in Eastern Indonesia, mainly in Sulawesi. In Western Indonesia, West Sumatra has the biggest share of cacao area to estate crops area (7 per cent). Even though the share was much less than the four provinces in Sulawesi, it has a higher annual growth rate (23 per cent) than other provinces (average of nine per cent) in the period 2002 – 2007 (Department of Agriculture 2009). Its share to estate crops area increased dramatically from two to eight per cent in this province in period 2004 – 2008. It is expected to increase further in connection with the government program to develop cacao-coconut intercropping.

Cacao development provides a big chance to increase farmers' income and improve welfare of their families in West Sumatra. This is because cacao could be intercropped with 100,000 ha of coconut palms. With coconut-cacao intercropping, farmers could get additional income of Rp.13.32 million per year (Department of Plantation of West Sumatra 2006).

Cacao estates have the potential contribution to poverty alleviation in West Sumatra for two main reasons. First, unlike oil palm and rubber estates, most cacao estates in West Sumatra are owned by smallholders (97 per cent). Smallholder farmers are direct beneficiaries of any government intervention through development programs that target them effectively. Second, there is a big opportunity for farmers to gain higher prices for fermented cacao beans if the whole cacao supply chain works well, generating higher income. This, in turn, should lead to poverty alleviation.

Incomes of cacao farmers are low even though there are a lot of supporting programs coming from the government of West Sumatra. Handayane (2007) found that cacao farms in West Sumatra were unprofitable. This finding is probably related to the fact that cacao producers in Indonesia cannot achieve their potential yields (ACDI/VOCA 2005; Handayane 2007; Sahara, Dahya and Syam 2005). Low production, high production cost and low price received by farmers are thought to contribute to the low incomes of cacao farmers. This paper attempts to explore constraints on smallholders producing cacao in West Sumatra and how best to lift the constraints in developing the cacao industry in order to exploit the opportunities on the world market that lead to rural poverty alleviation.

Some preliminary results of the research are presented in this paper. It is organised into six sections. In the next section we provide overview of cacao marketing in Indonesia, which is followed by the discussion on the contribution of agricultural growth to poverty alleviation. Analytical framework and design of this study are described in section four and five. The study results are discussed in section six that ends up with a conclusion.

## 2. Marketing Challenges Facing the Indonesian Cacao Industry

The Indonesian cacao industry has a comparative advantage in world market in terms of ability to supply cacao beans in large quantity (ACDI/VOCA 2005). There was an upward trend in export volume and values of Indonesian cacao in the period from 2001 to 2006. However, between 2006 and 2007, the volume decreased while the export values continued to increase. This change needs to command attention in order for Indonesia to maintain its comparative advantage and its position as the third biggest producer in the world.

Three important factors providing export opportunity for the Indonesian cacao industry in the world market are world demand, market share and the price of cacao. WCF (2007b) reported that the consumption growth rate of cacao (2.6 per cent) is higher than production growth rate (2.3 per cent). The share of Côte d'Ivoire, the largest cocoa producer in the world, is expected to decline slightly from 36.9 per cent to 36.7 per cent in the period of 2008–2013 because the average growth of its cacao production is lower than that of world production (ICCO 2008a). As production growth of Indonesian cacao (nine per cent on average) is higher than that of world production, there is a big opportunity for Indonesian cacao industry to capture a bigger share of the world market.

ICCO (2008a) stated that the annual market value of world cocoa is expected to increase at an average rate of 1.9 per cent per annum in real terms between the 2007/2008 and 2012/2013 seasons. In addition, following bilateral discussions between Indonesia and USA on the framework of trade and investment facilitation, the US Food and Drug Administration (FDA) has relented on their import policies on cacao from Indonesia, in which they would implement conditional discontinuation of automatic detention on Indonesian cocoa exports (Indonesia Export Bank 2009). This will be a big chance for Indonesian cacao producers to receive a higher export price. The cacao industry needs to be ready to exploit this market opportunity.

To support the development of cacao industry, the Indonesian government has established short-, medium- and long-term programs. Its goal is to improve cacao productivity and quality, improve cacao pod borer control, increase farmers' income, and to support cacao agribusiness development through encouraging input supply and improving processing industry capacity (Goenadi et al. 2005). The Indonesian government has provided funds to encourage these programs. The total fund required to develop the cacao industry in Indonesia in the period 2005 – 2010 was about Rp.5.36 billion. The sources of the fund were the government (29 per cent), cacao community (65 per cent) and the private sector (6 per cent) (Goenadi et al. 2005).

WCF (2007b) reported that policy making and strategy selection on sustainability in the cacao industry in Indonesia has been directed towards:

- a. Increasing yields through replanting and rehabilitating unproductive plantations, serving farmers with improved seed/clones, providing training and technical assistance for cacao farmers, and implementing good agricultural practice.
- b. Quality improvement through developing post-harvest facilities and promoting the application of quality standards.
- c. Improving the distribution mechanism through developing farmers' bargaining position to gain remunerative prices for better bean quality.
- d. Developing local financial institutions to make loans more affordable to cacao producers

- e. Value-added enhancement through increasing the export of cacao derivatives/finished products, and by increasing and improving the performance of downstream firms.

At the province level, the government of West Sumatra provided funds from the annual development budget to encourage cacao development. In the cacao development program, poor farmers would get 700 seedlings per hectare, while others would be supported with credit at a subsidized interest rate of 10 per cent per year. The government would also provide a processing plant and training for farmers to improve the management of their cacao farm. Some cacao development programs have been implemented in West Sumatra in 17 regencies. The programs consist of free seedlings for farmers, training to control pests and diseases, and providing equipment for fermentation and processing cacao beans to become cacao paste (Department of Plantation 2009).

### 3. Poverty Alleviation and Agricultural Growth

The elimination of poverty is a key concern of all poor countries. It is also the central objective of the Millennium Development Goals to halve the poverty rate by 2015 (Laderchi, Saith and Stewart 2003). To support this aim, many international agencies are currently conducting projects regarding poverty issues. For example, the Asian Development Bank has established a policy to allocate at least 40 per cent of all public sector lending to poverty intervention since 1999 (Perez-Corral 2001).

Poverty is still a prevalent problem in Indonesia where the poverty rate was calculated at 13 per cent in 2010 (BPS-Statistics Indonesia 2010). The majority of the Indonesian poor people live in rural areas (64 per cent) and depend on the agricultural sector for their livelihood. Therefore, agricultural development in Indonesia could have a significant effect on poverty alleviation. As lack of income is a central feature of poverty, increased income can improve the living standards of the poor, which enables them to build assets, reduce vulnerability to disasters and improve their food security (AusAID 2000).

The contribution of agricultural growth to poverty alleviation is well known and has been proved in many developing countries. Previous studies reveal that agricultural growth brought more positive impact on the poor than other sectors. An increase in yield by 1 per cent reduced the proportion of people living on less than \$1 per day by 0.6 – 1.2 per cent (Thirtle et al. 2001; Wadsworth 2004). Hossain (2001) stated that agriculture's role in poverty alleviation depends on the state of the economic development. The effect would be substantial at low levels of income, where food production is a major source of employment and income. However, agriculture's importance as a source of livelihood and its poverty-reducing role decline with economic prosperity.

Anríquez and Stamoulis (2007) argued that the agricultural sector has played an important role in development because it has the highest backward linkages at earlier stages of development. This suggests that a development strategy of agriculture as a leading sector can have strong multiplier effects on the rest of the economy. They identified four main contributions of agricultural growth to poverty alleviation: directly increasing small farmers' income and consumption, indirectly reducing food prices, increasing incomes in the non-farm rural economy, and raising unskilled employment and wages.

Irz, Colin and Wiggins (2001) described the impact of agricultural growth on poverty in terms of three subsequent effects: farm, rural, and national economy. They stated that the degree of the impact depends on the degree of engagement of the rural poor in the farm sector and the extent to which output growth

raises incomes. The more the poor are engaged in the farm sector, the greater the effect of production growth on poverty.

#### **4. Analytical Framework: Participatory Impact Pathway Analysis**

This study uses participatory impact pathways analysis (PIPA), which emerged in 2006. The impact pathway (IP) contains a set of detailed assumptions and hypotheses that specifies how a project is expected to achieve its goal. PIPA describes the normative action of individuals and organisations for change, and how such change might impact on people's livelihoods (Douthwaite et al. 2008).

PIPA describes project impact in terms of an IP logic model and network maps (Douthwaite et al. 2007a). The IP logic model is a flowchart that shows the relationships between outputs and eventual developmental impacts. It starts with identifying a problem tree, which can be done in a workshop. The network maps provide additional information to construct the causative theory. PIPA uses network mapping to explore how stakeholders link to and influence each other and how the project aims to change the existing network. It complements logical framework by providing additional information about the actors involved in bringing about developmental change (Douthwaite et al. 2007a). An IP logic model and network maps are then articulated into an outcomes logic model that describes the project's medium-term objectives in the form of hypotheses: which actors need to change, what are those changes and which strategies are needed to realise these changes (Douthwaite et al. 2008).

The use of PIPA in this study is a modified version and entails a triangulation approach to gathering information, a method commonly used in social sciences to cross-verify information from a number of sources. While a participatory workshop in PIPA is the core approach, in this study the workshop in the initial stage is preceded by gathering information from existing scientific studies of cacao production and followed by a set of surveys and semi-structured interviews. By applying four different methods in this study to gain information, the aim is to get a better understanding of the causes of problems in the cacao industry, their priorities for action, and the best approach to their solutions. This triangulation of methods, according to De Marchi et al. (2000), provides powerful results in sociological research. The main advantages and disadvantages of each method used are presented in Table 1.

The objective of the participatory workshop in this study was to get information and views from stakeholders on current issues in the cacao industry in West Sumatra. The format of the workshop was informed by the findings reported in a variety of research papers and reports on the cacao industry. The workshop results were then used as guidance in conducting surveys and semi-structured interviews. According to Dale (2004), a workshop is a facilitated group communication where participants are expected to be equal in terms of their willingness and ability to contribute. They have a chance to conduct a free-ranging dialog. This method is "a highly democratic mode of problem analysis and decision making" (Dale 2004:161). Barahona and Levy (2002) stated that this method is appropriate to investigate complex matters requiring thought.

A participatory approach is a bottom-up approach that involves the local population in designing and implementing policy or program to change their lives (Jennings 2000). This method can create opportunity for practitioners and researchers to understand problems together that lead to benefits for both (Bammer 2005). Moreover, Bammer (2005) stated that this approach can produce new knowledge by combining the perspectives of researchers and practitioners. This type of 'futures study' (List 2006) is a problem-solving approach (Alsan 2008).

Table 1. Relative Merits of Methods to Identify and Solve Problems in the Cacao Industry

Method	Main advantages	Main disadvantages
Scientific studies	Rigorous analysis provides verification and validation of information. In-depth studies of parts of a system.	Do not provide an integrated picture of the system being studied. Haphazard coverage of system problems and solutions.
Workshops	Good for gathering a broad range of views. Cooperation is encouraged to solve shared problems. Enable marginalized groups to participate. Brainstorming can lead to consensus on priority problems and their solutions.	Difficult to ensure representativeness of participants. Biases emanate from dominance of discussions by individuals or groups.
Surveys	Representative samples. Free of influence of dominating people or groups. Possible to obtain detailed information. Information can be used for statistical analysis.	Knowledge of respondents typically restricted to only part of the system. Lack of verification or validation of information provided. Lack of flexibility in interviewing. No record of data and rely on recall. Costly
Semi-structured expert interviews	Allow focused conversations through two-way communication. Flexibility in interviewing. Good for obtaining expert views on specific operations in a system. Suitable for gathering confidential and sensitive information. Free of influence of dominating people or groups.	Interviewees often lack knowledge of other parts of the system being studied. Lack of verification or validation of information. No corporate view of problems and their solutions.

Arnold and Fernandez-Gimenez (2007) stated that a participatory approach enables marginalized groups to participate in development research to share information and to find their own solutions to address local concerns. Therefore, it can improve the quality of the research through the participant input of stakeholders. This approach has been adopted widely, reflecting belief that a bottom-up approach encourages participants to become agents of change and decision-making (Duraiappah, Roddy and Parry 2005: p.3). Participation enables the poor and voiceless to get involved in the development process, allowing them to have "greater influence and more control over the decisions and institutions that affect their lives" (Duraiappah, Roddy and Parry 2005: p.3).

However, workshops can create personality constraints that lead to biased outcomes. Some people may dominate the workshop deliberations while others do not participate well. This can lead to misleading conclusion due to an under-emphasis on dominated people's views, as argued by Duraiappah, Roddy and Parry (2005). The workshop, therefore, was complemented by surveys and semi-structured interviews to overcome this problem.



Surveys and semi-structured interviews provide opinions from experts and knowledgeable people on particular issues. They are used to get information that is not captured by the workshop or to correct for biases in workshop outcomes. Barahona and Levy (2002) stated that surveys can generate statistics that are representative of a population, which are not produced by workshop. Surveys and semi-structured interviews were conducted following the workshop in order to get detailed information on problems that were identified in the workshop.

## 5. Design of the Study

This study was conducted in West Sumatra province for two reasons. First, West Sumatra is designated as the production centre for cacao in Western Indonesia. Second, cacao development in this province is mainly funded by the provincial and regency governments, indicating their strong interest in developing the cacao industry. Three municipalities are involved in this study – Pasaman, 50 Kota and Solok – which were selected based on their distance to the export point.

A random sample of 100 heads of farm households and 36 traders were interviewed using a structured questionnaire. Semi-structured interviews with key informants supplemented the survey information. Key informants consisted of exporters, processing firms and local government officials who provided general information on cacao farming, and policy issues and programs affecting small-scale cacao farmers in the study area.

## 6. Findings and Discussion

As semi-structured interviews are still work in process, preliminary results of the study presented in this paper are based on the workshop and some survey results only. The results are discussed in this section sequentially.

### 6.1. Workshop Results

The workshops were conducted in three municipalities that involved 68 participants. They consisted of 36 farmers, 6 village buyers, 4 village cooperatives, 1 seedling supplier, 18 Department of Plantation officers, 2 Department of Industry and Trade officers and 1 extension officer. A meta-plan process was used to encourage all participants to be actively involved. It encouraged stakeholders to express their opinions in a participative way, to identify issues facing the cacao industry and to begin developing solutions to identified problems. A professional facilitator, who has extensive experience in USAID projects using a participatory approach, facilitated the workshop with the help of two assistants (a camera operator and a secretary).

The workshop began with identification of problems facing the cacao industry in West Sumatra. It developed to identify cause, effect and solution for the three most important problems from the aspects of workshop participants. These participants then drew a problem tree by arranging problems, and their causes and effects. After that, they identified solutions for the identified problems. At the end of this phase, participants were asked to select the solution with the highest priority.

In the next phase, participants were asked to illustrate the relationships among stakeholders engaged in cacao agribusiness, in the form of current and future network maps. The current network map describes

existing key relationships between stakeholders, while future network map shows how stakeholders should link together to achieve better performance of cacao agribusiness.

From the workshop results, three identified problems facing cacao industry were found to be low production of cacao, low price of cacao beans and price instability. Pest and disease attack and low quality of seedlings were identified in the workshop as the main causes of low production. Based on the workshop results, these factors were connected with farmers' lack of knowledge on agronomic practices due to the ineffectiveness or absence of extension services.

Low quality of cacao beans and low bargaining power of farmers came up during the discussion about marketing issues as indicators of low price of cacao beans received by farmers. A low level of cooperation between farmers and the village cooperative was identified as a factor affecting price instability on the farmer level.

To illustrate the relationships among stakeholders engaged in cacao agribusiness, current and future network maps were drawn in the workshop. In the current network map (Figure 1), processing firms do not exist; therefore, farmers cannot sell their cacao beans directly to the processing firms. There is also no direct relationship between farmers and exporters. However, cacao farmers do not rely solely on village buyers to sell their cacao beans. They can also sell them to wholesalers as alternative buyers.

Cacao agribusiness involves cattle producers who provide manure for cacao farming and use the waste of cacao fruits as food for their livestock. In the current network map, financial institutions not only support farmers but also support seedling suppliers, fertilizer and chemical suppliers, wholesalers and livestock farmers. In addition, the government and extension officers currently provide support for farmers but participants considered it not to be enough.

The future network map (Figure 2) exhibits relationships among stakeholders that differ from those in the current network map. It is expected that exporters and processing factories will be more involved with farmers in the future. Thus, farmers have alternative buyers to whom they can sell their cacao beans and have a potential advantage if they can sell their cacao beans to buyers from exporters and processing factories who offer higher prices for better-quality cacao.

The workshop participants suggested that another important stakeholder that should be involved in the future is the village cooperative. The cooperative will support farmers to sell their cacao beans at reasonable prices and provide capital for farmers. They stated that village cooperatives should be supported by financial institutions, and that the government should support more stakeholders in the future.

Financial institutions are expected to support more stakeholders to finance their business in order to develop cacao agribusiness. A price stability institution was suggested in the workshop as another important stakeholder that should be involved in cacao agribusiness. This institution is expected to be able to discharge the function of price control to ensure stability in the cacao industry that will help farmers to plan their farming.

Figure 1. Current Network Map in Cacao Agribusiness in West Sumatra

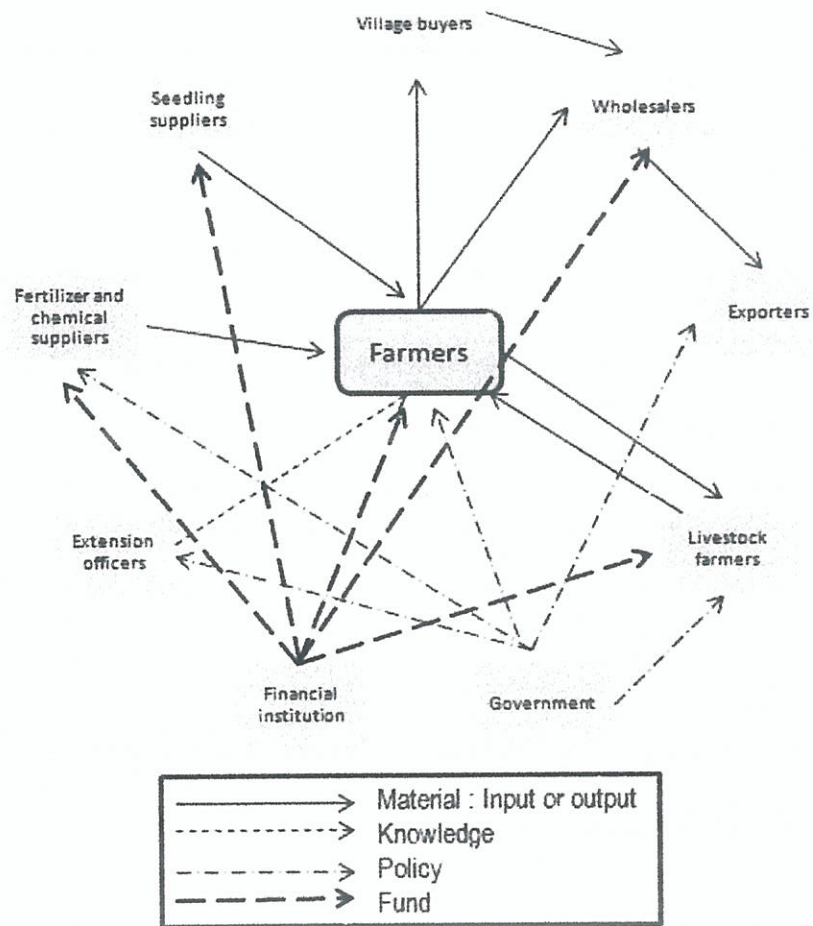
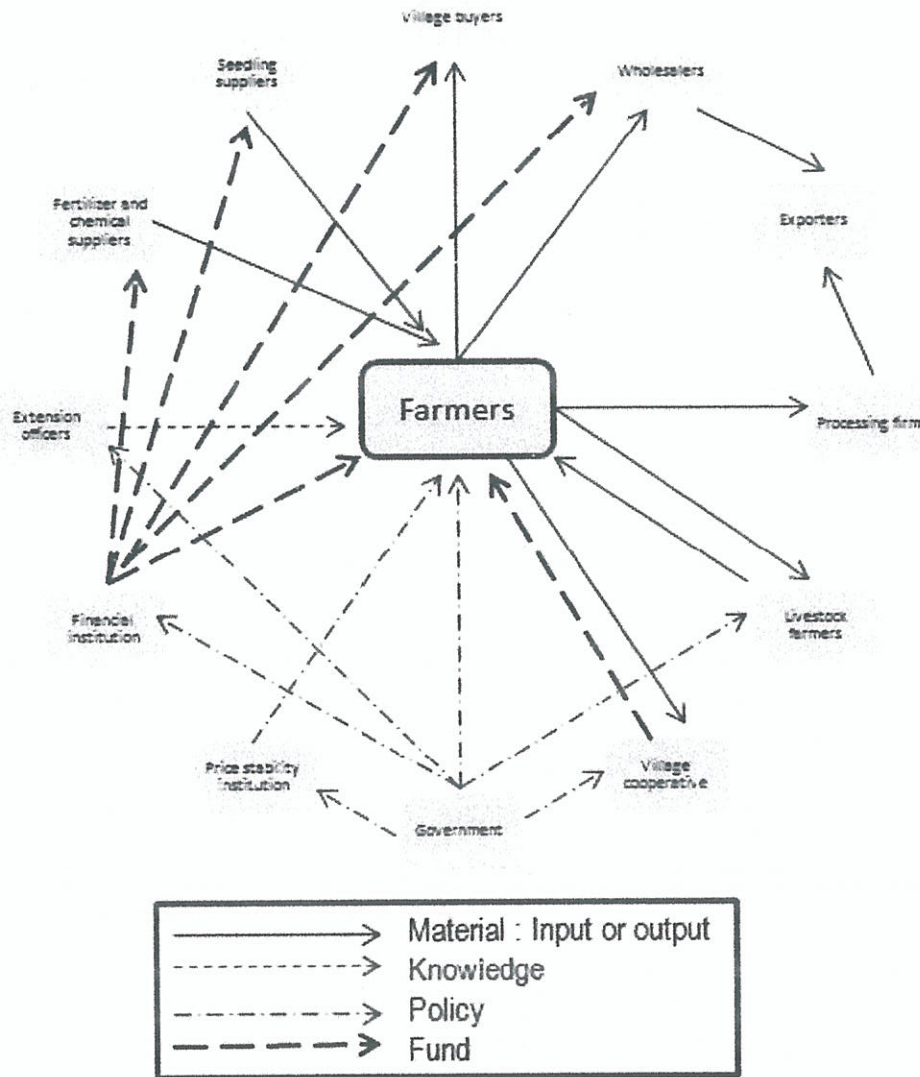


Figure 2. Future Network Map in Cacao Agribusiness in West Sumatra



## 6.2. Survey Results

There were 100 households farmers involved in this study. The characteristics of the household heads are presented in Table 2. Of the household heads interviewed, 70 per cent were male and 30 per cent female. The minimum age was 20 years old and the maximum 77 years old, with a mean age of 47 years old. Most sample farmers (70 per cent) were in the age group of below 55 years old. This indicates that there is a group of farmers who have the physical capacity to run their farm. However, most of them (45 per cent) had a low level of formal education, with one per cent reported as having no formal education. This condition may limit their ability to adopt new methods and technology to develop their cacao farm.

Table 2. Characteristics of Cacao Farmers in West Sumatra in 2010

Farmer characteristics	Percentage
Sex	
Male (people)	70%
Female (people)	30%
Age	
25 - 34 years	19%
35 - 44 years	22%
45 - 54 years	29%
55 - 64 years	16%
≥ 65 years	14%
Education	
No education	1%
Primary education	45%
Junior high school	23%
Senior high school	24%
Tertiary education	7%
Landholding distribution	
< 1 ha	36%
1 - 2 ha	44%
> 2 ha	20%
Average landholding (ha)	1.87
Irrigated land	0.41
Dry land	1.46
Average number of family member	6
Children (people)	2
Adult (people)	4
Number of farmers whose income below poverty line	23%
Number of farmers whose income above poverty line	77%
Average income from cacao farming per year (Rupiah)	15,956,360
Average household income per year (Rupiah)	26,994,816
Average income per capita per month (Rupiah)	574,134

Note: total sample = 100

The area of land owned ranged from 0.1 ha to 10.25 ha with an average of 1.87 ha per household. A substantial proportion of farms (36 per cent) were less than one hectare, which suggests that many cacao farmers in this region are poor.

Cacao farming was the main source of farmers' income. It contributed about 59 per cent to total household income. Average income per capita of cacao farmers was Rp.574,134 per month. This value was higher than the poverty line for rural areas in West Sumatra in 2009 (Rp. 201,257) that was used by Statistics Indonesia. Based on this measurement, about 23 per cent of cacao farmers were poor.

The survey reveals that the average yield of cacao trees in West Sumatra was 899 kg/ha of cacao beans per year. This figure is considerably low because the survey results reveal that some farmers in the study site had their cacao yield more than 2,000 kg/ha of cacao beans per year. Nevertheless, 51 per cent of farmers did not consider the yield of their cacao trees to be low.

Pest and disease attack and low quality of seedlings were also identified as the main causes of low production in the survey. About 41 per cent of farmers stated that their cacao trees were attacked by pests and diseases and most farmers claimed to lose about 50 per cent to 75 per cent of their cacao production due to pest and disease attack (Table 3). The main pest and disease reported were cacao pod borer and black pod but most farmers (64 per cent) did not adopt control measures. Lack of knowledge on pest and disease control and the high cost of chemicals were the main reasons given for their inaction.

Table 3. Pest and Disease Control for Cacao Trees in West Sumatra

Controlling pests and disease	Total	Percentage (%)
Control pest and disease	100	100
Yes	36	36
No	64	64
Reason for not controlling pests and disease	64	100
Do not know how to do it	16	25
Chemical is expensive	26	41
Chemical is not available	4	6
No infestation	5	8
It has no effect on yields	10	16
Lack of labour	1	1
Other	2	3
Kind of pest and disease attack	41	100
Cacao pod borer	11	27
Black pod	23	56
Red branch borer	1	2
Fungus	4	10
Do not know	2	5
Percentage of production loss due to pests and disease	41	100
< 25%	6	15
25% - 49%	10	24
50% - 75%	23	56
>75%	2	5

Low quality of seedling was also identified as a major cause of low production in the survey. About 51 per cent of farmers agreed on this condition. This study found that farmers planted low-quality cacao seedlings because they could not afford to buy good-quality seedlings. About 15 per cent of farmers got their cacao seedlings from the government program while 43 per cent obtained them free from other farmers. Most farmers (57 per cent) did not know which variety of cacao seedlings they grew, indicating that farmers lack knowledge on cacao seedlings. In addition, the survey results show that 31 per cent of cacao farmers in West Sumatra did not use fertilizers. Expensive fertilizer and perceptions of no effects on the yields of

cacao trees were the main reasons. This condition is a potential factor causing low yields of cacao trees in this region.

Low price of cacao beans received by farmers was confirmed by 50 per cent of farmers in the survey. The other farmers did not state low price of their cacao beans as a problem. This situation can be connected to the source of price information they got. Most of them relied on information from buyers on the price of cacao beans.

The survey found that the price of cacao beans at the farm gate ranged from Rp.8,000 per kilogram to Rp.30,000 per kilogram. The big difference between the lowest and the highest price of cacao beans was because the government established an export tax on cacao beans in April 2010. The aim of this tax was to support processing firms and to encourage exporters to buy more processed cacao product in order to gain a higher value of cacao. However, this tax generated a significant decrease in price of cacao beans at the farm gate.

The main cause of low price of cacao beans at the farm gate was identified as low quality of cacao beans. Most farmers did not ferment their cacao beans properly due to no price difference between proper fermented and improper fermented of cacao beans, which encouraged them to produce a low quality of cacao beans. Village buyers and wholesalers stated that they could not differentiate the price because the supply of fermented cacao beans was only in small amounts. These beans were then mixed with unfermented cacao beans when they sold them.

Harvesting partially ripe cacao pods was identified by 25 per cent of farmers as another factor contributing to the low quality of cacao beans. They stated that squirrels often attack cacao trees with fully ripe pods. Therefore, they had to harvest partially ripe pods or a mix of fully and partially ripe pods. In addition, there was no price difference between cacao beans coming from fully ripe and partially ripe pods at the market, which swayed farmers to prefer to harvest partially ripe cacao pods.

Most cacao farmers in West Sumatra (76 per cent) sold their cacao beans to village buyers, while only 24 per cent of them sold their beans to wholesalers (Table 4). Prompt payment was the most important consideration for farmers in selecting the buyer. Most farmers (71 per cent) sold the cacao beans on their place and all of them received cash payment.

Most farmers were satisfied with their transactions with the buyer. This seemed to be the reason for farmers not to change the main buyer in the past five years and maintain a long-time relationship with the buyer. Eight buyers were in operation. This condition can prevent buyers from exerting monopoly power in the market because it enables farmers not to rely on a particular buyer. However, farmers also relied on village buyers as a source of information about the price and the quality of cacao beans, which may weaken their bargaining position.

Lack of cooperation between farmers and the village cooperative and lack of a farmers' association were confirmed by some farmers as potential causes of price instability in the survey. However, the survey shows that most farmers did not know the cause of price instability.

Table 4. Marketing Profile of Cacao Beans in West Sumatra

Marketing profile	Percentage (%)
The main buyer	100
village buyer	76
Wholesaler	24
Reason to choose this buyer	100
certainty of payment	6
high price	28
certainty of price	11
prompt payment	39
family relationship	7
good service	4
Other	5
Years of selling to the main buyer	100
< 5 years	70
5 - 10 years	25
> 10 years	5
Satisfaction with the main buyer	
Always	52
Often	34
Seldom	12
Never	2
Source of information on price	100
Media	3
other farmers	7
extension officer	1
village buyers	69
Wholesalers	19
Exporters	1
Source of information on quality	100
Media	4
other farmers	8
extension officer	12
village buyers	43
Wholesalers	9
Askindo	1
Training	1
Nowhere	22

Note: total sample = 100

The study found that about 22 per cent of farmers had debts with the main buyer (Table 5). Being indebted to the main buyer may restrict farmers from selling their cacao beans to other buyers. However, farmers did not consider that this financial relationship caused them to receive a lower cacao price than other farmers. This finding may be related to the time the main buyer set the price of cacao beans for farmers who borrowed money. All farmers stated that the price of their cacao beans was set at the time of selling.



Table 5. Financial Issues of Cacao Farmers in West Sumatra

Financial issue	Total	Percentage
Debt to the main buyer		
Yes	22	22%
No	78	78%
Time for price setting		
At the time of selling	22	100%
Receive lower price than other farmers due to indebtedness		
Yes	3	14%
No	19	86%
The buyer allow farmers to sell to other buyers		
Yes	6	27%
No	16	73%

#### 6.4. Impact Logic Model for Cacao Agribusiness in West Sumatra

Based on the workshop and survey results, constraints facing cacao industry in West Sumatra can be categorised into three aspects: farming, input supply and output marketing. These aspects are core issues used to draw the impact logic model for cacao agribusiness in West Sumatra, which is illustrated in Figure 3. In the farming aspect, farmers lack knowledge in agronomic practices, particularly for controlling pest and diseases and fertilizing. This study found that farmers did not control pest and disease due to lack of knowledge. Some farmers did not fertilize their cacao trees because they believed there was no effect on yields. In this case, farmers may not use fertilizer properly in which case the use of fertilizer would not affect yields of cacao trees significantly. Lack of knowledge on fertilizing is a possible factor affecting this condition.

Most farmers stated that they lack access to extension services and training even though an extension officer was available in their region. The view has been widely expressed that the number of extension officers is not enough to provide extension services regularly in order to improve farmers' knowledge, training and extension services.

In terms of input supply, farmers found fertilizer was expensive. The workshop and survey reveal that the price of fertilizer was high at the farmer level because the fertilizers were not distributed well. In addition, when fertilizer was available, farmers did not have funds to buy it.

Currently, a grading system for cacao beans exists at the exporter level. Village buyers and wholesalers do not grade cacao beans at the time of buying; nor do they grade them at the time of selling. Therefore, they set the same price for all quality of cacao beans. The view was expressed that cacao beans with good quality will become more widely available when farmers' practices in agronomic and post harvest activities improve. At present, village buyers do not have enough knowledge on the grading system, while wholesalers can grade cacao beans well.

This study found that some farmers harvest partially ripe cacao pods and do not do fermentation because they need the money soon. As these practices were identified as the main factor affecting the quality of

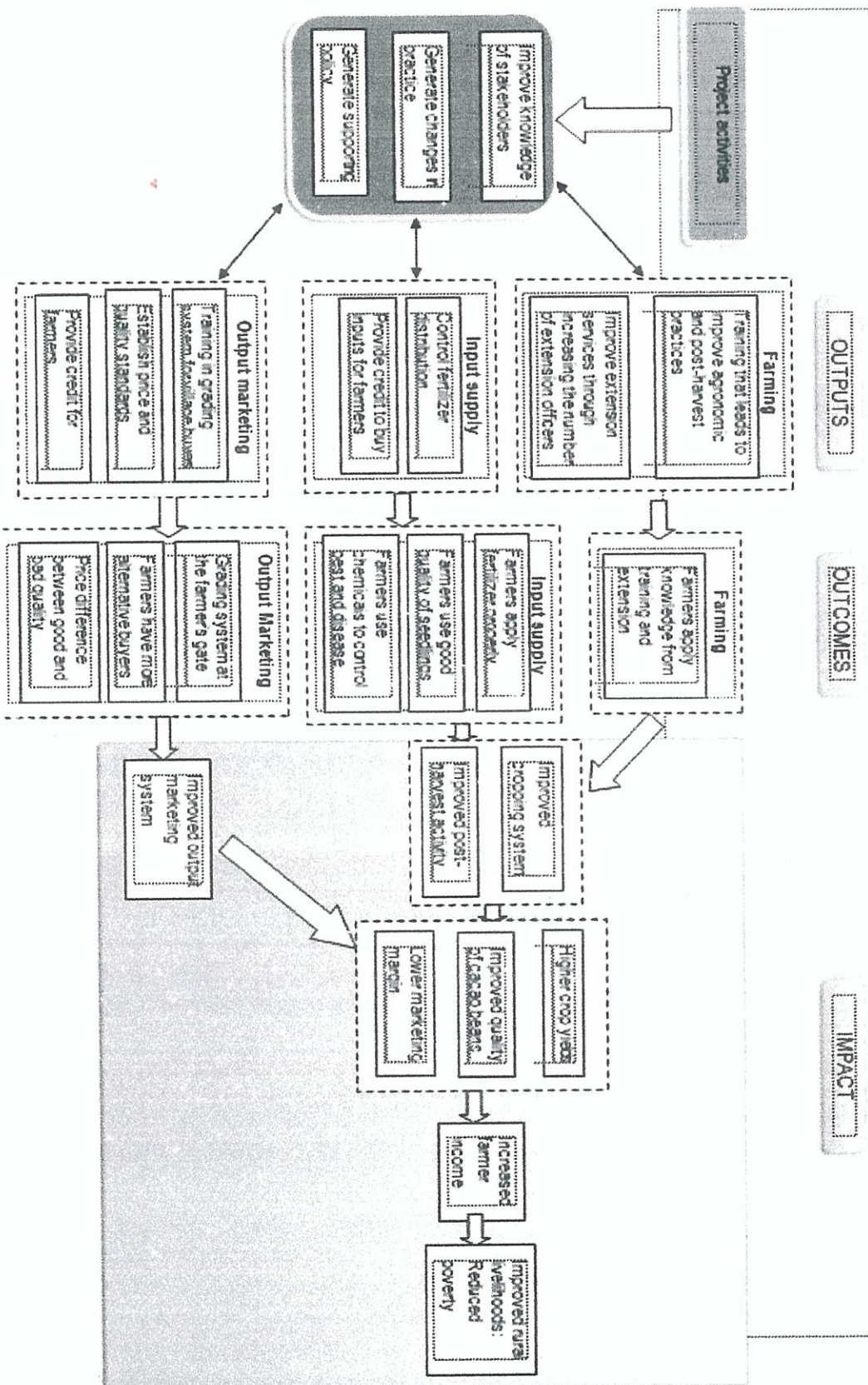
cacao beans, farmers without access to credit to finance their needs are not waiting for ripe cacao pods or fermenting their beans.

Once the information-gathering process is complete, the next stage in the research is to decide on a priority set of action research projects. A typical set of projects based on progress results to date would entail: actions to improve the farmers' cropping system and post harvest practices through the application of knowledge from training and extension services; the use of good-quality seedlings and the proper use of inputs that enable farmers to get higher yields of cacao trees and a better quality of cacao beans; and improvements to the marketing system so farmers can get higher prices for better quality beans. Improved cacao production and marketing, in turn, should lead to increases in farmers' incomes that generate improved rural livelihoods and have the potential to reduce poverty in West Sumatra.

### 6.5. Concluding Comments

This paper reports on progress made in applying a modified PIPA framework to identify the main problems facing the cacao industry in West Sumatra and to recommend action research projects to provide solutions to these problems. The use of the PIPA framework benefits the study in terms of designing a strategy to improve cacao industry performance that is illustrated in an impact logic model. This model also provides a feature how to link cacao agribusiness development and poverty alleviation. Use is made of triangulation in attempting to assess the credibility and validity of a variety of sources used to identify problems in the industry and their solution. These sources include a literature review of existing scientific studies on cacao, a workshop in which participants were invited from all parts of the industry, a set of surveys of participants in different parts of the industry, and a set of semi-structured interviews with a variety of cacao experts.

Figure 3. Impact Logic Model for Cocoa Agribusiness in West Sumatra



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