



Australian Government
**Australian Centre for
International Agricultural Research**

Eastern Indonesia-Agribusiness Development Opportunities (EI-ADO)

Legumes Value Chain Study Executive Summary



Locations: East Java, West Nusa Tenggara (NTB), and East Nusa Tenggara (NTT)

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Executive Summary Soybeans, Peanuts and Mungbeans

Background on AIPD-Rural / EI-ADO

This project is one of five lead commodity value chain studies undertaken as part of the larger \$1 million Australian Government's Department of Foreign Affairs and Trade (DFAT) funded project Eastern Indonesia Agribusiness Development Opportunities (EI-ADO). In this project, Australian Centre for International Agricultural Research (ACIAR) commissioned research to identify lead commodity value chains to be the focus of a new DFAT program Australia Indonesia Partnership for Decentralisation – Rural Economic Program (AIPD-Rural).

The goal of AIPD-Rural is a 30 percent increase in incomes for more than 1,000,000 male and female smallholder farmers by 2022.

The objective is in increased competitiveness of poor male and female farmers, realised through:

- Increased productivity;
- Improved business performance;
- A growing share of an expanding market; and
- The continuous adoption of innovations that contribute to productivity, performance, and market growth.

The expected outcomes are:

- Improved farmer practices;
- Increased access to input and output markets; and
- Improved business enabling environment at the sub national level.

The strategy to be used is to address the systemic growth constraints in rural agricultural sectors that are most relevant to small farmers in the districts in which the Program operates.

The Program is to take a market-led approach of working with on- and off-farm market stakeholders (public and private sector) to stimulate both increased access to and the sustained delivery of public and private inputs and services that are likely to increase the incomes of poor farmers.

Background on Study

In consultations with government and industry stakeholders to select commodities for EI-ADO, peanuts were ranked 5th and soybeans and mungbeans were ranked 6th behind beef, mango, maize vegetables as the commodity(ies) with greatest potential for poverty reduction and market development in the AIPD-Rural districts. It was decided that due to similar production systems soybeans, mungbeans and peanuts would be grouped into the one category of 'legumes'.

NTT, AIPD target districts: TTU, Ngada, East Flores, Sumba Barat

Research conducted in NTT was devoted exclusively to the mung bean value chain and all field work was conducted on Timor Island from September 28 - October 3, 2012. The team met with key actors in Kupang, TTU, and Belu districts. Although not a target district, Kupang as a regional capital is important for this VC as it represents the largest local market outlet for the commodity and is the headquarters of numerous potential support services, including input supply companies and

financial institutions. Similarly, Belu is considered to be the "epicentre" of mung bean cultivation on Timor Island with key market actors all along the value chain who also interact with players in other NTT target districts, especially TTU. Follow-up research was conducted in Betun (Belu district) with mung bean farmers and collectors on October 6-7.

East Java AIPD target districts: Malang, Trenggalek, Sampang, Situbondo

In this region, the primary focus was on soybeans, followed by peanuts and to a less significant degree on mung beans. Owing to the extensive logistical spread of this region, two sub teams were assisted by field coordinators to conduct field interviews in Surabaya, Malang, Trenggalek, and Sampang districts from October 6-12, 2012. Prior to visiting these areas, the team met in Jakarta to review interview strategies and to conduct two key meetings (with Garuda Foods and the American Soybean Association). After extensive field visits, the sub teams regrouped for feedback meetings.

Surabaya was deemed key for all three target legume commodities, as it features a cluster of importers, inter-island traders, distributors, and processors, through whom much Indonesian (and imported) production flows. In Malang, there was a relatively higher focus on peanut farmers, processors (roasted peanuts and peanut oil), in addition to tofu and tempeh processors; in both Trenggalek and Sampang the teams interviewed actors all along the soybean and peanut value chains in equal measure.

NTB AIPD target districts: West Lombok, North Lombok, Bima, Dompu

NTB is the only province where all four AIPD-Rural target districts were visited. Equal focus was paid to peanuts and soybeans (mung beans were excluded in NTB), in addition to the input supply network. In order to maximize outreach to key informants, the sub-team strategy used in EJ was also applied in NTB. In West Lombok, interviews with tofu and tempeh processors were the focus, in addition to wholesale traders of peanuts and soybeans. Important input supply companies were contacted as well. In North Lombok, the overwhelming focus was on peanut cultivation and trade, as it was a more important crop.

In Bima and Dompu districts, the focus was exclusively on the soybean VC. There, interviews were conducted with seed developers, tofu / tempeh processors, input suppliers, and wholesale soybean traders. After returning to Lombok, one sub team conducted interviews in Central Lombok with soybean farmers and traders, as key informants in Bima and Dompu had indicated the presence of a significant trading network for their soybeans there.

Soybeans

Socio-economic and policy settings

As it is a rising staple commodity for the world's fourth most populous country, the cultural significance of soy and its importance for food security in Indonesia cannot be overstated. Along with peanuts it is the third most important source of protein after cereals and fish for Indonesians in both rural and urban areas (Susenas, 2010). Consumption of soy-based products is rising gradually for both populations. In general, the urban and rural poor are the highest consumers of tofu and tempeh; most soybean farmers (more than 1 million on 600,000 ha) can be described as poor, as are the many thousands of people employed in the tempeh/tofu processing industry (up to 100,000 nationwide), underscoring soybean's importance as a "pro-poor" commodity (source: American Soybean Association interview, October 5, 2012).

As a legume and a cash crop, soy is not the primary source of income for most Indonesian farmers: it usually complements the intensive cultivation of more highly valued primary crops such as rice, maize, and sorghum. Indonesia produces less than 850,000 MT on 600,000 ha as of 2012. The amounts produced can vary significantly from year to year, depending on many factors especially international prices (relative to other staple commodities) and climatic conditions. The lack of quality seed, irrigation, and knowledge/skills transfer has also been exerting downward pressure on soybean cultivation in most regions studied.

The main policy currently affecting soybeans is a 5 percent tariff imposed on imports in January, 2012, which was revoked temporarily in July following protests by tempeh and tofu processors. Previously, there had been a 10 percent tariff on imports. This tariff was lifted in 2008, however, after tempeh and tofu processors protested and lobbied due to the significant affect it was having on their sales margins.

Prior to 1998, the Indonesian State Board of Logistics (BULOG) held a controlling stake in the importation and distribution of soybeans. As a result of the 1998 crisis, the agricultural market was liberalized and the importation of soybeans was taken up by private importers.

Today there are roughly three importers that are based in Jakarta. The Ministry of Trade has stated that it intends to make Indonesia "self-sufficient" in soybean production by 2015 and intends to reintroduce steps to regulate imports.

Macro settings

Although a rising consumer, Indonesia is not a major producer of soybeans on a global scale. At just under one million metric tonnes (MT) in 2009, Indonesian production fell below 900,000 MT in 2011 and is expected to continue to decline in 2012-13.

Indonesia currently only produces one third of the soybeans it consumes. Thus in global terms it is strictly an importer of soybeans. According to the American Soybean Association (ASA) in Jakarta, Indonesia will import up to 2.1 million MT soybeans in 2012, with at least 1.9 MT from the United States alone. After the United States, Indonesia imports from Malaysia and Argentina followed by Uruguay and Brazil.

The food industry product channel absorbs 88 percent of all imported and locally produced soybeans. Within the food industry, (according to the ASA in Jakarta) approx. 50 percent of the beans are processed into tempeh, 40 percent into tofu, and up to 10 percent into sauces and other more high-end soy products, incl. commercialized soy milk (Susenas, 2010). Much of the locally produced soybeans are used for the same processed products, but less are used for tempeh and more for tofu.

Industry Settings

The epicentre of soybean production in Indonesia is East Java, followed by Central Java and then NTB. Together, these three regions account for two thirds of national production.

Of all the AIPD districts visited, the most vibrant soybean production areas were on Sumbawa island in NTB (Bima and Dompu), and to lesser degree in Trenggalek and Sampang.

For NTB, the relatively higher production of soybeans can be attributed to the dry climate and a lack of land pressure (especially in Bima and Dompu). The quality of soybeans from this area is considered high by market wholesalers in Surabaya, many who theorize that the relatively larger land plot sizes and richer soil have been more conducive to quality production.

Overall trends in local production show relatively flat or declining growth rates over the past six years. These trends can be attributed to; a lack of access to quality seed; few incentives for farming other than to grow primary crops such as rice or maize; poor farm-level infrastructure in terms of irrigation and post-harvest storage; and the influence of large-scale and regular imports. These factors prevent soybean production from spreading and increasing, and they also account for dramatic fluctuations in production. The area planted and total production have declined substantially (from 1.7 million ha in 1991 to just over 600,000 ha today). Meanwhile, imports have been increasing steadily by as much as 10 percent every year.

Demand for soybeans is steadily increasing on the Indonesian market. This demand, however, is being filled mostly by American imports, which are increasing on average by 10 percent each year since liberalization of imports was first enacted in 1998.

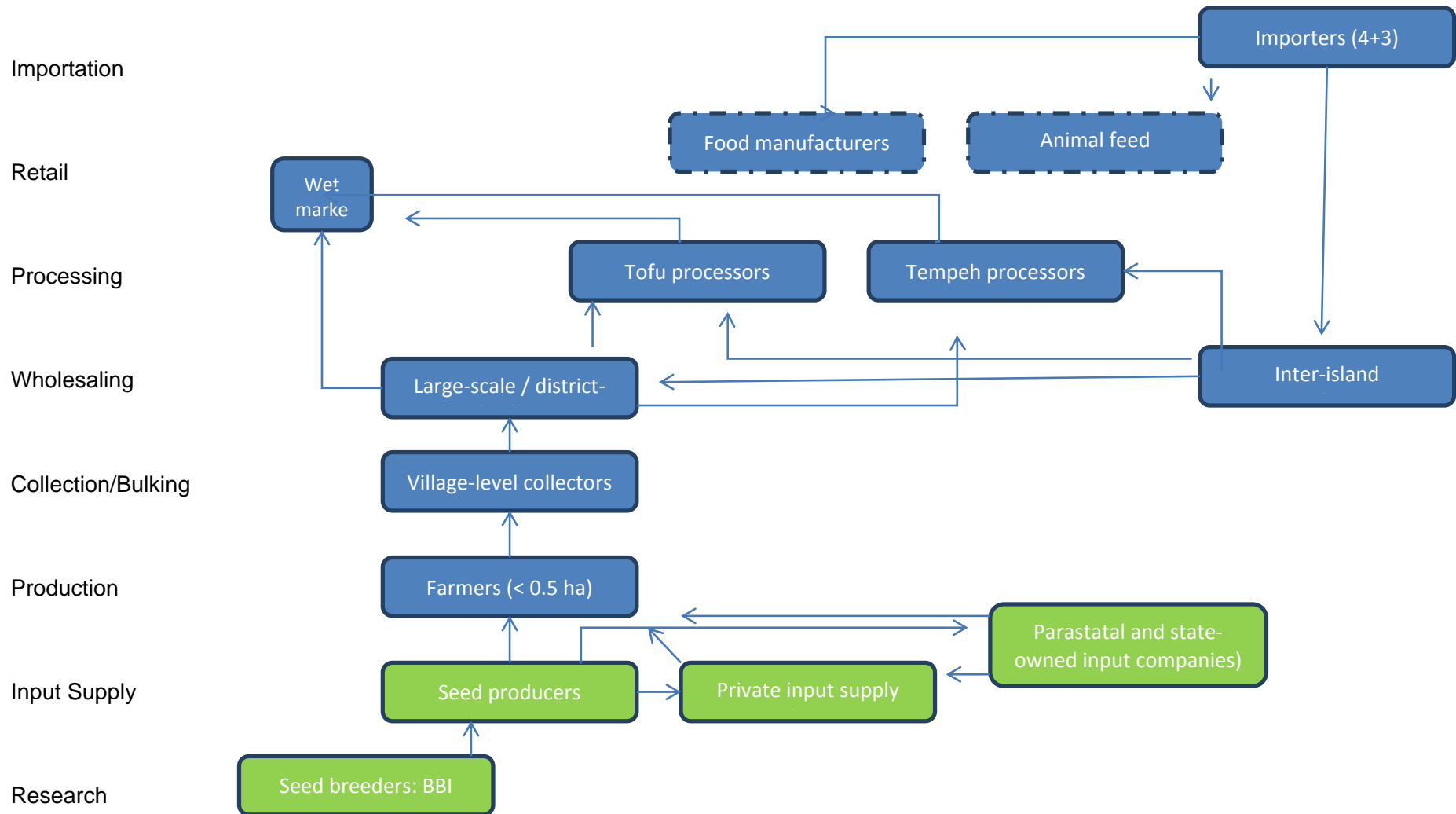
With few exceptions, sales of tofu and tempeh are limited to the wet market and bazaars in the AIPD provinces and districts. Marketing and outreach keep it as a household staple for poorer urban and rural populations; many processors feel that supermarkets are not the appropriate venue to sell it as it is not associated with the high quality products that such supermarkets carry.

However, there are tofu and tempeh processors who target the steadily growing urban middle class - some thereby charging higher premiums. While such processors are in the minority, several interviewed did express interest in expanding their market outreach to non-traditional market channels.

Margins all along the soybean value chain - from farmer to import distributor - are the lowest of the three legume commodities studied. Similar to what an urban distributor of imported soybeans will make, a local collector or wholesaler, after factoring in all expenses, will typically earn no more than 1.5 percent net margin, and thus needs to rely on trade of bulk quantities to offset costs.

In similar fashion, large-scale distributors purchasing from the primary importers will earn no more than 50 IDR/kg clean after expenses, which include storage, labour, energy, and transport.

Indonesia Soybean Value Chain Map



Value Chain Constraints and Market-Based Solutions - Soybeans

Value Chain Constraints and Market-Based Solutions - Soybeans

Value chain constraints /opportunities	Market-based solutions	Existing/ potential providers	Challenges to the provision and use of market-based solutions (by type of provider)
<p>Input supply: 1. There is a lack of commercially-available certified seed for farmers; many are using seed from their own seed banks, and the yields decrease with time as a result. Oftentimes the only "quality" seed available is passed through state-run distribution schemes that do not reach the majority of farmers in a given area. Some farmers are hesitant to buy commercial seed available due to concerns about quality or because commercial seed they have received in the past through subsidy programs has been of poor quality.</p> <p>While there are seed developers producing seed in certain areas under contract with state-owned input supply firms for eventual redistribution, most farmers interviewed do not have access to these seeds.</p> <p>Some wholesale buyers try to sell “seed-quality soybean” (soybean suitable for planting) to farmers as a way of guaranteeing supply with harvest, but their seed selection methods cannot be described as scientific or effective. Many of them are unaware of the existence of commercial seed developers.</p> <p>Growers reported that timely availability of quality seed is a problem, which in some cases leads to delays in planting and crop establishment issues (due to poor quality). Some input suppliers sell soybean seed but there are no systems in place to assess germination and vigor of the seed before planting.</p>	<ul style="list-style-type: none"> • Access to private sector market distribution channels to soybean seed developers • Access to improved quality seed for soybean farmers 	<ul style="list-style-type: none"> • Input supply distributors and retailers • Wholesale buyers • Commercial seed developers 	<p><i>Commercial seed developers:</i> Seed developers sell a limited amount of seed to private input supply networks (retail shops and distributors in more urban centers), but as they grow the seed on behalf of a government-sponsored buyback scheme (PT Pertani or PT Sanya Sri in NTB or EJ), they have not been developing private sector distribution channels. They face difficulties in marketing seed through these channels, especially since private input suppliers cannot absorb the same high quantities that the state-sponsored companies can. Furthermore, these seed developers often cite bureaucracy and difficulty certifying their seed, and need access to state-of-the-art storage strategies and packaging to improve product quality.</p> <p><i>Input supply distributors and retailers:</i> Many interviewed explained they would be willing to sell quality commercial seed if it were reliable, consistent, and well-packaged. Furthermore, their attention is mostly focused on rice or maize seed.</p> <p><i>Wholesale buyers:</i> Many wholesale buyers and their agents are unfamiliar with marketing seed to farmers. They are unfamiliar with techniques such as demonstration plots, seed selection and storage, etc.</p>
<p>2. While a problem for actors across the entire value chain, smallholder farmers in particular lack access to credit for agricultural inputs. This</p>	<ul style="list-style-type: none"> • Access to affordable credit for inputs to soybean farmers 	<ul style="list-style-type: none"> • Wholesale buyers and tofu/tempeh processors 	<p><i>Wholesale buyers and processors:</i> Many wholesale buyers are already providing a certain degree of credit to supplier farmers as an</p>

<p>inhibits them from being able to purchase the inputs (seed, fertilizer - even though it is often subsidized - as well as pest control and herbicides).</p> <p>In certain cases, farmers enter into informal agreements with buyers as a way to mitigate the lack of commercial credit.</p>	<ul style="list-style-type: none"> • Training in more formalized buyer-seller schemes including contracts and credit provisions to buyers and farmers/farmer groups 	<ul style="list-style-type: none"> • Commercial banks 	<p>embedded service. But as indicated above, they lack familiarity with mechanisms for contract farming - or at least on how to formalize relations with farmers, despite a pronounced willingness to explore such possibilities with a market development program like AIPD-Rural.</p> <p><i>Commercial banks:</i> Traditionally, these entities have never focused on farmers as potential clients and are unskilled at effective loan recovery or even designing appropriate loan packages tailored to the needs of specific farmers (in this case - of soybeans)</p>
<p>3. There is reportedly a large amount of cheaper but inferior-quality, often counterfeit, seeds, pesticides, and herbicides. Input companies have no way of controlling the circulation of these products and farmers are unaware of the inauthenticity of the products. Retailers are often attracted to them because they are cheaper and consequently easier to sell. This not only results in ineffective use of poor quality inputs and reduced productivity, but they may be biologically hazardous. Their lack of effectiveness can also engender mistrust between farmers and input suppliers.</p>	<ul style="list-style-type: none"> • Access to improved product quality verification and monitoring for input supply producers • Awareness training to input retailers (L2) on the implications of counterfeit or low quality inputs 	<ul style="list-style-type: none"> • Input supply companies in collaboration with communications / technology companies 	<p><i>Input supply companies:</i> Local input supply companies (distributors) are not familiar with innovative ICT- and mobile-phone-based technology schemes that facilitate product verification, which can involve barcodes or SMS verification.</p>
<p><u>Wholesale:</u> 4. Soybean wholesalers in Lombok express a lack of knowledge and communication with potential/existing buyers in Bali and Surabaya. At times they have tried to contact new buyers - even inviting wholesalers for informal business-to-business (B2B) meets, but to no permanent avail. This represents missed sales opportunities for wholesalers in NTB upon whom farmers and collectors are dependent. It is also a significant missed opportunity to understand quality issues affecting all VC actors.</p>	<ul style="list-style-type: none"> • Access to buyers and marketing information to inter-island wholesalers 	<ul style="list-style-type: none"> • Inter-island wholesale buyers and suppliers 	<p>These actors are not used to reaching out beyond mobile phone communication and often have not toured the markets in Denpasar or Surabaya. They have a somewhat limited view of the issues their buyers face and how competitive their products are vs. imports, etc.</p>
<p><u>Production, harvest, and post-harvest collection:</u> 5. Farmers often apply unskilled methods for planting, weeding, and harvesting, which lowers their harvests and results in uneven product quality (e.g. beans of varying sizes, etc.). They</p>	<ul style="list-style-type: none"> • Access to training and information on best production practices and post-harvest handling to 	<ul style="list-style-type: none"> • Commercial input supply agents w/ input retailers 	<p><i>Input supply agents:</i> These agents sometimes are unable to reach out to enough farmers as the products and materials they use are more geared toward maize and rice cultivation. Domestic input supply companies lack</p>

<p>often broadcast seed, rather than practice in-line pocket planting, an inefficient planting method that raises their input costs; for seed, it means they are applying up to 4x more seed to sow the same hectare. Similarly, many are reported to be broadcasting NPK and urea, rather than "targeted" application.</p> <p>6. Farmers lack knowledge in and access to proper post-harvest storage methods for soybeans. As a result, especially for rainy-season farming, local soybeans have higher moisture content than American imports.</p>	<p>farmers</p>		<p>informational materials and strategies to promote soybean farming, as the market is heavily tilted toward maize and rice cultivation</p>
<p>Processing:</p> <p>7. Tofu processors often lack access to affordable fuel and more efficient processing techniques, which limits their ability to make higher amounts of tofu at lower cost. Several have reported that in other areas of southeast Asia there are affordable technologies available, but they have limited knowledge of them.</p> <p>8. Many tofu and tempeh processors would like to purchase inputs collectively, but there is no formal venue in which they can communicate issues to each other in most districts of NTB in EJ at least in Sampang.</p> <p>9. Certain tofu/tempeh processors would like to diversify their buyers/markets and upgrade their branding, packaging, and marketing strategies in an increasingly tight market. But they are unskilled and unfamiliar with the business development possibilities available.</p>	<ul style="list-style-type: none"> • Access to affordable improved processing technologies to tofu processors • Access to economies of scale in purchasing inputs for farmers • Access to branding/ marketing services for tofu & tempeh processors. 	<ul style="list-style-type: none"> • Engineering companies w/ tofu processors • Consortia of tofu/tempeh processors • Marketing agencies and consultants 	<p><i>Engineering companies :</i> These companies, while able to design efficient fuel stoves, may not be familiar with the specific technologies and designs required by SME processors for higher fuel efficiency.</p> <p><i>Tofu/tempeh processor groups:</i> Several identified "lead" processors in NTB and EJ have reported that they have made efforts in the past to create formal or informal groups for issues ranging from advocacy to environmental issues or coordinating on local markets.</p> <p>Processors and marketing agencies/consultants may have limited to no experience working with each other.</p>

Peanuts

Socio-economic and policy settings

Peanuts are an important commodity for Indonesian consumers and present a different set of challenges to the VC actors working with them as compared to soybeans. One major difference with soybeans is that peanuts are largely consumed as snack foods and sauces in home cooking. Another difference is the fact that while imports are growing, they make up only 20-25 percent of Indonesian consumption. Finally, the peanut value chain, while still relegated to secondary crop status by the Indonesian government, affords higher per kg margins to value chain participants than soybeans.

Peanuts are an important cash crop for smallholder farmers (.5 ha or less), who make up the majority of Indonesian farmers. It is the fourth most commonly grown crop in Java and NTB after rice, maize, and cassava. Peanuts serve many purposes. They are a rich and cheap source of vegetable protein and are used to produce edible oil for cooking, oil cake for cattle feed, and peanut butter. Peanut shells are also used as a source of fuel. As a legume, peanuts help to reinvigorate the soil after intensive grain/rice harvests through nitrogen fixation.

A principle concern in the industry is the evidence of insufficient government controls, from harvest through to retail, of aflatoxin content. There are laws on the books and agencies working to spread awareness on acceptable levels and best practices to avoid aflatoxin contamination from harvest to wholesale, but few market actors interviewed indicated any knowledge of the problem and risks associated therewith. Evidence of contaminated peanuts can be found in storage warehouses but these stocks are rarely subjected to government controls. According to wholesale traders in Surabaya, only imported peanuts undergo health/phytosanitary inspections at customs.

SME processors (roasters) indicated that they are subject to health inspections and certification but there is no specific mention of aflatoxin in these inspections. Garuda Foods, the only major flagship processor interviewed so far, implements its own safety system, along with HACCP controls at their processing centre, to minimize aflatoxin mold.

While the recent advances in crop varietal and management technologies have resulted in productivity gains in peanut, ignoring the food safety aspect in the peanut food and feed chain can result in a significant but invisible negative impact on human and animal health. As such, there is a strong need to develop and implement aflatoxin risk management practices and market policy interventions to minimise the aflatoxin risk to humans and livestock.

A number of independent studies conducted in Indonesia revealed extremely high levels of aflatoxin (up to 1,000 ppb) in peanut and maize products - far beyond acceptable levels of 40 ppb or less. The studies also showed that most of the aflatoxin contamination occurred in the post-harvest product handling phase, as the product moves through the supply chain into the retail traditional 'wet' markets (Y.S. Chauhan, G.C. Wright, R.C.N. Rachaputi, 2010).

Macro settings

Overall, Indonesia is the world's 7th largest producer of peanuts producing approximately 800,000 MT in-shell in 2011. Despite the comparatively high levels of production of peanuts in the world, Indonesia is also a net importer of peanuts.

Indonesia's exports of peanuts have not grown over the last ten years. One of the reasons stated by wholesalers is limited domestic production. The study team surmised that there could also be

international concerns regarding aflatoxin contamination that could be having an effect on exports. None of the traders, farmers, or wholesalers interviewed knew of any active campaigns to ensure that Indonesian peanuts comply with both domestic and international limits on aflatoxin contamination.

Peanuts are an important staple food for most Indonesians and feature prominently in local cuisine. Growing demand and consumption is linked to the growing Indonesian population (approx. 1.5 percent/yr). Despite this growth in demand, production has trended downwards with unmet demand being filled by imports (mostly India and China). With 310,000 MT expected to be imported in 2012, Indonesia is already the world's largest single importer after the European Union, and its imports are growing in excess of 3 percent/year.

Industry Settings

Overall, peanut production has been declining throughout Indonesia at an average rate of over 3.5 percent/year over the last nine years (USDA Gain Report, 2012). In the provinces of East Java and NTB peanut production area has remained relatively stagnant over the past 5 years. This assessment is supported by what the legumes team found in NTB and certain areas of East Java. While a more profitable crop for farmers and traders than soybeans, peanut farmers lack adequate farming infrastructure such as quality seed distribution networks. In contrast, farmers enjoy more widespread access to quality maize and rice seed, both through private and public distribution.

In addition to being consumed by farmers, peanuts are used in cooking in the form of sauces ("gado gado" sauce) sold by street vendors and restaurants/eateries, or roasted as snacks in the form of brittle, in-shell, or shelled. Up to 10 percent of peanuts on the market are processed into peanut oil and dry cake, the latter for the animal feed industry.

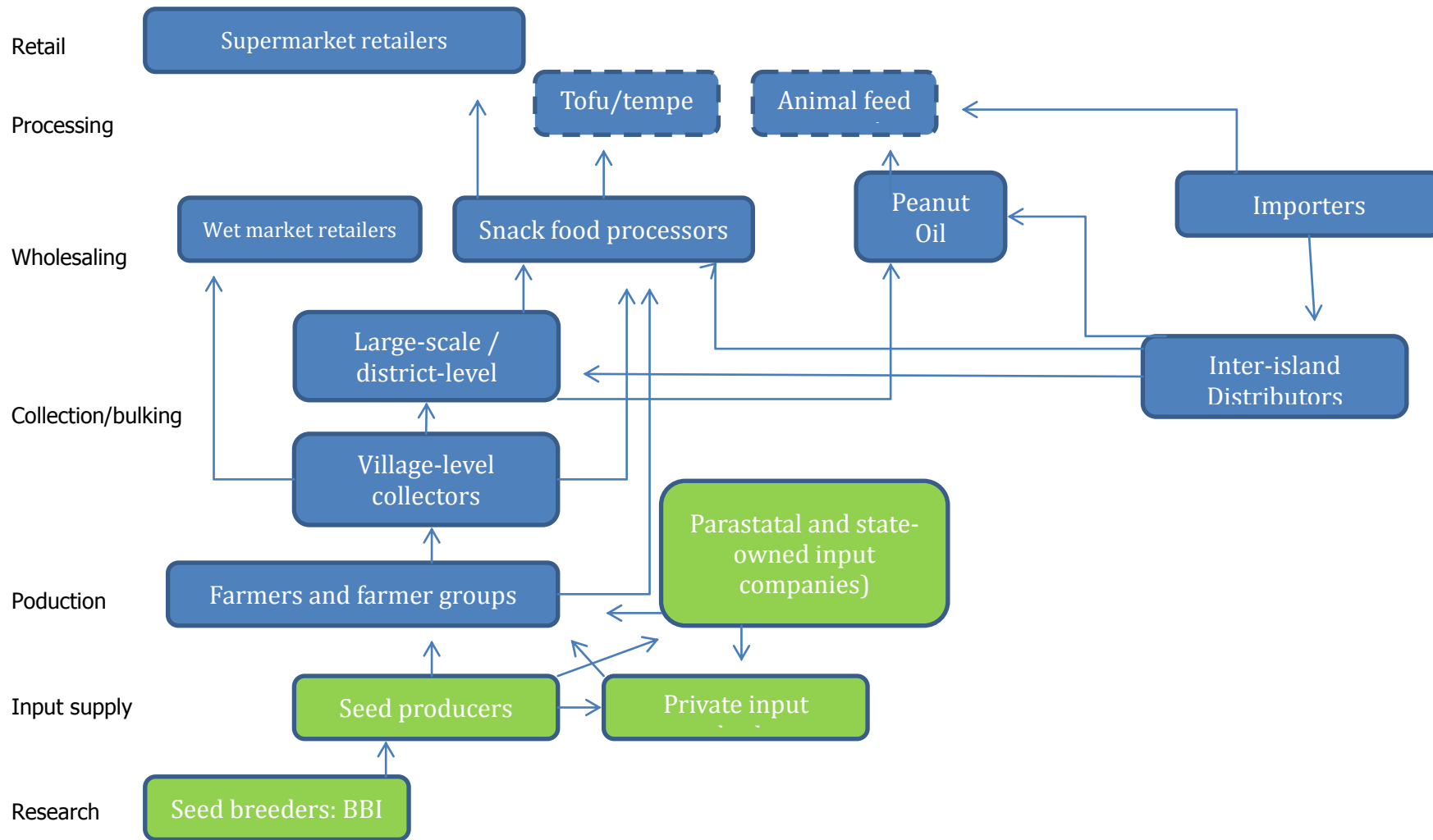
Every component of the peanut plant has some commercial use: peanut shells are sold by wholesalers as combustible fuel to tofu/tempeh processors and are reported to be a preferred fuel source by those processors interviewed in NTB. They are also used as a component in animal feed.

The peanut plant "straw" is used as on-farm cattle feed and traded or even sold or bartered by farmers. Peanut shells in North Lombok are sold as fuel to tofu and tempeh processors in Mataram.

The main drivers of peanut-as-food consumption on the market are snack food companies such as Garuda Foods, PT Dua Kelinci (both based in Central Java but sourcing peanuts from all over Indonesia, including the target provinces), Mitra Foods, and Orang Tua Group.

The presence of formal retail outlets as the end market for a significant portion of peanuts, in addition to more informal outlets at bazaars, is in marked contrast to the other two legume crops in this study, soybean and mungbean. It holds interesting opportunities for AIPD-Rural's program development.

Indonesian Peanut Value Chain Map



Value Chain Constraints and Market-based Solutions – Peanuts (NTB and EJ)

Value chain constraints /opportunities	Market-based solutions	Potential providers	Challenges to the provision and use of market-based solutions (by type of provider)
<p>Input supply: 1. There is a lack of commercially-available certified seed to farmers; many are using seed from their own seed banks or buying unofficial commercial seed from other farmers. There is a perceived lack of availability of quality, improved peanut seed through commercial channels</p> <p>Some wholesale buyers and peanut roasters/processors in East Java sell selected peanut pods or kernels to their own supplying farmers as a way of guaranteeing supply with harvest. But as with other legume crops their seed selection methods are not necessarily scientific or effective. Many of them are unaware of the existence of commercial seed developers.</p>	<ul style="list-style-type: none"> • Access to private sector market distribution channels to peanut seed developers • Access to improved quality seed to peanut farmers 	<ul style="list-style-type: none"> • Input supply distributors and retailers • Wholesale buyers and processors • Commercial seed developers 	<p><i>Commercial seed developers:</i> Seed developers face difficulties in marketing seed through private input supply networks (retail shops and distributors in more urban centers. They need access to state-of-the-art storage strategies and packaging to improve product quality. Many cite difficulties with the certification process. Furthermore, certified seed may not necessarily be of superior quality to certain uncertified seed</p> <p><i>Input supply distributors and retailers:</i> Many interviewed explained they would be willing to sell quality commercial seed if it were reliable, consistent, and well-packaged. They may not be aware of the presence of all the commercial seed developers. Their attention is more focused on rice and maize seed.</p> <p><i>Wholesale buyers:</i> Many wholesale buyers and their agents are unfamiliar with formal seed selection and the availability of various improved varieties they could be propagating. They are unfamiliar with techniques such as demonstration plots, seed selection and storage, etc. Most merely invite farmers to sort through their collected harvest and pick out planting material, often charging the same price to farmers as they would for regular pods to buyers rather than exacting a premium.</p>
<p>Producers lack access to inputs on credit which prevents them from being able to</p>	<ul style="list-style-type: none"> • Access to input credit for peanut farmers 	<ul style="list-style-type: none"> • Wholesale buyers and tofu/tempeh processors 	<p><i>Wholesale buyers and processors:</i> Many wholesale buyers are already</p>

<p>purchase inputs (seed, fertilizer, pest control products and herbicides).</p> <p>In certain cases, farmers enter into informal agreements with buyers to mitigate the lack of commercial credit. These buyer/seller schemes appear to be more advanced between peanut processors and farmers in areas visited in EJ (esp. Malang). In NTB, especially North Lombok, some wholesalers at the village level are supplying credit to peanut farmers.</p>	<ul style="list-style-type: none"> • Training in more formalized buyer-seller schemes including contracts and credit provisions to buyers and farmers/farmer groups 	<ul style="list-style-type: none"> • Commercial banks 	<p>providing some credit to supplier farmers, but they lack familiarity with mechanisms for contract farming - or at least on how to formalize relations with farmers, despite a pronounced willingness to explore such possibilities with a market development program like AIPD-Rural.</p> <p><i>Commercial banks:</i> Traditionally, these entities have never focused on farmers as potential clients and are unskilled at effective loan recovery or designing appropriate loan packages tailored to the needs of specific farmers (i.e. soybeans)</p>
<p>2. There is reportedly a large amount of cheaper but inferior-quality, often counterfeit, seeds, pesticides, and herbicides. Input companies have no way of controlling the circulation of these products and farmers are unaware of the inauthenticity of the products. Retailers are often attracted to them because they are cheaper and consequently easier to sell. This not only results in ineffective use of poor quality inputs and reduced productivity, but they may be biologically hazardous. Their lack of effectiveness can also engender mistrust between farmers and input suppliers.</p>	<ul style="list-style-type: none"> • Improved product quality verification and monitoring to input supply producers • Awareness training to input retailers (L2) on the implications of counterfeit or low quality inputs 	<ul style="list-style-type: none"> • Input supply companies in collaboration with communications/technology companies 	<p><i>Input supply companies:</i> Local input supply companies (distributors) are not familiar with schemes that facilitate product verification, which can involve SMS messaging systems and mechanisms to verify product authenticity.</p>
<p><i>Production, harvest, and post-harvest collection:</i></p> <p>3. Farmers often apply unskilled methods for planting, weeding, and harvesting, which not only lowers their harvests but results in uneven product quality (e.g. beans of varying sizes, etc.). They often broadcast seed - an inefficient planting method that raises input costs. Many are reported to be broadcasting NPK and urea, rather than "targeted" application.</p>	<ul style="list-style-type: none"> • Access to training and information on best farming practices and post-harvest storage to farmers, collectors, wholesalers, and processors. 	<ul style="list-style-type: none"> • Commercial input supply agents w/ input retailers • Wholesalers • Processors 	<p><i>Input supply agents:</i> These agents sometimes are unable to reach out to enough farmers as products and materials they use are more geared toward maize and rice cultivation. Domestic input supply companies lack informational materials and strategies to promote soybean farming. The market is heavily tilted toward maize and rice cultivation.</p> <p><i>Wholesalers and processors:</i></p>

<p>4. Actors across the entire value chain are unaware of (or not expressing concern with) the hazards associated with aflatoxin contamination of peanuts. Farmers lack knowledge in and access to proper post-harvest storage methods for peanuts which, especially for rainy-season farming, results in peanuts with higher moisture content and susceptibility to Aspergillus contamination.</p> <p>There are government standards on a national level but are not being enforced so market actors are left to their own standards of quality control.</p>	<ul style="list-style-type: none"> • Awareness building to quality controls to wholesalers and processors 		<p>Neither processors nor wholesalers and their collector agents are aware of the dangers of aflatoxin contamination. It is essential to control humidity, which they only check based on visual inspection, not with any instrumentation.</p>
<p><i>Processing:</i></p> <p>5. As annual peanut production falls across Java and NTB, larger-scale peanut processors do not have sufficient access to quality peanuts and are forced to import kernels from India. These are ultimately more expensive.</p> <p>Some processors have attempted to source peanuts from farmers in NTB, but was unable to fulfill target quantities.</p>	<ul style="list-style-type: none"> • Access to raw material supply to lead firm peanut processors 	<ul style="list-style-type: none"> • Lead firm processors, collectors/agents, and farmer groups 	<p>Some LFs expressed a lack of skills in proper seed development and extension, which the company (and its competitors) would like to build up.</p>

Mungbeans (NTT)

Socio Economic and Policy

The third legume value chain examined in this study is mung bean. The area covered was limited however to two districts of NTT (TTU - an AIPD-Rural target district - and Belu, both on Timor Island). Mung beans are abundant in wet markets throughout NTB, NTT, and EJ, either as fresh sprouts or dry beans. They are often cooked at home as porridge. They are even processed by companies into popular drinks such as “mung bean tea”.

Similar to peanuts and soybeans, they are regarded as a profitable secondary legume crop, and in some cases they were the primary source of income for farmers interviewed in NTT. Many traders and retailers in NTT reported respectable margins on their mung bean trade as well as strong demand, and relative ease of storage.

Mung beans are a useful source of protein to consumers in Java, NTB, and NTT, and they enjoy relatively higher demand among the urban and rural poor. They are also used as an ingredient in animal feed.

For certain farmers in NTT, especially those with access to irrigation, mung bean is seen as a reliable crop and source of income. Several farmer groups interviewed reported eagerness to plant at least two crops per year. A few traders even mentioned that it is being grown increasingly as a rainy season crop in Belu district.

The only policies and regulations known to affect mung beans in Indonesia involve imports of plant products, which are overseen by the Department of Agriculture. Importers are required to obtain phytosanitary certification for pests and residues issued by the Indonesian National Agency for Drug and Food Control (or "BPOM"), in addition to an importer's license.

There are no known tariffs on imported mung beans presently from other ASEAN nations, China, Australia, or New Zealand. However, a 5 percent import tariff applies for dried beans (including mung beans) from India, a major mung bean exporter.

Macro settings

There are few clear statistics available on global mung bean cultivation, but for all dry beans (which also include other pulses as well as pigeon peas, etc.), Indonesia ranks 12th among the world's producers at approximately 250,000 MT. According to the Indonesian Nation Bureau of Statistics, this figure is over 300,000 MT. It is reasonable to assume, however, that mung beans do not constitute a majority of dry bean crops and that production is closer to 50,000 MT of mung beans/year. The world's largest producer of mung beans is India, but China is the largest exporter at approx. 200,000 MT/year or less.

A relatively small amount of mung beans are exported from Indonesia yearly. The most prominent exporter interviewed in Surabaya reported sending up to 4,000 MT/year to other ASEAN countries. This exporter was quick to point out that only the large, dull-green mung beans from Central Java are exported, and none from NTT or elsewhere. He also stated that Indonesia also imports mung beans from China and India, but the majority of mung beans consumed in Indonesia are grown in Java.

Industry settings

For all of Indonesia, NTT ranks fifth in production of mung beans behind Central and EJ, Sulawesi, and NTB. Centres of production in NTT are Belu, followed by Manggarai (Flores), Sikka (Flores), and Kupang - none of which are AIPD-Rural target districts. That said, there is some production in the target district of TTU which is adjacent to Belu.

According to the Indonesian Nation Bureau of Statistics, while mung bean production has remained stable or even grown in other provinces, it has fallen by 50 percent in NTT since 2007, even though productivity has remained stable over this period. One reason given by key informants is the lack of on-farm labour and opportunities for farmers to seek alternative employment in newly emerging cities in NTT. For the target district of TTU other reasons cited include unpredictable rain patterns coupled with a lack of access to good seed varieties. Farmers interviewed in Belu district reported difficulties with excessive rainfall since 2011 that have resulted in trade of mung beans falling by as much as 40 percent.

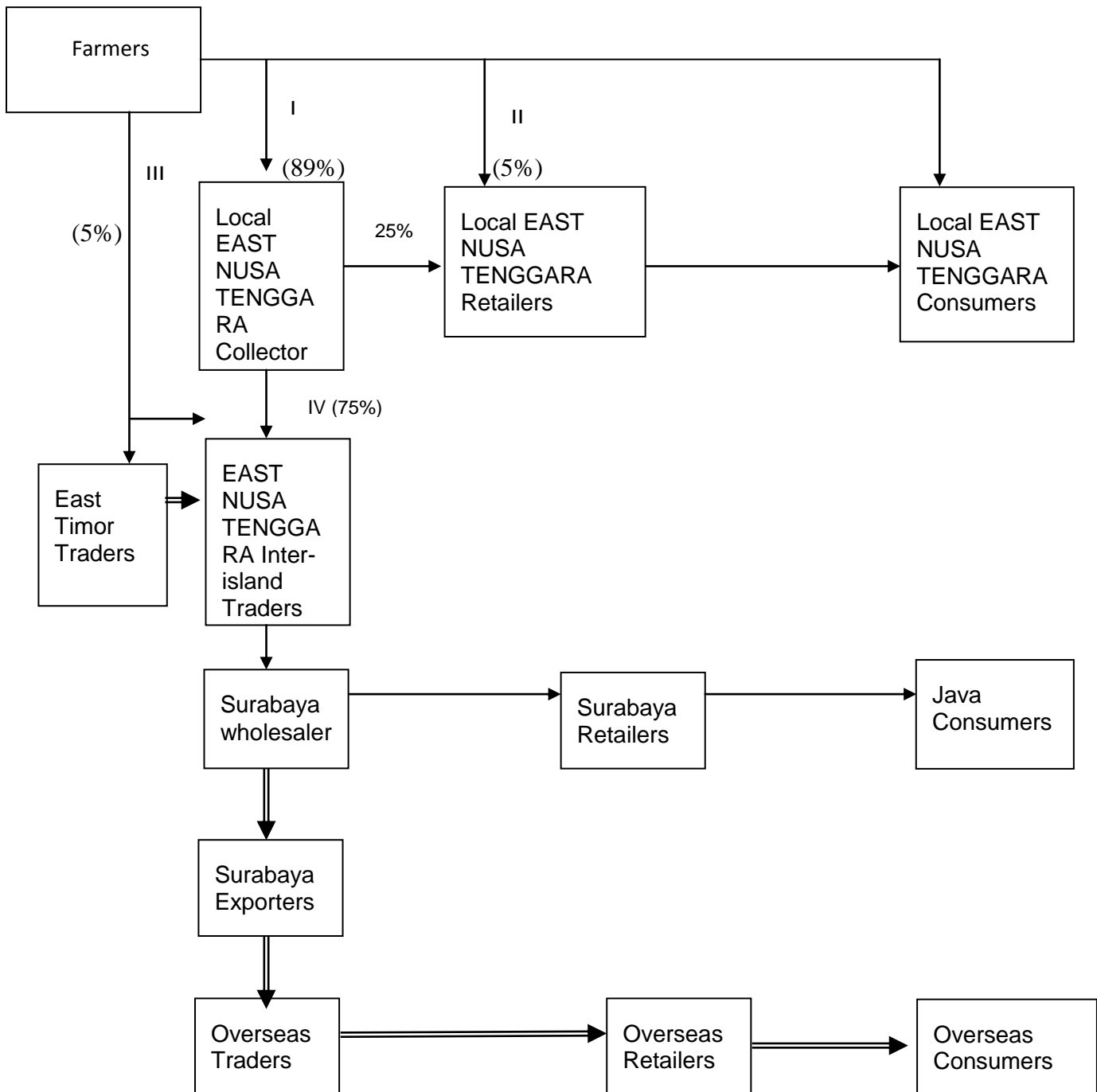
Their final uses in Indonesia include the following:

- Fresh sprouts - the majority of small and shiny mung beans in EJ are processed into sprouts. It appears the dull beans in Timor Island are also for that purpose. Sprouts are sold mostly at wet markets by small-scale retailer-processors.
- Sweet porridge - typically produced at home or by street vendors, this is a common breakfast food or dessert (called "es kacang hijau").
- Cakes and snacks - available for sale by street vendors but most often cooked at home.
- Mung bean starch and flour - this can be used by processors (see below) to make infant formula.
- Mung bean drink - this is a milk substitute produced by two large companies in Indonesia. Processed in West Java, these are the most high-end, smartly packaged commercialized products produced from mung beans available on the market. A variant of this is mung bean drink powder, which is produced in West Java.

Retailers at wet markets in NTT reported that demand for mung beans is constant year-round. This is a primary incentive for which these retailers - who are also selling various grains, staples, vegetables, and locally traded spices - cite for trading in mung beans.

Some wholesalers in Surabaya reported that mung beans from NTT - specifically those from Atambua - exhibit quality issues in that suppliers tend to mix old harvests with fresh ones. This sometimes results in insect infestations - to which mung beans are highly susceptible if not stored under proper conditions.

East Nusa Tenggara Mung bean Supply Chain and Stakeholders



Source: Adar, D., Basuki, T., Bennu, F., Augustiana, H., "Mungbean Value Chain Analysis in East Nusa Tenggara Province and Potential for Linkages with other Major Mungbean Markets in Indonesia". ACIAR SMAR 2007/068 (2009)

Mung beans received less attention during the study than the other value chains. Nevertheless, the team was able to identify further areas of work which AIPD-Rural could explore in NTT. These are:

- *Flores and Sumba islands* - all indications are that the majority of mung bean production for NTT is on these two islands (in addition to Belu district). More seed developers and wholesale traders in these areas should be contacted to compare with the information gathered from West Timor.
- *Follow-up with seed developers* - Two seed multipliers in Atambua, were interviewed. Both expressed interest in working with AIPD-Rural to help solve the problem of access to quality seed for mung bean farmers by expanding private distribution networks through shops and input distributors. Their outreach alone might result in certified mung bean seed being made available to thousands of farmers in Belu and TTU districts. Are there other seed developers in Flores or Sumba islands?
- *Examine the possibility of transposing ACIAR's public-sector mung bean loan program model into the private sector* - the current setup of the NTT bank loans might be replicated by more private sector actors. The legume team interviewed one other bank and they expressed interest in identifying a suitable contractual model with farmers and wholesale traders in NTT or EJ as guarantors, with the potential for input supply companies to provide technical training to farmers.
- Both financial institutions interviewed stressed the importance of assuring a guaranteed market for farmers before they would be willing to provide loans. So far, the local market appears able to absorb local production, but this might change if there is a sudden bounce in production levels. These same sources warned that if production levels increase too quickly, the market price could collapse. They both based their assertions on experience with other unsubsidized commodities but would not specify which ones.
- Other LFs in NTT suggested they could work with AIPD-Rural to extend mung bean farming with credit and technical support to local farmers in TTU. They expressed confidence in the ability to sell any beans produced, but the question would be at what price threshold that would be acceptable to farmers.

Illustrative Project Facilitation Activities

The illustrative project facilitation activities presented below will support the development of the MBS mentioned in this report. These activities are not exhaustive, but rather illustrative. They will need to be fine-tuned with further follow-up as part of the ongoing program design process. Additional facilitation activities will also be identified as more MBS are addressed.

Any intervention or initiative proposed by a targeted MBS provider should contribute to the company's ability to improve, expand or develop the products and support they provide to producers to whom they buy or from whom they sell. Based on the constraints and market-based solutions analysed in the previous sections, as well as discussions with targeted MBS providers, some illustrative facilitation activities for the legumes value chain might include the following:

1. Illustrative facilitation activity: develop capacity of lead firms to conduct producer training and extension activities

Facilitation activities can build the capacity of lead firms to develop training modules, organize demonstration plots to expose producers to improved production practices and/or new varieties, and introduce high-yielding and sustainable production methods;

Market-based solutions addressed: *training in more formalized buyer-seller schemes including contracts and credit provisions for buyers and farmers/farmer groups; access to training and information on best farming practices and post-harvest storage for farmers;*

Examples for legumes -

- Several soybean and peanut wholesalers in EJ, NTB, and NTT have expressed willingness to improve their sourcing abilities and building better relations with farmers, and would like support in developing training materials they believe might result in improved trust as well as product quantity and quality available to them. Depending on the numbers of wholesalers with whom the AIPD program is able to collaborate, more than 10,000 farmers and their families will benefit directly.

2. Illustrative facilitation activity: support LFs to introduce improved and new varieties of seed to producers

Facilitation activities include supporting LFs to identify and test new varieties of seed needed by producers and the industry;

Market-based solutions addressed: *Access to improved quality seed to peanut farmers; Access to training and information on best farming practices and post-harvest storage to farmers;*

Examples for legumes:

- Large corporates who have previously invested in improving their sourcing capabilities in NTB, expressed interest in developing the ability to test and extend new and improved peanut seed to its sourcing areas, including target districts in NTB. By working with these types of companies alone, the potential outreach to poor farmers is 10,000 or more in the short term, and eventually over 100,000 farmers as the varieties are made available to more and more legume farmers in the general population. The more companies that are brought on board, the more effect this will have on legume farmers accessing improved varieties of peanut seed over the long term.

3. Illustrative facilitation activity: build the capacity of LFs to improve and expand their procurement from producers

Facilitation activities may involve helping wholesalers, processors and lead firms to develop or expand innovative outgrowing and direct procurement models with poor farmers that include providing those farmers with technical support, inputs, and an assured market.

Market-based solutions addressed: *Training in more formalized buyer-seller schemes including contracts and credit provisions to buyers and farmers; access to training and information on best farming practices and post-harvest storage to farmers; training in group purchasing of soybeans/inputs to tempeh/tofu processors*

Specific examples for legumes:

- Several of the large snack food companies and/or their wholesale suppliers already have experience with outgrowing operations and could be supported to expand these operations into (or return to) the targeted areas. This could easily benefit over 10,000 farmers.
- Tofu/tempeh processors in Mataram (Lombok) would like support in trying to organize into informal groups in order to facilitate group purchasing of soybeans. Such activities, they believe, could lower the price they get from wholesalers and increase their leverage. UP to 300 processors and their employees in Lombok could benefit directly.

- A wholesale mung bean collector in NTB would be interested in extending mung bean farming of improved varieties to farmers in TTU. This could have direct effects for hundreds of farmers. The company already sources rice from this region as well as mung bean from Belu district, having significant experience in extension, embedded credit and (informal) contract schemes.

4. Illustrative facilitation activity: introduction of new technologies to improve LF efficiencies (and their products / services provided to producers)

Facilitation activities include: introducing new or improved tools/equipment to processors or producers (not buying them for them), offering technical support in developing improved post-harvest techniques and new methods of post-harvest storage, or support for a company in its efforts to develop or improve its final products (quality, packaging, labelling, product diversification etc.);

Market-based solutions addressed: *Access to affordable improved processing technologies to tofu processors, improved product quality verification and monitoring to input supply companies*

Specific examples for legumes:

- SME tofu processors in NTB (Bima, Mataram) and Sampang (East Java) were interested in improving efficiencies in their fuel usage. Some mentioned that in nearby regions and ASEAN countries similar tofu processors are using better but affordable technologies from which they would like to learn
- Input supply distributors and producing companies may be interested in implementing an SMS-based product verification scheme to help farmers buying their products verify authenticity, thereby mitigating the problems caused by counterfeit products. Implemented successfully in other countries (including Bangladesh, Zambia, and Kenya), this would involve collaborating with one or more mobile phone operators

5. Illustrative facilitation activity: exposure visits/ business-to-business meetings

Facilitation activities include inter-regional or international learning visits to lead firms or processors to identify new technologies, sources of useful tools, equipment, or skills, etc.

6. Illustrative facilitation activity: facilitating market access for LFs (who in turn will purchase more from producers)

Facilitation activities include: development of promotional materials, facilitation of trade show participation to lead firms, business-to-business meetings, and technical support to meet requirements of existing or potential markets.

Market-based solutions addressed: *Access to branding/marketing and business development services to tofu & tempeh processors*

Note: there are more lead firms in the targeted value chains that will need to be contacted to explore market development opportunities.

Certain tempeh and tofu processors in NTB and EJ would like to improve the branding of their products in order to reach out to new and more upscale markets. Activities might include cost-share programs to link processors with marketing agencies and consultants

- Peanut roasters in Lombok and EJ contacted so far would like to collaborate, on helping them find new markets and upgrade their processing technologies
- Seed development companies across all three commodities have little to no experience marketing through private sector channels and would like AIPD-Rural to help facilitate their

connections with potential distribution networks in the private sector, including input supply shops and wholesaler agribusiness operations. The activities will require that the seed developers tailor their products and packaging to their input supply shop and farmer/wholesaler clients, perhaps with the introduction of new, improved varieties more suitable to the local market.

7. Illustrative facilitation activity: improving LF quality management systems (allowing them to improve products and services to producers)

Facilitation activities include: helping lead firms or processors to improve quality management systems, linking businesses with market development or quality management (QM) service providers

- Peanut roasters/processors as well as soy cracker and tempeh processors often lack hygiene certification. One peanut processor has admitted they have not been able to sell to certain clients due to a lack of food safety documentation and systems. They would be interested in some technical support in upgrading their QM systems and food safety. This should involve identifying food safety consultancies and developing cost share agreements with the processors as well as training programs (QM).

Summary - It is important to note that the ultimate feasibility of these proposed activities, and the details of how they will be implemented will only be able to be determined closer to project implementation, once more in-depth discussions are held with the targeted market actors themselves. In order to get sustainable and commercially viable results, the proposed providers of the market based solutions will need to take full ownership and responsibility for the proposed initiatives. During the time of discussions and negotiations the targeted companies might propose a wide range of innovative interventions that have not yet been discussed. It is therefore important to be open minded at this stage and not try to create a project blue print. At the same time, before ruling out any of the illustrative facilitation activities mentioned in this report they should be vetted with the market actors to get their feedback as to what is feasible or not.