

**2016 UPDATE**  
**SOYBEAN SUB-SECTOR GROWTH STRATEGY**  
**IN**  
**EAST JAVA**

**June 3, 2016**

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## Abbreviations

|            |   |
|------------|---|
| AIP-PRISMA | Australia-Indonesia Partnership for Promoting Rural Income through Support for Markets in Agriculture |
| BATAN      | Badan Tenaga Nuklir Nasional  |
| BBI        | Balai Benih Indonesia   |
| BPSB       | Badan Pengawas Sertifikasi Benih (Seed Control and Certification Bureau)                              |
| BPTP       | Balai Pengkajian Teknologi Pertanian (Institute for Agricultural Technology)                          |
| CAGR       | Compound annual growth rate   |
| CSIRO      | Commonwealth Scientific and Industrial Research Organisation  |
| EWINDO     | East West Seed Indonesia  |
| GAP        | good agricultural practices   |
| Ha         | Hectare   |
| ILAF       | Intervention Logic Analysis Framework   |
| ILETRI     | Indonesian Legume and Tuber Crop Research Institute   |
| KOPTI      | National Association of Tempeh and Tofu Processors  |
| MTA        | Mitra Tani Andalan  |
| NTB        | Nusa Tenggara Barat (West Nusa Tenggara)  |
| NTT        | Nusa Tenggara Timur (East Nusa Tenggara)  |
| PAT        | Perluasan Area Tanam  |
| SME        | Small and medium-sized enterprises  |

## Summary of key changes from previous GSDs and focus for next year

| Year | August 2014 - June 2015   |
|------|---|
|      | <p>Over the past year, the team has focused on implementing several interventions to promote good quality seeds in East Java and on identifying additional constraints faced by soybean farmers. They have conducted numerous meetings with market actors in the sector, as well as a survey of input and cultivation practices in four districts of East Java. This has improved their understanding of the dynamics, constraints, and opportunities in the sector. The main changes to the GSD include:</p> <ul style="list-style-type: none"> <li>• <b>Adding a separate intervention area related to improving information and extension services:</b> In the previous version of the GSD, information services were only being addressed through embedded information from existing or new nurseries. While the intervention area on promoting good quality seeds will still involve embedded information through actors in the seed supply chain, there is now an additional intervention area which looks specifically at promoting better information services. This could involve partnerships with other types of input suppliers (not just seed related actors), as well as lead farmers.</li> <li>• <b>Highlighting the importance of pest and disease management:</b> The previous version of the GSD understated the impact of pests and diseases on production losses and claimed that these were not considered to be a major threat. Upon further investigation, the team found that pest and disease control is critical for improving productivity and losses can reach up to 80% without proper pest and disease control strategies. This is now discussed in the market dynamics. The ILAF, analysis, and strategy sections have also been updated such that pest and disease control will be addressed under the new intervention area on better information services.</li> <li>• <b>Expanding the intervention options under the intervention area on quality seeds:</b> Originally the focus on quality seeds was to work on certified seeds with established or new potential nurseries. The team is now also looking at ways to introduce new varieties developed through local or international research institutes through partnerships with private seed companies. This is now discussed in the market dynamics, as well as the ILAF, analysis, and strategy sections. Additional partnership opportunities with other market actors (i.e. EWINDO, BATAN, CSIRO, Soybean Lab, Syngenta Foundation) are presented in this version of the GSD.</li> <li>• <b>Revisiting the impact of post-harvest losses:</b> The previous GSD claimed that post-harvest losses were insignificant (approximately 5%). It appears that this was based on investigations in one location, and it is not clear whether this can be generalised to the rest of East Java. While the team does not have further information on the impact of post-harvest losses, they plan to revisit this through a post-harvest assessment this year. For now, we have taken out the reference from the GSD on how losses are insignificant and will provide more accurate information on the impact of post-harvest practices in next year's update. This may or may not lead to the addition of a new constraint and related intervention area.</li> <li>• <b>Adding several more initial target districts:</b> The previous version of the GSD focused on Trenggalek and Sampang as initial target districts. The updated GSD now also includes information on the dynamics in Ngawi, Madiun, and Nganjuk, which are areas where the team plans to pilot a new intervention with BASF.</li> </ul> <p>The market growth potential in the sector has not changed, and there is still significant opportunity to expand East Java's soybean production in order to meet the growing demand for soybean from the food processing industry.</p> |
|      | <p><b>The planned focus for July 2015-2016 is on:</b></p> <ul style="list-style-type: none"> <li>• Piloting an intervention with BASF to promote information services for soybean farming and an intervention with BATAN and EWINDO to introduce higher-yielding varieties (Mutiar 1)</li> <li>• Conducting a post-harvest assessment in order to understand the losses from current post-harvest practices and identify potential opportunities for post-harvest services</li> <li>• Conduct an assessment to understand the demand for soybeans by large industrial food processors and the potential for promoting the use of local soybeans to these industrial processors. In particular, Nestle, Unilever, and Indofood are currently importing soybeans for the</li> </ul>   |

- production of baby food, but it is unclear what volumes they purchase and how significant this market is.
- Monitoring the local government in Sampang and Trenggalek to check that they will continue using the training methodology/materials and nursery assessment methodology when they establish new nurseries
  - Monitoring UD Karya Tani to check that the company continues selling certified soybean seeds in Trenggalek and expands sales to other districts

| Year | July 2015 - June 2016  |
|------|--|
|      | <p>From July 2015 to June 2016, the team has focused on implementing several interventions to promote good quality seeds in East Java, promote Good Agriculture Practice through lead farmers called soybean doctor and promote new and high yield soybean variety. Team also working on identifying additional constraints faced by soybean farmers. The main changes to the GSD include:</p> <ul style="list-style-type: none"> <li>• <b>Update information on existing soybean nursery business in East Java:</b> In the previous version of the GSD, information about existing nursery business in East Java need to be revise based on information from certification institution – BPSB. Upon further investigation, the team found that the number of soybean nursery is bigger than previous GSD but higher turnover of nursery.</li> <li>• <b>Update market map.</b> The previous version of market map in GSD understated the source of soybean from various supplier and unclear information of Government program in seed subsidy.</li> <li>• <b>Adding several more initial target districts:</b> The previous version of the GSD focused on Trenggalek, Sampang, Ngawi, Madiun, and Nganjuk as initial target districts. The updated GSD now also includes information on the dynamics in Bojonegoro and Lamongan which are areas where the team plans to pilot a new intervention with BASF.</li> </ul> <p>The market growth potential in the sector has not changed, and there is still significant opportunity to expand East Java’s soybean production in order to meet the growing demand for soybean from the food processing industry.</p> |
|      | <p><b>The planned focus for July 2015-2016 is on:</b></p> <ul style="list-style-type: none"> <li>• Modified intervention with UD Karya Tani to other intervention in creating online market place to sell certified soybean seed.</li> </ul>   |

| Year | July 2016 - June 2017 |
|------|-----------------------|
|      |                       |

## 1 Executive summary

**Indonesia is a rising consumer of soybeans, but it currently only produces one third of the soybeans it consumes.** Demand is driven by the food processing industry, particularly tempeh and tofu processing. Soybean is one of the most important source of protein for Indonesians in both rural and urban areas. Indonesia relies on a sizable amount of soybean imports to fulfil domestic demand, with imports having increased on average by 10% each year between 2005 and 2015.

**East Java is the epicentre of soybean production in Indonesia, accounting for 43% of national production.** Soybean production in East Java is supported by a large harvested area, with East Java accounting for 35% of Indonesia's soybean harvested area in 2012. While there has been an upward trend in productivity, yields continue to be low when compared to international benchmarks and the genetic potential of available cultivars. Soybean farming, which is a secondary crop for farmers, complements the intensive cultivation of more highly valued primary crops and provides an additional income stream to farmers in the post-rice or maize harvest seasons.

**There is a market opportunity to expand East Java's soybean production in order to meet the growing demand for soybean from the food processing industry.** Tofu and tempeh consumption are on the rise as local populations have developed a preference for these sources of protein. Processors have reported robust production and sales growth over the past five years and expect to continue expanding their operations. As a result, there is an existing and growing market that is able to absorb increases in local soybean production.

**Analysis of the market reveals a number of problems that currently constrain the ability of soybean farmers to take advantage of this market opportunity.** Farmer productivity is low because they use poor quality seeds and poor agricultural practices, including around pest and disease control. Limited access to good quality certified seeds and improved soybean seed varieties means that farmers continue to use degenerated seeds with low and declining yields. Furthermore, they are unable to maximise yields because they have limited access to information on good agricultural practices (including on pest and disease control strategies) and are reluctant to invest in better practices and/or pesticides and insecticides because of the perceived low returns from soybean farming

These problems are associated with weaknesses in seed and information/extension services. Although there are a few established nurseries that can produce certified seeds, most of them do not have commercial distribution channels. In general, nurseries face large obstacles when trying to obtain seed certification, and there are high barriers to entry into the soybean nursery business. While government research institutions have developed improved, higher-yielding soybean varieties, they have low capacity to promote these new varieties. At the same time, private seed companies have not considered soybean seeds as a potential market. Finally, public provision of information and extension services is poor, and there is a lack of private alternatives.

**The vision of change at the sector level is to:** increase smallholder productivity and make soybean farming more profitable. At the service level, it is envisaged that farmers will have

improved access to: (1) seed and (2) information and extension services. To realise this vision, this report recommends the following two intervention areas:

- Promote good quality seeds
- Promote better information services, including on pest and disease control strategies

We envision that seed services will be provided through nurseries, seed retailers, seed companies, with potential collaboration with the local government and government seed institutions (such as BATAN and BPSB) or international research institutions or projects engaged in soybean research. Information services can be provided through some of these same actors, as well as through chemical input companies and lead farmers.

**It is recommended that the intervention areas in the East Java soybean sector be implemented in two phases.** In the first phase, the focus is on *promoting good quality seeds* since we already have several partners and on-going interventions in this area. This will be followed in the second phase by *promoting better information services, including effective pest and disease control strategies*, which is a new intervention area introduced in the 2015 update of the GSD.

## 2 Background

The Australia-Indonesia Partnership for Promoting Rural Income through Support for Markets in Agriculture (AIP-PRISMA) is a multi-year program that is a part of the Government of Indonesia's midterm development strategy to accelerate poverty reduction through inclusive economic growth. With the support of the Government of Australia, the program aims to achieve a 30% increase in the net incomes of 300,000 male and female smallholder farmers in eastern Indonesia by June 2017. PRISMA works in East Java, West Nusa Tenggara (NTB), East Nusa Tenggara (NTT), Papua, and West Papua.

This Sector Report aims to provide a logic and rationale for market-based interventions which can support the soybean sector to the benefit of smallholder farmers in East Java.

## 3 Sector description

### 3.1 Sector profile

The sector profile provides information on the current status and potential of the target sector. This has been derived mainly from secondary data and literature relevant to the soybean sector

#### 3.1.1 Overall context

**Global demand for soybean is strong and rising, with China being the biggest driver of demand and prices for soybeans.** World production of soybeans has rapidly increased, with a compound annual growth rate (CAGR) of 3% over the past decade. In 2013, 276 million tonnes of soybean were produced globally. The United States and a group of South American countries are the main producers, and the US and Brazil accounted for 32% and 30% of global production respectively in 2013.

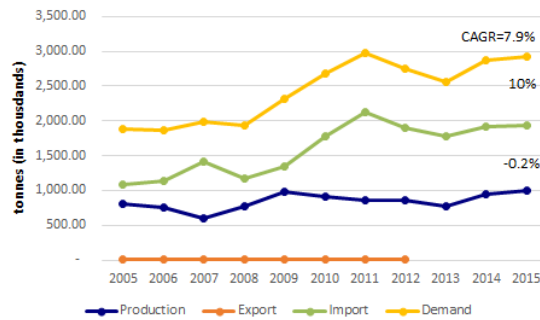
China alone imported 59.9 million tonnes in 2012, accounting for over 62.4% of world soybean imports. This was on top of an estimated 12 million tonnes of domestic production. Chinese soybean demand is expected to continue growing alongside increases in population, incomes, urbanisation, and meat consumption. As demand in China grows, this has put upward pressure on international soybean prices, and world soybean prices have generally trended upwards.

**Although a rising consumer of soybeans, Indonesia is not a major producer on a global scale, and its soybean production has in fact been declining.** Soybean is one of the most important source of protein for Indonesians in both rural and urban areas. Soybean has deep historical roots in Indonesian culture, with tempeh having originated in Java and having been a food staple since at least the 16th century. Tofu was introduced subsequently into the Indonesian diet by the Chinese. Tempeh, tofu, and soy sauce are respectively consumed by nearly 70%, 65%, and 45% of households in Indonesia.



Nonetheless, both soybean production and harvested area in Indonesia have been trending downwards for the past 20 years. In the past decade, Indonesian production of soybeans was just less than one million tonnes with its peak in 2009. Production has declined to 780 thousand tonnes in 2013 and accounts for less than 1% of global production. National demand, on the other hand, has been growing at a CAGR of 7.9% between 2005 and 2015.

**Figure 1: Indonesian soybean market**

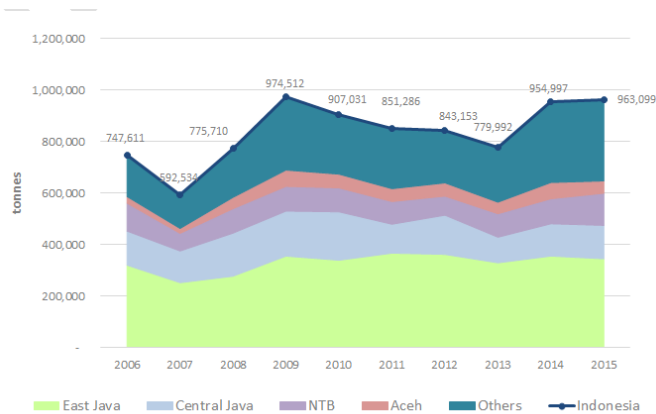


**Indonesia currently only produces one third of the soybeans it consumes and relies on a sizable amount of soybean imports to fulfil domestic demand.** Indonesia has been a net importer of soybeans since 1975. Imports, which have increased on average by 10% each year between 2005 and 2011, reached 2.1 million tonnes in 2011. Most of the soybeans imported into Indonesia are sourced from the US, which contributed approximately 85% of Indonesia’s soybean imports in 2012. Indonesia does export some soybeans, but the volumes are negligible when compared to imports.

**3.1.2 Local context**

**The epicentre of soybean production in Indonesia is East Java, accounting for 43% of national production.** Four provinces, namely East Java, Central Java, NTB, and Aceh, contribute 75% of national soybean production. Between 2006 and 2015, East Java consistently produced more soybean than any other province and contributed on average 38% of annual national production. Unlike the national trend in which production declined on average by 4.4% annually, production in East Java increased slightly by a CAGR of 0.6% between 2009 and 2015.

**Figure 2: Soybean production by top provinces**

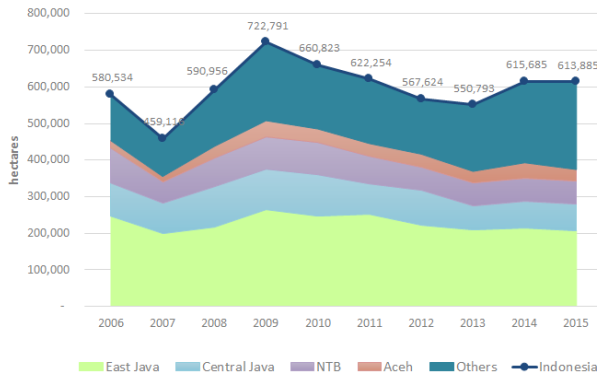


**Soybean production in East Java is supported by a large harvested area, with East Java accounting for 35% of Indonesia’s soybean harvested area in 2015.** Similar to national trends, between 2009 and 2015, there was a downward trend in the soybean harvested area in East Java. In East Java, this resulted in a 17% reduction in harvested area from 264.8 thousand hectares (ha) in 2009 to 220.8 thousand ha in 2015. Nationally, the soybean harvested area fell by 21% during the same period.

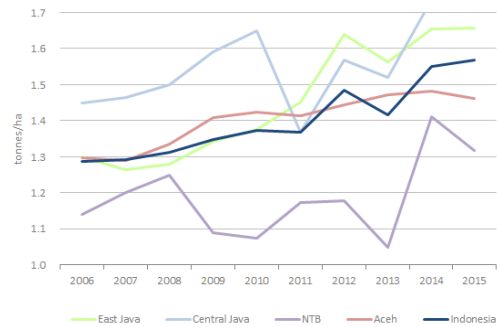
**Since harvested area has declined faster than production, there has been an upward trend in productivity.** But yields continue to be low when compared to international benchmarks. In 2015, national yields reached 1.57 tonnes/ha while East Java registered 1.65 tonnes/ha—the highest productivity among the top four provincial producers. Only Central Java has surpassed this figure, with a yield of 1.8 tonnes/ha in 2015. When compared with US and

South America, yields in Indonesia are only half of what is being achieved by the leading global producers.

**Figure 3: Soybean harvested area by top provinces**



**Figure 4: Productivity by top provinces**

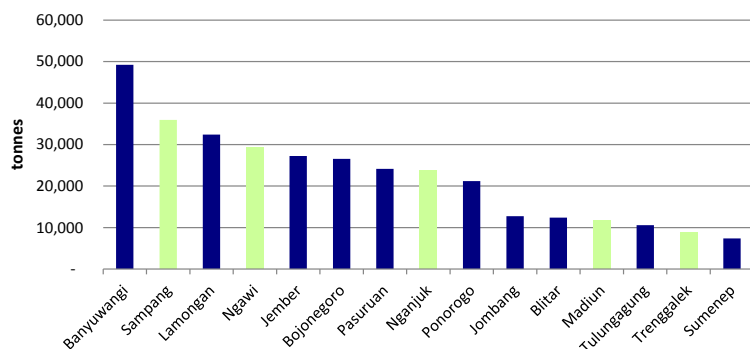


**Soybean farming is estimated to involve approximately 620,000 farming households in East Java and is an important source of additional income for poor farmers.** While soybean is not the primary source of income for most Indonesian farmers, it usually complements the intensive cultivation of more highly valued primary crops and provides an additional income stream to farmers in the post-rice or maize harvest seasons. Most soybean farmers can be described as poor, as are the many thousands of people employed in the tempeh and tofu processing industry. The urban and rural poor are also among the highest consumers of tempeh and tofu. This underscores the importance of soybean as a pro-poor commodity.

In addition to their pro-poor economic benefits, soybeans, along with other legumes, have the unique ability to fix atmospheric nitrogen to support their own growth and provide residual nitrogen for use by subsequent cereal grain and fodder crops. They also provide significant crop rotation benefits by reducing pests, soil-borne and foliar disease, and weed pressure.

**At the district level, the 5 districts in which AIP-PRISMA is starting its soybean sector interventions accounted for 30% of soybean production in East Java in 2015.** These districts are Sampang, Ngawi, Nganjuk, Madiun, and Trenggalek. Initial districts are selected based on the availability of entry points and potential for outreach. The main soybean cultivation areas in East Java are located in flat lowlands, and the selected districts consist mainly of lowland areas. Sampang was the second largest producer of soybeans in 2015, with nearly 40 thousand tonnes. All five districts are within the top 15 soybean producing districts in East Java and although some of the districts have average yields that are higher than the provincial average, productivity is still well below what can be achieved when using certified seeds or new soybean varieties. Average yields in Madiun and Trenggalek were slightly lower

**Figure 5: Top soybean producing districts (2015)**



than the provincial average whereas yields in Sampang, Ngawi, and Nganjuk ranged between 1.7 to 2.1 tonnes/ha.

## 3.2 Sector dynamics

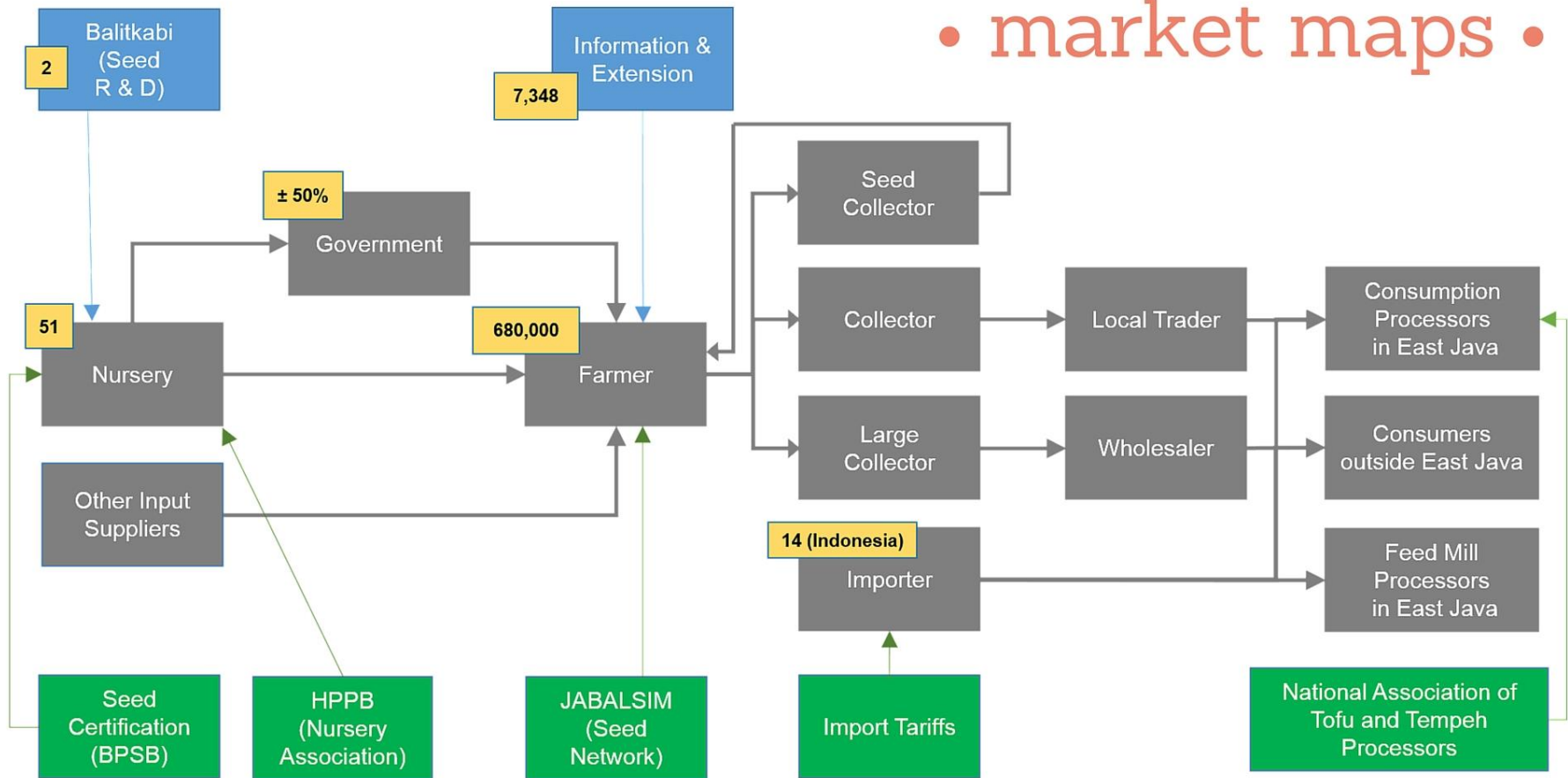
### 3.2.1 Market overview

Most farmers purchase retained seeds from a range of sources and will use some form of fertiliser (either subsidised fertiliser or commercially available liquid chemical fertiliser). Not all farmers will purchase pesticide and insecticides despite potential high losses from pest and diseases. Farmers who do use chemical controls will only spray their crops as a reactive rather than preventative measure. Soybean tends to be a secondary crop for farmers and is grown in any three seasons during the year depending on the topography, availability of rainfall or irrigation, and the market prices of rice and maize. It is mainly grown during the dry season on East Java mainland and in the rainy season in Madura. In terms of trading, farmers are able to offload all their production to collectors or wholesalers, who will sell to local tempeh or tofu industries or traders that are connected with food processing industries mainly in Central Java.

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3.2.2 Sector map

• market maps •



### 3.2.3 Core value chain

#### Input

**The majority of soybean farmers will purchase retained seeds from general goods stores, other farmers, or collectors/traders.** Based on a rapid survey of four districts (Blitar, Ponorogo, Trenggalek, and Sampang) conducted by the team, it appears that only a small proportion of farmers are using government subsidised seeds and retained seeds from their own farms. Most farmers are purchasing seeds from a range of sources but none of the farmers who were interviewed are buying seeds from nurseries. Since seeds are mainly coming from other farmers' seed banks, the seed stock is likely to be degenerated, with decreasing yields over time. Furthermore, those who are sorting seed-grade soybeans to sell back to farmers often have ineffective seeds selection methods, and there is no assurance of the quality of the seeds that farmers are purchasing. Seed prices range from IDR 6,000-18,000/kg and are often higher when purchased from other farmers.

**The dominant source from which farmers purchase seeds varies from district to district.** For example, in Sampang, nearly 80% of farmers buy soybean seeds from general goods stores, followed by collectors. In Blitar, the two main sources are from other farmers and then general goods stores. Farmers in Trenggalek tend to purchase seeds from stores, as well as collectors or farmers from other sub-districts or districts (including Ponorogo, Nganjuk, Banyuwangi, and Blitar). Farmers from other areas will come at the beginning of the cultivation season and sell soybean seeds at traditional local markets in Trenggalek. Traders will also source seeds from soybean farmers in other districts/sub-districts. Because soybean cultivation is staggered across sub-districts and districts, it is always possible to obtain seeds from other areas at the time of planting.

**Since only a small amount of seeds is sourced from nurseries, few farmers are currently using certified seeds in East Java.** For the most part, farmers are unaware that certified seeds exist. The only exception is in districts (such as Blitar, Nganjuk, and Madiun) where there are soybean nurseries producing certified seeds. For example, while only 15% of farmers in Ponorogo, Trenggalek and Sampang have heard of certified seeds, all farmers interviewed in Blitar were aware of certified seeds even though they were not using them. In some cases, these nurseries are also selling small quantities of uncertified better quality seeds with branded packaging. Certified seeds, which are at least 20% more expensive than uncertified seeds, contribute less than 30% of total soybean planting seed requirements in Indonesia.

**Farmers are planting several varieties of soybean seeds, including Willis, Argomulyo, and Anjasmoro varieties.** The Willis variety, which has a potential productivity of 2.5 tonnes/ha, is commonly used in Sampang but is only achieving on average 1 tonne/ha. Other varieties that are used in Sampang, but to a lesser degree, are Argomulyo and Anjasmoro (with potential yields of 3.1 tonnes/ha and 3.7 tonnes/ha respectively). Although farmers in Trenggalek claim to only use the Willis variety, they may not actually have the knowledge to correctly identify what seed varieties they are using. For example, seeds purchased from other districts are more likely to be of the Anjasmoro variety since farmers in Ponorogo, Nganjuk, Ngawi, Madiun, Banyuwangi, and Blitar are predominantly growing Anjasmoro soybeans.

**While higher yielding varieties have been developed in Indonesia, these are not available at the farmer level.** The Indonesian Legume and Tuber Crop Research Institute (ILETRI) has

been developing open-pollinated legume varieties with high yield potential and resistances to major biotic and abiotic stresses. Similarly, BATAN, the National Nuclear Energy Agency, has also produced several high yielding varieties of soybean using radiation mutation techniques for breeding. New varieties from BATAN include Mutiara and Gamasugen. Average yields from these varieties are 2.4 tonnes/ha (with a potential of up to 4.1 tonnes/ha for Mutiara and 2.6 tonnes/ha for Gamasugen under ideal conditions). Gamasugen can be harvested after 66-68 days whereas commonly used varieties are harvested between 85-110 days.

Higher-yielding varieties also exist from a number of international research agencies or programs. Syngenta Foundation has developed new varieties in the Philippines, which may be suitable for Indonesia. CSIRO, Australia's national science agency, has also been releasing new soybean varieties through its National Soybean Breeding Program and is interested in new markets for their soybean varieties. Finally, the USAID-funded Soybean Innovation Lab at the University of Illinois has focused on the development of soybean varieties for tropical climates. Unlike the varieties launched by ILETRI and BATAN, these international varieties would still need to be tested and registered for use in Indonesia, and this could take up to 2 years.

**Chemical usage patterns vary depending on the district but most farmers will use some form of fertiliser.** In Trenggalek and Sampang, farmers tend to use subsidised fertiliser for soybean farming. However, it is not clear whether the fertiliser is being purchased specifically for soybeans or if farmers are relying on residual subsidised fertiliser from the previous rice or maize harvest. In areas where fertilisers are subsidised, it is also common for farmers to use excessive amounts of fertiliser. In Nganjuk, Ngawi, and Madiun, farmers typically buy liquid chemical fertilisers from agro-input stores. They will also burn rice husks before planting the soybean crop since the common perception is that this practice will provide increased nitrogen for the soybeans.

**Although losses from pest and disease can be significant, farmers tend to have reactive rather than preventative control strategies, and not all farmers will use pesticides and insecticides.** Without proper measures to control pests and diseases, losses can reach up to 80%.<sup>1</sup> Common pests and diseases for soybean farming in Indonesia include leaf rust, downy mildew, leaf blight, pod borers, armyworm, and bean flies. There have been shifts in pest species and dominant pests in East Java over time and the distribution of pests and disease vary according to location. For example, a 2005 survey of soybean pests by ILETRI found that pod borers and pod sucking pest were the most significant threat to soybean cultivation in East Java.<sup>2</sup>

Nevertheless, over half of the farmers interviewed in Trenggalek and Sampang are not using pesticides or insecticides (or any other pest control measures). For the most part, farmers who do use chemical controls will only spray their crops if there are already indications of damage from pests and diseases. In more advanced soybean production zones (Pasuruan, Ngawi, Madiun, Nganjuk, and Blitar), almost all farmers will use pesticides purchased from agro-input stores. They typically use local brands (e.g. Petrokimia Gresik), even though BASF, Syngenta, Bayer, and Dupont have registered products that are suitable for pest and disease control for

<sup>1</sup> <http://pangan.litbang.pertanian.go.id/berita-647-menyatukan-pemahaman-petani-terhadap-dasardasar-pht-pada-tanaman-kedelai.html>

<sup>2</sup> <http://balitkabi.litbang.pertanian.go.id/en/index.php/research-highlight/soybean/952-important-soybean-pest-and-diseases-and-biological-agents-potential-in-east-java>

soybean. Despite using pesticides and insecticides, farmers tend to use the wrong chemicals and are not spraying at the appropriate times and with the correct frequency and dosage. This is in part because farmers and agro-input retailers alike have limited knowledge of what is most appropriate to use or how to apply these chemicals. Agro-input retailers also tend to promote cheaper local brands since they receive a higher margin from these products.

## Production

**Soybean tends to be a secondary crop for farmers and is grown in any three seasons during the year depending on the topography, availability of rainfall or irrigation, and the market prices of rice and maize.** The average soybean harvested area per household is 0.25 ha. The majority of soybean farmers in East Java mainland are located in the lowlands where soybean is planted once annually during the dry season. The typical cropping pattern in these areas is *rice – rice (or maize) – soybean*, with the peak planting occurring in July. Since soybeans mature within 3 months, the peak harvest occurs in October. There are also a smaller number of farmers who plant soybean in upland areas where it is possible to plant two crops annually. The first soybean crop is planted during the rainy season, and the main cropping pattern is *maize – soybean – soybean*. Soybean farming on the East Java mainland tends to be monoculture, except in Blitar where it intercropped with chilli and maize. Blitar is also the only district on the East Java mainland where the dominant planting season for soybean is in February.

The cropping pattern in Sampang varies between sub-districts in the North and South. In the North, soybean is planted in November at the beginning of the rainy season. These tend to be highland areas with no access to irrigation. Soybean is usually intercropped with maize and is grown during the first two seasons before the tobacco season. In the South, where there are fewer soybean farmers, there are some sub-district with access to irrigation (e.g. Torjun). The pattern in these areas tend to be *rice – rice – soybean*, with soybeans planted as a monoculture in the dry season.

**Farmers often apply unskilled methods for planting, weeding, and harvesting, which lowers their harvests and results in uneven product quality. Post-harvest practices are also rudimentary.** Men are the principal farmers of soybean, but women also play a role in some of the production and post-harvest processes. In some villages, women will be responsible for planting and weeding while in other areas these tasks are done jointly with men. Farmers often broadcast seed rather than practice in-line pocket planting, a more efficient planting method that lowers input costs. For seed, it means they are applying up to four times more seed to sow the same hectare. Similarly, many farmers are reported to broadcast NPK and urea rather than employ targeted application of fertiliser. ACIAR trials have shown that the adoption of improved agronomic practices can lead to improvements in soybean yields of 170%.

Harvest labour is typically shared by men and women. After the harvest, soybeans are usually sun-dried for one week to reduce their water content. There are currently no drying facilities for soybean farmers in East Java although Unilever has expressed interest in developing drying facilities for farmers who produce soybean during the rainy season. They are currently doing an assessment on appropriate drying machines in Central Java. In Sampang, threshing is done by grinding the beans with a motorcycle or by hitting them with wooden sticks. On East Java mainland, farmers will pay approximately IDR 20,000 per 100kg to a mobile threshing service provider. The machines are operated by men from Nganjuk and Kediri, who travel across the

East Java mainland to provide threshing services. Men tend to do the threshing of beans after which women may sift and clean the beans. The team will be conducting an assessment on post-harvest losses and services, particularly for areas which are planting soybean during the rainy season.

### Trading and Processing

**Farmers are able to offload all their production to collectors or wholesalers who tend not to reject or grade any of the soybean.** On East Java mainland, collectors are usually farmers with larger plot sizes of at least 1 ha. Smallholder farmers will bring their production to these collectors, and tempeh and tofu processors will also go directly to these collectors to purchase soybeans. In some rare cases, processors may buy directly from farmers. In Sampang, collectors tend to buy soybean directly at the farm gate before selling it to larger-scale collectors or wholesalers. The main difference between a wholesaler and village-level collector of soybeans is related to the scale of operation, availability of a warehouse, and links with buyers in other provinces or throughout East Java. They will source from farmers as well as collectors, either providing their own transportation or inviting collectors and farmers to deliver directly to their warehouses.

**Nearly all the production in each district on East Java mainland remains within the district and goes towards feeding the local tempeh or tofu industries.** Tofu and tempeh are processed all over Indonesia, mainly by small-scale home industries. Tofu and tempeh consumption has increased markedly in the last 10 to 15 years as local populations have developed a taste for it and have reduced their reliance on alternative protein sources. When compared with tofu processing, tempeh processing requires less physical labour. As a result, women tend to be more present at all levels of tempeh processing and are more likely to be running small businesses and directing both family and hired labour.

Many of the small producers will also use imported soybeans to produce tempeh and tofu, and there is no consistent pattern across East Java in terms of preferences and use of imported versus local soybeans. For example, in Trenggalek, tempeh chip processors will only use local soybeans and tempeh processors will use a mix of imported and local soybeans. These processors prefer the taste of local soybeans and consume all of the soybeans produced in Trenggalek. However, since production in Trenggalek is insufficient to meet the growing demand of local tempeh processors, soybeans are also sourced from nearby districts, such as Ponorogo. These processors are able and willing to absorb increased soybean production from farmers in Trenggalek. On the other hand, small-scale tofu home industries in Trenggalek have been using imported soybeans for over two decades and have no interest in sourcing any local soybeans. This contrasts with Ngawi, Madiun, and Nganjuk where both tofu and tempeh processors use local and imported soybeans. There is also a large tofu processor in Pasuran which requires that one-third of the soybeans used are from local sources. In order to fulfil that requirement, the processor has sourced local soybeans from as far as Sulawesi.

**In contrast, the majority of Sampang's production is sold to traders outside of the district.** Traders prefer to sell soybeans to wholesalers outside of Sampang because they are able to absorb large orders and pay immediately in cash. The main destination is Central Java, which accounts for 70% of Sampang soybeans that are traded outside of the district. Other popular markets include Bali and other districts in East Java.



Less than 25% of soybean production remains within the district. These soybeans are sold primarily to the small tempeh processing sector in Sampang. There are approximately 40 small and medium-sized enterprises (SME) producing tempeh for consumption within Sampang. In addition to the tempeh processors, there are a handful of SMEs (approximately 10) that produce tofu. They have been using imported beans for over a decade. Since most of Sampang's soybean production ends up outside the district, processors have to supplement locally sourced soybeans from Sampang with soybeans produced in nearby Bangkalan and Pamekasan. There are also a handful of local 'kecap' soy sauce processors that will source small amounts of soybeans from Sampang. However, kecap processing accounts for less than one percent of all soybean traded in Indonesia.

**The retailing of raw soybeans is rare, and with a few exceptions, sales of tofu and tempeh are limited to the wet market.** Retailing is carried out by micro retailers, most of whom are women, who buy directly from the processors. As it is a perishable product, turnaround for tofu is daily, whereas tempeh can be stocked for up to one week, depending on the climatic conditions. Marketing and outreach keep tofu and tempeh as household staples for poorer urban and rural populations. As widely consumed processed commodities, tofu and tempeh are highly sensitive to the price fluctuations experienced in the trade of soybeans. However, due to the sensitivity of low-income consumers to price increases, tofu and tempeh processors respond to price fluctuations by reducing the size of their products (which are not sold by weight) rather than increasing the nominal price to consumers.

#### 3.2.4 Supporting functions/services

**Seed services are important for stimulating the adoption of certified seeds by farmers. Currently, certified seeds are mainly available through the government seed subsidy program.** Under the National Self-Sufficiency Soybean Program, soybean farmers are supposed to receive 3 to 5 kg of free seeds, which are distributed through the district-level agricultural department. Key issues with the government subsidy program include how (1) the free allocation is lower than the amount of seeds needed by farmers; (2) distributed seeds are often of variable quality; and (3) the timing of seed distribution often does not match the cultivation season. Although the program is supposed to provide certified seeds, pressure to meet the high demand for seeds has meant that, in reality, the program is also distributing uncertified seeds and seeds of mixed varieties to farmers. This results in uneven growth and productivity of the resulting soybean plants.

**While there are 41 soybean nurseries in East Java, not all of these nurseries are active. There are 24 nurseries that are currently producing certified soybean seeds regularly.** Between 2002 and 2007, JICA had a program with the Ministry of Agriculture to develop soybean nurseries. In East Java, the program started with 30 farmer groups, and JICA provided intensive technical assistance to these groups on the cultivation of soybean seed. Most of the private soybean nurseries that are successfully producing certified seeds have graduated from this program, which spread across Blitar, Nganjuk, Banyuwangi, Jember, Mojokerto, Lamongan, Gresik, and Bojonegoro. Because of limited land ownership in East Java, all of these nurseries have contract farming models for growing seeds. Until recently, there was also a nursery in Sampang that graduated from the JICA program and was producing certified soybean seed. As a result of a conflict with the local village head, who commandeered the equipment at the nursery, the Sampang nursery is no longer operational.

One of soybean nurseries in East Java is UD Karya Tani in Blitar, which was also established through the JICA program. It is harvesting soybean seed on 200 ha and has the capacity to expand to 1,000 ha by working with more farmer groups. While it mainly works with contract farmers in Blitar, it has expanded its model to work with farmers in Malang district.

**Few of these nurseries have private distribution channels for certified seeds. But nurseries have expressed interest in selling certified seeds commercially.** Soybean nurseries grow certified soybean seed on behalf of the government-sponsored buyback scheme in which certified seeds are sold to PT Sang Hyang Sri, a parastatal input supply company which will redistribute seeds through the government seed subsidy program. Since the predominant focus has been on producing certified seeds for the government scheme, nurseries have sold insignificant amounts to private input supply networks (retail shops and distributors) and have not yet developed commercial distribution channels. For example, only UD Karya Tani started selling small amounts (7 to 20 tonnes) of certified soybean seeds through a seed retailer in Lumajang in 2014.

Nurseries face difficulties in marketing seed through private channels, especially since private input suppliers cannot absorb the same high quantities as state-sponsored companies. At the same time, farmers have expressed hesitancy in buying certified seeds because the supposed “certified” seeds that they previously received through the subsidy program have been of poor quality. Nonetheless, input distributors and retailers have expressed willingness to sell quality commercial soybean seeds if they are reliable, consistent, and well-packaged. Nurseries are also interested in establishing commercial channels for certified seeds because they cannot rely on the government distribution scheme. Despite high demand for certified seeds from the government program, there is no assurance that PT Sang Hyang Sri will purchase the certified seeds produced. There is an example of a case in Blitar where the nursery received an order of 500 ha of certified seeds from PT Sang Hyang Sri. In the end, the parastatal only purchased 100 ha of certified seeds.

**Despite interest in making certified seeds commercially available, the certification process continues to be a major challenge for all nurseries, including those who have successfully produced certified seeds in the past.** In the current seed supply chain, breeder seeds are produced by Balitkabi, a government R&D institution. These are then given to the BPTP (Balai Pengkajian Teknologi Pertanian) to produce foundation seeds. BBI (Balai Benih Indonesia), another government institution, is responsible for producing stock seeds from foundation seeds. Stock seeds are sold to nurseries, which will produce extension seeds for soybean farmers. For each season of seed production, nurseries have to register with BPSB (Badan Pengawas Sertifikasi Benih) the amount of certified seed they intend to produce and details around the land area, variety, and schedule for planting and harvest. BPSB will conduct an assessment during the cultivation and harvest periods to check that planting and post-harvest procedures are being observed and to assess the quality of the seed produced. After the seed has been dried, a sample is also provided to BPSB for testing. It can take up to a week to test the seed and approximately one month for nurseries to receive the certification. Key criteria for certification include the moisture content of the seed and germination capacity.

Seed certification is particularly difficult to obtain in East Java. Bureaucratic delays can also result in farmers receiving the seed certification after the soybean planting season. Given the short lifespan of certified soybean seeds, seeds are reclassified as grains for consumption after

3 months and cannot be sold as certified seed for the next harvest. Some smaller nurseries are claiming to get their seeds certified through established nurseries or through BPSP in other provinces. It is, however, not clear how this is possible since the BPSP should be monitoring the planting and harvesting process of seeds for certification. Seeds that meet the certification standards can obtain the government price of IDR 12,000/kg. Seeds that are rejected are often sold to farmers at lower prices of IDR 8,000 to 10,000/kg. If nurseries are in need of cash, they may even sell soybean seed as grains for consumption.

**Challenges in obtaining seed certification, along with the high level of investment required, short life span of seeds, and uncertain end markets, also deter the establishment of new nurseries.** The National Soybean Nursery Development Program, which was established after the JICA program, has an annual budget to support the establishment of new nurseries and provide technical assistance to existing soybean nurseries. In East Java, it targets 17 districts as potential centres for the production of soybean seed. Both the local governments in Sampang and Trenggalek have actively tried to create new nurseries as part of the nursery development program. Although efforts by the local government in Trenggalek have been unsuccessful in previous years, their plan for 2015 was to establish six nurseries (incentivising two inactive nurseries to re-enter the market and four new farmers to enter the soybean nursery business). None of the new nurseries established in Sampang have been able to obtain certification, but the local government in Sampang also has targets to create more nurseries in 2015.

Farmers who have been selected to establish new soybean nurseries often have no prior nursery experience with any crop. This means they often lack the experience and skills to manage other farmers and to ensure that the growing procedures are being observed by these contract growers. There have been cases where contract farmers are actually growing different varieties than what the nurseries have registered with BPSP. Another common problem is the low germination capacity of seed produced, which arises if plants are not properly attended to during the growing process. Nurseries also need to follow specific post-harvest procedures and have specialised drying and storage infrastructure to ensure that seeds meet moisture content requirements, which are important for extending the lifespan of the seeds. In short, high investments in terms of capital and skills are required to successfully grow certified seeds. This includes sufficient capital to pay contract seed growers in a timely manner. Otherwise, there is a risk that contract growers will sell the seeds as consumption grains to soybean traders. When coupled with the short life span of soybean seeds and the lack of a guaranteed end market for certified seeds, this lowers the attractiveness of the nursery business for potential new entrants.

**Private seed companies are also absent from the soybean seed market in Indonesia.** None of the local or multinational seed companies are producing soybean seeds. They have expressed concerns around the low price for soybean seeds (when using the government price for certified soybean seeds as a benchmark) and how farmers may not engage in repeat purchases since soybean seeds are open-pollinated varieties. However, as noted above, most farmers are already buying seeds every planting season. As a result, the main challenge is around convincing farmers to shift from buying cheaper retained seeds from farmers, traders, and general goods stores to buying high-yielding seeds from seed companies or certified seeds from nurseries. As a result of new seed regulations in 2015, which restricts the sale of horticultural seeds to local seed companies, some multinational seed companies (such as

EWINDO) are looking for new seed markets outside of horticulture and have started to explore the potential for producing soybean seeds.

**In addition to seed services, information and extension services are critical to improve agricultural practices of soybean farmers. Unfortunately, farmers mainly get their information through peer farmers.** Peer farmers may have similarly low levels of knowledge or awareness of good agricultural practices (GAP) in soybean farming. Even though soybean is part of the government self-sufficiency program, there is limited extension staff with the capacity to support soybean farmers and educate them on the benefits of investing in better quality seeds and fertilisers. Some farmers have also found that the recommendations and information provided by the government do not necessarily result in higher yields. For example, the BPTP recommends a seeding rate of 40 kg/ha, but most farmers are seeding as much as 80 to 100 kg/ha and are achieving higher yields than if they had followed the government recommended seeding rate. Whereas private input suppliers often provide some information services for other crops, they tend not to provide information and advice on soybean farming as their products are heavily tilted towards maize and rice cultivation. Finally, no embedded information is provided through nurseries or traders.

### 3.2.5 Supporting rules and regulations (enabling environment)

**High government attention favouring maize and rice planting over soybeans has encouraged farmers to plant these primary crops instead of soybeans. However, recently, the Indonesian government has begun to reprioritise soybean cultivation.** Five main commodities (namely rice, maize, soybean, sugar, and beef) have been targeted by the government as part of its National Self-Sufficiency Program. There are 12 priority provinces, including East Java, which have been targeted to help meet the national objective for self-sufficiency in soybeans. In 2013, there was a national production target of 1.5 million tonnes but less than 800 thousand tonnes were produced domestically. The government has continued to provide farmers with subsidised seeds and has also instigated another program, Perluasan Area Tanam (PAT), to expand the harvested area of soybean cultivation by 300 thousand ha. For East Java, the government is targeting a 35% increase in production for 2015 (an additional 125,000 tonnes).

**The Ministry of Trade has stated that it intends to make Indonesia 'self-sufficient' in soybean production by 2015, which is a very ambitious goal.** It has supported this statement through attempts to regulate imports. Previously, there had been a 10% tariff on imports. This tariff was lifted in 2008 after tempeh and tofu processors protested and lobbied due to the significant negative effect it was having on their sales margins. In January 2012, the Ministry reinstated a 5% tariff on imported beans in an effort to support the production and trade of local beans. As of September 2014, this tariff has been lifted, again as a result of pressure from tempeh and tofu processors. The Ministry of Trade has also set a price floor of IDR 7,750/kg for soybean. In reality, there is no mechanism to enforce the price floor and prices can sink to under IDR 4,000/kg.

**KOPTI, the National Association of Tempeh and Tofu Processors, has strong political clout and often lobbies the government to reduce import tariffs and provide other backstops to secure affordable soybeans.** The stated objectives of KOPTI are to: facilitate the supply of soybeans; avoid extortion by middlemen; obtain government assistance for legal

protection and advice; improve the poor image and status of tempeh makers, so that their profession is regarded as a craft passed through the generations; increase product quality and productivity; and produce tempeh and tofu at a price easily affordable to the general population. However, most of the small-scale tempeh and tofu processors are not members and have not participated in KOPTI activities.

## 4 Analysis

### 4.1 Problems and underlying causes

The problems and underlying causes are specific to the poor target groups that AIP-PRISMA seeks to support through interventions in the soybean market system in East Java. These problems have been identified through the Sector Dynamics section above and are also presented in the Intervention Logic Analysis Framework (ILAF) table. The two key problems can be summarised as:

- Farmer productivity is low because they use poor quality seeds
- Farmer productivity is low because they employ poor agricultural practices, including around pest and disease control

**Farmer productivity is low because they use poor quality seeds.** Farmers lack access to good quality certified seeds and improved soybean seed varieties. They also lack information on the most appropriate seeds to use based on local agro-climatic conditions. As a result, they tend to use retained seeds from their own or other farmers' seed banks. These are likely to be old, degenerated varieties which are characterised by low and declining yields. Genetic degeneration also occurs more quickly in the seeds of particular crops, especially soybean. As a result, it is critical to renew the seed stock for soybeans every few years to prevent a marked deterioration in yields. The use of poor quality seeds contributes to low average yields (with the provincial average at 1.64 tonnes/ha). In contrast, the genetic potential of available cultivars ranges between 2.5 and 4.1 tonnes/ha.

**Farmer productivity is low because they employ poor agricultural practices, including around pest and disease control.** Yields are also constrained by farmers' limited access to information on GAP and reluctance to invest in better practices and/or pesticides and insecticides because of the perceived low returns from soybean farming. This can vary slightly depending on the district. While farmers in more advanced production zones (Blitar, Ngawi, Madiun and, Nganjuk) are less reluctant to invest in pesticides, they lack knowledge around which chemicals to use, as well as when and how to use them properly. On the other hand, farmers in less advanced production zones (Sampang, Trenggalek, Ponorogo), often do not invest in pesticides at all despite how losses from pests and diseases can be up to 80%. More generally, farmers tend to use ineffective or out-dated practices (including the broadcasting of seed and fertiliser) which have negative impacts on productivity. After planting the seeds, farmers may also neglect the soybean crop until it is harvest time. According to ACIAR trials, the adoption of improved agronomic practices can lead to improvements in soybean yields of 170%. Also, based on farm-level observations, a 33% increase in costs to purchase better seeds and fertilisers can result in a nearly three-fold increase in profits—a significant improvement in profitability for farmers.

## 4.2 Services, enabling environment, and weaknesses analysis

There are a number of services and enabling environment factors which affect the underlying causes of the problems highlighted above. In order to strengthen the market system, it is crucial that identified weaknesses in these services and enabling environment factors are the target of interventions. The key services weaknesses are detailed in the ILAF table and include:

- Nurseries that produce certified seeds are few and don't have private distribution channels while newer nurseries are unable to meet government certification standards
- Seed companies are not producing soybean seeds while local research institutions have low capacity to promote new higher yielding varieties
- Poor public provision of extension services and lack of private alternatives

### **Nurseries that produce certified seeds are few and don't have private distribution channels while newer nurseries are unable to meet government certification standards**

The use of quality certified seeds can result in significant yield improvements for farmers. Unfortunately, there is an absence of an efficiently functioning seed supply chain to supply certified seeds to growers. Nurseries that are producing certified seeds are only able to contribute 5.6% of total soybean planting seed requirements in Indonesia. Since the main focus of private soybean nurseries has been on producing certified seeds for the government seed subsidy program, they have not yet developed commercial distribution channels. Few nurseries have the marketing and distribution capacity to sell certified seeds through private channels. Challenges include how private input suppliers are not able to absorb the same high quantities as state-sponsored input supply companies and how farmers are reluctant to invest financial resources in purchasing the more expensive certified seeds. At the same time, both established and new nurseries face large obstacles when trying to obtain seed certification. When coupled with the high level of skill and capital investment required to operate a nursery, short life span of soybean seeds, and lack of a guaranteed end market, these challenges also deter new entrants from entering the soybean nursery business.

### **Seed companies are not producing soybean seeds while local research institutions have low capacity to promote new higher yielding varieties**

The introduction of improved seed varieties can also result in significant yield improvements. While government research institutions (ILETRI and BATAN) have developed improved, higher-yielding soybean varieties, their focus has been solely on research and development. These institutions have limited capacity and resources to promote new varieties and produce breeder and foundation seeds. Ideally, other government seed institutions (such as Balitkabi and BBI) would multiply the seeds to eventually produce extension seeds for farmers but these seed agencies are also under-resourced and tend to promote only varieties that are already familiar to farmers. Alongside the absence of an efficiently functioning government seed supply chain, private seed companies have also not considered soybean seeds as a potential market. This is associated with the low price of soybean seeds and concerns that farmers will not engage in repeat purchases. Finally, a number of improved varieties have also been developed in other countries, but they will need to be tested and registered in Indonesia before seed companies can produce and market those varieties.

## Poor public provision of extension services and lack of private alternatives

Information and extension services are important to ensure farmers have better access to information on GAP in soybean farming (including pest and disease control) and are educated on the benefits of investing in soybean production. There are, however, few reliable sources of information for soybean farmers. Government has relatively few extension agents and is not equipped to satisfy the need for technical information and training. Since soybean is not a priority crop (like rice or maize), existing agents tend to have limited technical knowledge and skills on soybean farming. Private input suppliers also tend to have products and information materials that are more geared towards maize and rice cultivation, and no embedded information is available through input suppliers, soybean nurseries, or traders.

## 5 Strategy for change

The strategy is designed to strengthen the weaknesses in the current service provision and enabling environment in the market system. This takes the form of (1) identifying the market potential, through calculations to show the potential of the sector; (2) a vision of change, to envisage how the value chain or market system would operate if identified problems are resolved; and (3) a set of interventions which can be targeted at specific market actors or groups of market actors which can be engaged to drive change in the system.

### 5.1 Market potential

**There is a market opportunity to expand East Java's soybean production in order to meet the growing demand for soybean from the food processing industry.** Tofu and tempeh consumption are on the rise as local populations have developed a preference for these sources of protein. Processors have reported robust production and sales growth over the past five years and expect to continue expanding their operations. As a result, there is an existing and growing market that is able to absorb increases in local soybean production.

### 5.2 Vision of change

Focusing on achieving the potential outlined above for the soybean sector in East Java, a vision of change can be outlined for both the sector and service levels. The vision of change at the **sector level** is to increase smallholder productivity and make soybean farming more profitable. At the **service level**, it is envisaged that farmers will have improved access to: (1) seed and (2) information and extension services.

We envision that seed services will be provided through nurseries, seed retailers, seed companies, with potential collaboration with the local government and government seed institutions (such as BATAN and BPSB) or international research institutions or projects engaged in soybean research. Information services can be provided through some of these same actors, as well as through chemical input companies and lead farmers.

### 5.3 Intervention areas

It is crucial that interventions are designed which are 'systemic' so that outcomes are not dependent upon the project or development partner for sustainability. This means that AIP-PRISMA should not seek to provide services (or at least only temporarily) but rather enter the

market system in a catalytic manner to tackle the service weaknesses in existing market actors. Based on our analysis, two key intervention areas will be necessary to transform the soybean sector in East Java. The following table shows the key intervention areas along with approved, on-going, or completed interventions and intervention concepts:

| Intervention Areas   | Approved, on-going, or completed interventions and intervention concepts  |
|--|---|
| <p><b>Intervention Area 1:</b> Promote good quality seeds</p>  | <ul style="list-style-type: none"> <li>• Develop commercial market for certified soybean seeds through existing nurseries (UD Karya Tani in Trenggalek)</li> <li>• Promote establishment of new nurseries for certified soybean seeds (Local governments in Sampang and Trenggalek)</li> <li>• Introduce through private seed companies new varieties developed by seed research and development agencies (BATAN and EWINDO in East Java)</li> <li>• Introduce new market place for good quality certified soybean seed.</li> </ul> |
| <p><b>Intervention Area 2:</b> Promote better information services, including on pest and disease control strategies</p> | <ul style="list-style-type: none"> <li>• Promote better information services, including on pest and disease control strategies (BASF in Madiun, Nganjuk, and Ngawi)</li> </ul>  |

### **Intervention Area 1: Promote good quality seeds**

The key objective is to ensure the availability and use of quality certified soybean seeds and embedded information, both of which are essential for improving farmer productivity and profitability from soybean farming. Since women are responsible for managing household finances and are involved in the planting of soybean, it will be important for women to have firsthand exposure to the benefits of better quality seeds and improved farming practices.

This intervention area will include interventions to (1) promote the use of good quality seeds that are already available at the farmer level and (2) promote new varieties that have been developed but not yet available at the farmer level. For varieties that are already available to farmers, this would involve working with existing and potential new nurseries to increase the production of certified seeds. This may include efforts to streamline government certification processes and improve the ability of new nurseries to meet government certification standards; establish a commercial market for certified seeds for existing nurseries; and improve embedded information through nurseries. There is significant potential for the participation of women as seed growers in these expanding or newly established nurseries. For new soybean varieties, this may include supporting the testing and registration of new varieties in Indonesia (from CSIRO, Soybean Lab, or Syngenta Foundation) and linking local and multinational seed research institutions to private seed companies in Indonesia that will be able to produce and market the new seed varieties.

In order to promote good quality seeds, AIP-PRISMA has been working with UD Karya Tani in Trenggalek, one of the biggest soybean nurseries in East Java, to develop a commercial market for certified seeds in Trenggalek. Support has been provided on establishing the private distribution network and developing a promotional plan, along with various promotional materials and the branding and packaging for the product. UD Karya Tani started selling the first batch of certified seeds to Trenggalek in June 2015. AIP-PRISMA is also supporting the local



governments of Sampang and Trenggalek with the establishment of 6 new nurseries under the government nursery program. Since the government only had nursery trainings for other crops, support has been provided on developing a soybean nursery training program. Finally, AIP-PRISMA has recently signed an agreement with EWINDO and BATAN to introduce new soybean varieties to farmers. As BATAN has limited capacity to produce breeder and foundation seeds, EWINDO will produce the seeds (from breeder until extension seeds) and will market the new higher-yielding varieties to farmers. BATAN will receive royalties from seed sales of the soybean varieties that they have developed. There is potential to scale this model to other research institutes and seed companies who are interested in introducing new varieties to the market.

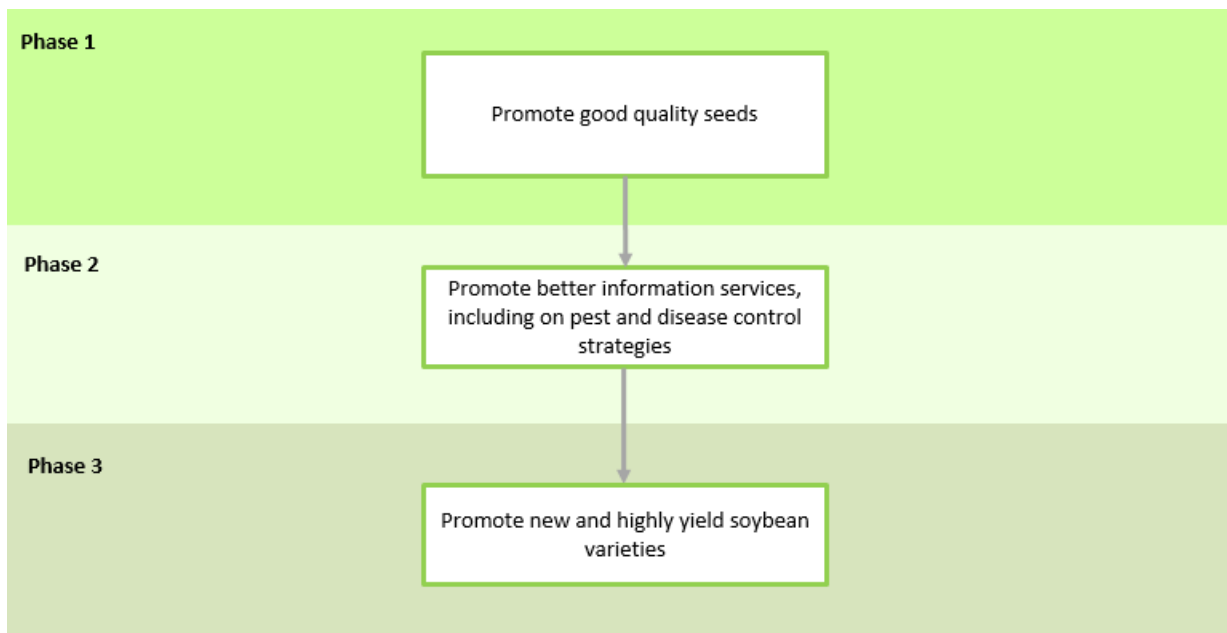
### **Intervention Area 2: Promote better information services, including on pest and disease control strategies**

The main objective is to ensure better access and use of information on GAP by soybean farmer. This will allow farmers to maximise yields, including through reduced losses from pests and diseases. Similar to the previous intervention, it will be important that information on better practices are accessible to women and tailored to their needs.

There is potential to partner with input suppliers to ensure better embedded information through their distribution network. AIP-PRISMA is currently in discussions with BASF around a partnership in Ngawi, Nganjuk, and Madiun. BASF has plans to enter the soybean market in Central Java, East Java, and NTB. It has a product called *Paket Petani Sejahtera*, which includes the full range of chemicals needed for the entire cultivation cycle of soybeans. BASF also has a program called *Mitra Tani Andalan (MTA)* where they use lead farmers to sell their products but provide limited embedded information through these farmers. Potential areas of support include converting the MTA into Soy Doctors, who will be trained to provide information on good agricultural practice including pest and disease management for soybeans. Other potential ideas include developing a call centre for farmers where they can obtain information on GAP.

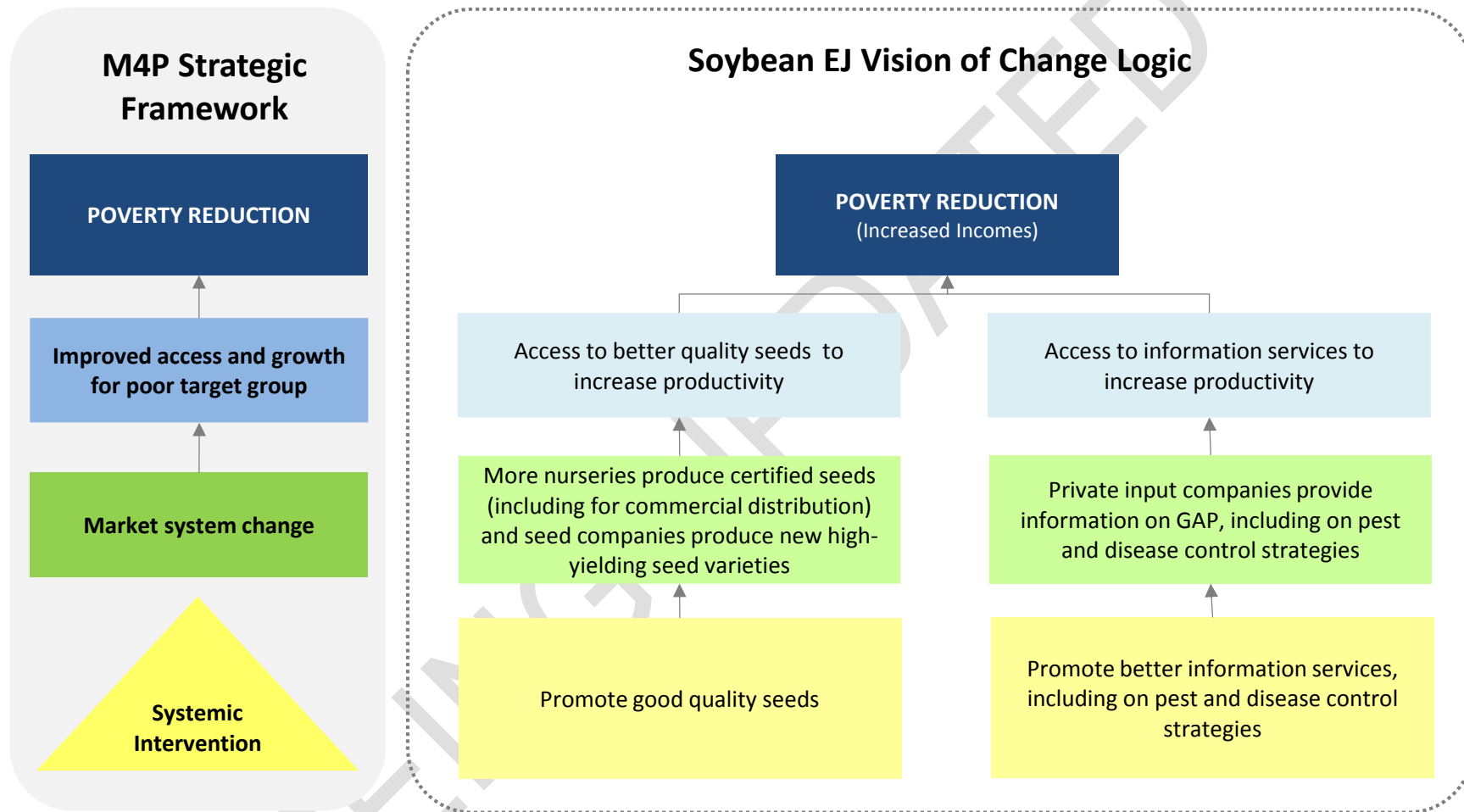
#### **5.4 Sequencing and prioritisation of intervention areas**

**It is recommended that the intervention areas in the East Java soybean sector be implemented in three phases.** In the first phase, the focus is on *promoting good quality seeds* since we already have several partners and on-going interventions in this area. This will be followed in the second phase by *promoting better information services, including effective pest and disease control strategies*, which is a new intervention area introduced in the 2016 update of the GSD. And the third phase is focus in promoting new and high yield soybean varieties by working with big seed producer.



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### 5.5 Sector vision of change logic



## Annex 1: Intervention Logic Analysis Framework (ILAF)

| (1) Problem/<br>Symptom   | (2) Underlying cause  | (3) (4) Services<br>and Enabling<br>Environment | (5) Service weaknesses/<br>underlying causes   | (6) Intervention<br>Areas  | Service<br>Provider/Partner   |
|---|---|---|--|--|---|
| Farmer productivity is low because they use poor quality seeds  | Farmers lack access to good quality certified seeds and improved soybean seed varieties                                 | Seed services                                   | Existing nurseries are few and don't have private distribution channels. New nurseries are unable to meet government standards for certified soybean seeds. Seed companies are not producing soybean seeds while local research institutions have low capacity to promote new higher yielding varieties. | <b>Intervention Area 1:</b><br>Promote good quality seeds  | <ul style="list-style-type: none"> <li>• UD Karya Tani</li> <li>• Seed retailers</li> <li>• Local governments in Sampang and Trenggalek</li> <li>• Provincial Agri Unit EJ (including BBI, BBPP, and BPSB)</li> <li>• BATAN</li> <li>• EWINDO</li> <li>• CSIRO</li> <li>• Syngenta Foundation</li> <li>• Soybean Lab</li> </ul> |
|   | Farmers lack information on the most appropriate seeds to use based on the local agro-climatic conditions               | Information & extension services                | Poor public provision of extension services and lack of private alternatives   |  |   |
| Farmer productivity is low because they employ poor agricultural practices, including around pest and disease control | Farmers are reluctant to invest in better practices and/or pesticides and insecticides because of perceived low returns | Information & extension services                | Poor public provision of extension services and lack of private alternatives   | <b>Intervention Area 2:</b><br>Promote better information services, including on pest and disease control strategies | <ul style="list-style-type: none"> <li>• Input companies (BASF, etc.)</li> <li>• Lead farmers</li> </ul>  |
|   | Farmers have limited knowledge in good agricultural practices (particularly in pest and                                 |   |  |  |   |

|  |   |  |  |  |  |
|--|---|--|--|--|--|
|  | disease control) for<br>soybean cultivation |  |  |  |  |
|--|---|--|--|--|--|

BEING UPDATED

## Annex 2: Gender table

| No | Activity in Production                  | Task Division |    | Explanation   |
|----|---|---------------|----|---|
|    |   | M             | F  |   |
| 1  | Decision on the commodity to be planted | v             | vv | Decision made by women because planting soybean during dry seasons is easier than other crop. The decision is also effected by farmers group. |
| 2  | Decision on buying soybean seed         | v             |    | Mostly by men, influenced by the farmers group.   |
| 3  | Buying soybean seed                     | vv            | v  | Farmers get seed from farmers group.  |
| 4  | Land Preparation                        | v             |    | By men.   |
| 5  | Planting                                | v             | v  | Together, men make hole and women plant the seed.   |
| 6  | Weeding                                 | vv            | v  | Mostly by men, women support pipe arrangement.  |
| 7  | Decision on buying fertilizer           | v             |    | Mostly by men, influenced by the farmers group.   |
| 8  | Fertilizing                             | v             |    | By men.   |
| 9  | Decision on buying pest control         | v             |    | Mostly by men, influenced by the farmers group.   |
| 10 | Pest control                            | v             |    | By men.   |
| 11 | Harvesting                              | v             | v  | Together.   |
| 12 | Drying                                  |               | v  | Mostly by women.  |
| 13 | Packaging and Storing                   |               | v  | Mostly by women.  |
| 14 | Transporting                            | v             |    | Transportation from field to house by men.  |
| 15 | Selling soybean                         |               | v  | Buyers come to farmers and bargaining made by women.  |