

2015 UPDATE
BEEF SUB-SECTOR GROWTH STRATEGY
IN
EAST JAVA

August 3, 2015

BEING UPDATED

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Abbreviations

AI	Artificial insemination
ADG	Average daily weight gain
AIP-PRISMA	Australia-Indonesia Partnership for Promoting Rural Income through Support for Markets in Agriculture
APFINDO	Meat and Feed Lot Association
CAGR	Compound annual growth rate
ILAF	Intervention Logic Analysis Framework
KKPE	Kredit Ketahanan Pangan dan Energi (Credit for Food Security and Energy)
KUPS	Kredit Usaha Pembibitan Sapi (Cattle Business Credit)
KUR	Kredit Usaha Rakyat
NTB	Nusa Tenggara Barat (West Nusa Tenggara)
NTT	Nusa Tenggara Timur (East Nusa Tenggara)
PKM	Pusat Kegiatan Masyarakat
PSDSK	Program Swasembada Daging Sapi dan Kerbau (Self-Sufficiency in Cattle and Buffalo Meat Program)
RPH	Rumah Pemotongan Hewan (Slaughterhouse)
RPJMD	Medium-Term Regional Development Plan

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 engaged with more market actors in the beef sector, as well conducted numerous field investigations and assessments (including a feed assessment). While this has improved their understanding of the dynamics, constraints, and opportunities in the sector, additional market research is needed. Aside from providing more updated and accurate details around the core value chain, supporting functions/services, and supporting rules and regulation, the main changes to the GSD include:</p> <ul style="list-style-type: none"> • Invalidating the constraint around the inability to increase production because of a shortage of female breeders: According to the previous version of the GSD, there is a shortage of female breeders since farmers were selling productive females for slaughter as a way to obtain quick cash. Since this was associated with limited access to finance, the GSD had proposed an intervention related to financial services. Upon further investigation, the team found that contrary to the mainstream belief (which may be motivated by the political nature of the cattle sector and the desire for increased breeder imports by feedlots), female cows are only being sold by smallholder farmers when they are no longer productive. The ILAF, analysis, and strategy sections have been adjusted accordingly, and the corresponding intervention around finance has been removed. PRISMA plans to launch a breeding study which would provide evidence on farmers' behaviour with respect to female breeders and the population and growth trends of breeders. • Invalidating the constraint around farmers receiving low prices when they sell to collectors: According to the previous version of the GSD, it was typical for farmers to sell their cattle prematurely and farmers experience difficulties selling larger, heavier cattle to collectors. In both situations, farmers would receive lower prices for their cattle. This was associated with weaknesses in financial services, market information services, and brokering services (i.e. to link smallholder farmers with feedlots/ fattening companies which can purchase larger, heavier cattle). Upon further investigation, the team found that the premise that farmers are prematurely selling cows is not a major issue and also not representative of smallholder farmers. It also appears that farmers do not have problems selling heavier cattle. The ILAF, analysis, and strategy sections have been adjusted accordingly, and the corresponding intervention has been removed. • Refining the strategy under the feed intervention area: As a result of a more nuanced understanding of the feed industry and feed practices of smallholder farmers, this has led the team to develop an intervention strategy that caters to different market segments. The intervention area around feed has evolved from a focus on concentrated feed to looking more broadly at the range of feed options available (including crop residues and agricultural by-products). In order to have feed options that are commercially viable for different segments of smallholder farmers, it may not make sense to only pursue feed options with the highest ADG (average daily weight gain). These changes came out of the feed assessment conducted by the team and the learnings from the failure to reach an agreement with the feed producer, Soegio. The section on intervention areas has been updated to reflect this new orientation, and more details on feed practices are provided under the sector dynamics. <p>The market growth potential in the sector has not changed, and there is still significant opportunity to expand East Java's production in order to fulfil national beef demand.</p>
	<p>The planned focus for July 2015-2016 is on:</p> <ul style="list-style-type: none"> • Piloting of the two interventions on feed (promoting concentrate feed with PKM and promoting crop residues with Wahyu Utama) • Designing the scale-up for these two interventions • Conducting further market assessments on breeding (which includes looking at issues around female breeders and AI services) and on import quotas and regulations

Year	July 2015 - June 2016

Year	July 2016 - June 2017

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1 Executive summary

Despite being the largest beef producer in Southeast Asia, Indonesia is a net importer of beef. Imports are estimated to constitute 32% of national consumption for 2015, with beef imports accounting for 41-55% of total imports each year. In 2014, beef imports were estimated to account for 13% of local consumption whereas live cattle imports (slaughter and feeder cattle) accounted for 17% of domestic consumption.¹ Import restrictions associated with Indonesia's beef self-sufficiency program have in previous years reduced the overall supply of beef and cattle. This has placed upward pressure on prices, which has helped to increase beef demand from local sources and promote inter-regional trade.

East Java is the biggest cattle producing province in Indonesia, accounting for 30% of the national cattle population. Development of its cattle and beef sector is driven by local consumption of beef and inter-regional cattle exports. Cattle from East Java accounts for up to 25% of the inter-provincial live cattle trade and 22% of national beef production in 2013. Given the province's large population, there is significant local demand for beef. Cattle and beef production in East Java is characterised by widespread use of artificial insemination (AI), the emergence of a nascent feed sector, and by far the largest cattle trading and slaughter sector in Indonesia. Despite higher levels of commercial activity and supporting infrastructure, there is room for improvement and higher productivity.

There is a clear market opportunity to substitute imports in Indonesia, and East Java has the potential to supply both local beef demand in the province and national beef demand through increased inter-regional exports. Overall, there is potential to substitute beef imports, as well as imports of slaughter cattle. Within East Java, there are opportunities to meet the growing demand from Surabaya municipality and other urban and industrial areas like Gresik, Sidoarjo, Tuban, Malang, and Jombang. Outside of the province, there is potential to expand regional exports to existing destinations such as Jakarta, West Java, Central Java, Kalimantan, and Bangka-Belitung.

Analysis of the market reveals a number of problems that currently constrain the ability of cattle farmers to take advantage of this market opportunity. Farmers experience low productivity as a result of slow weight gain in calves and cattle. This arises from the lack of access to services and information on more nutritious feed options. There are currently few commercial feed providers, and available commercial concentrates and supplementary feed products are often not affordable for smallholder farmers. Farmers are also unable to increase cattle production because of inefficiencies in AI. Farmers lack access to timely AI services and information on proper AI practices. This is associated with limited outreach of the current AI network, low technical capacity of AI agents, and weak information provision on AI.

The vision of change at the sector level is to: increase and maximise smallholder cattle production and productivity. At the service level, it is envisaged that farmers will have improved access to: (1) feed, (2) information, and (2) AI services. To realise this vision, this report recommends the following two intervention areas:

- Introduce affordable, nutritious commercial feed

¹ Japfa Comfeed

- Promote professional AI services, including information on good AI practices

We envision that feed and information services will be delivered through feedlots/fattening companies, feed companies, and feed traders. AI services will be delivered through feedlots/fattening companies and independent AI agents, in collaboration with Dinas Livestock and the national breeding centre.

It is recommended that the intervention areas in the East Java beef sector be implemented in two phases. The first phase will focus on *introducing affordable, nutritious commercial feed*, which is a potential quick win for smallholder farmers and PRISMA. This will be followed by *promoting professional AI services, including information on good AI practices*. Improvements in feed (under the first phase) will bolster efforts to improve the supply of calves under the second phase. Successful interventions in both areas can improve the commercial viability of cattle farming.

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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 beef sector to the benefit of smallholder farmers in East Java.

3 Sector description

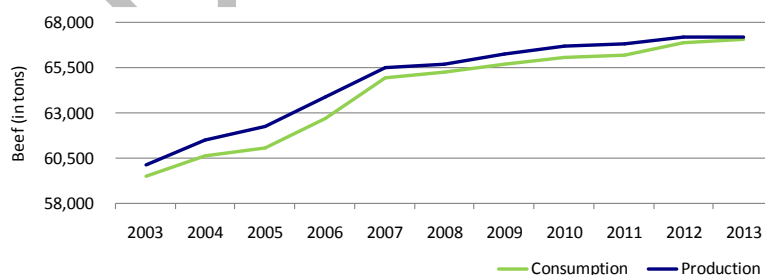
3.1 Sector profile

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 beef sector.

3.1.1 Overall context

Beef is an important agricultural industry globally, with world production and consumption steadily increasing over time. In 2013, international beef production was 67.21 million tonnes while consumption reached 67.07 million tonnes. World beef consumption has been increasing by 1.2% annually over the past decade. Strong global demand is expected to continue, driven by demand from the Chinese market.

Figure 1: World beef production and consumption



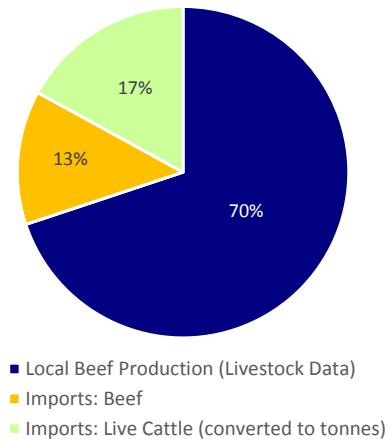
Source: OECD-FAO 2013

Indonesia is a mid-sized beef producer in the global context. While it is ranked 27th in the world, it is the largest producer in Southeast Asia. In 2013, total beef production in Indonesia reached 545,621 tonnes, and the cattle population reached 16.6 million. Three provinces (East Java, Central Java, and South Sulawesi) account for half of the cattle population.

Although beef and cattle production has been growing in Indonesia, consumption outstrips national production, and Indonesia is reliant on imports to sustain its demand for beef. The cattle population and beef production in Indonesia have been growing. While growth rates vary depending on the data source,² demand for beef is expected to continue

² There are large data discrepancies between government statistical data sets, which makes it difficult to estimate a growth rate for beef production. For example, according to BPS data, local beef production was 485,335 tonnes in 2011 but data from the livestock department is claiming that local beef production was only 292,450 tonnes. Depending on the data set and time period, calculations for compound annual growth rates for local beef production range between 6-16%.

Figure 2: Local production vs imports for 2014 (% of total consumption)



increasing as Indonesian income and middle class population grow. Imports are estimated to constitute 32% of national consumption for 2015. Virtually all cattle imported into Indonesia are from Australia, and legal beef imports come mainly from Australia and New Zealand. Beef imports constitute between 41-55% of total imports, and in 2014, they were estimated to account for 13% of local consumption.³ The recently signed China-Australia Free Trade Agreement is phasing out tariffs on Australian beef and cattle imports into China and is expected to stimulate exports of up to one million cattle per year to China. This could potentially impact the supply of Australian beef and cattle to other key export destinations, including Indonesia.

Import restrictions associated with Indonesia’s beef self-sufficiency program have in previous years reduced the overall supply of beef and cattle, thus putting upward pressure on prices. Import restrictions were introduced concurrently with very large government programs to stimulate domestic cattle breeding (e.g. through cattle rescue and re-distribution) between 2010 and 2012. These have led to high prices of beef on the local market, which are high when compared to both international and regional standards. While government data has indicated even tighter import quotas for 2013 and 2014, other sources (Japfa Comfeed) have recorded an increase in imports for both years.⁴ Data discrepancies may be political and associated with the election cycle, especially since the previous government had a target for beef self-sufficiency by 2014. The PRISMA team will be conducting an import quota study to clarify the trend and regulations around imports.

Import restrictions have increased beef demand from local sources, and inter-regional and inter-island trade is a significant market in volumes and as a proportion of local slaughter. Although increasingly protectionist trade policies have benefited producers across Indonesia, it has also depleted local inventory. There is also some concern that if policy measures are wound back, a price correction will occur that may reduce incentives for smallholder production and encourage some traders, butchers, and feedlots to switch back to sourcing imported cattle. Nevertheless, this is likely to have a modest effect over the medium to long-term, and the fundamentals of a constrained supply and growing demand for beef in Indonesia will remain.⁵

³ Japfa Comfeed

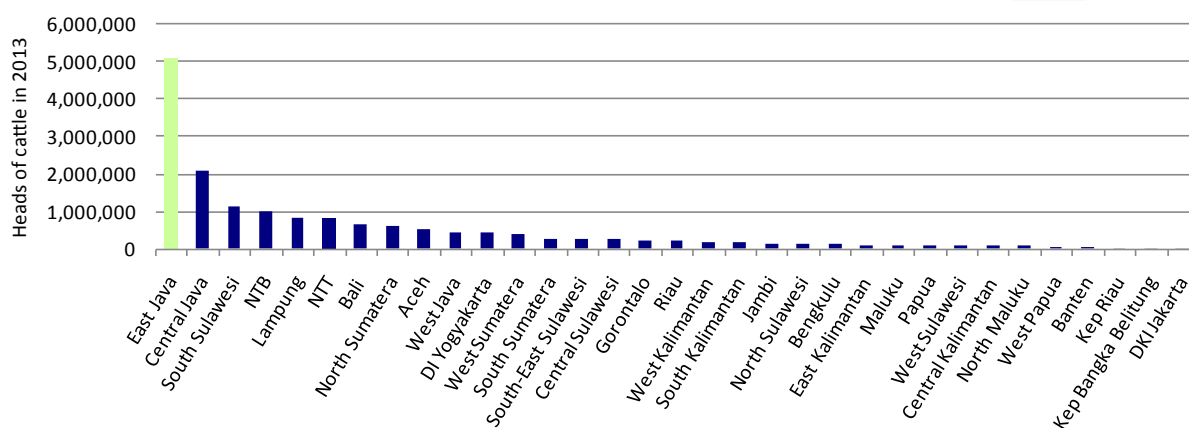
⁴ In 2013, government data indicated 75 tonnes of total beef imports whereas Japfa Comfeed reported 142 tonnes. In 2014, government data indicated 58 tonnes of total beef imports whereas Japfa Comfeed estimated 230 tonnes.

⁵ ACIAR Final Report on Eastern Indonesia Agribusiness Development Opportunities, Nov 2013.

3.1.2 Local context

East Java is the biggest cattle producing province in Indonesia with over twice as many head of cattle as Central Java, the province with the second largest cattle population. With more than 5 million head of cattle in 2013, East Java accounts for 30% of the national cattle population. The cattle population in East Java grew at a compound annual growth rate (CAGR) of 10% between 2009 and 2013.⁶ Albeit higher than the national average of 7%, it is low when compared to 3 of the 5 top provincial producers where growth rates reached 16%.

Figure 3: Cattle population by province in 2013



Livestock, including cattle, plays an important role in the provincial economy, as well as for household incomes. Although disaggregated data on the role of cattle in economic development is not available, livestock accounted for 22.3% of agricultural GDP in East Java in 2010. Gross cash income from cattle can exceed income from crops. According to one study, cattle can account for 61% of cash income in lowland areas (Probolinggo and Pasuruan) and 84% in upland areas (Malang). Approximately 68.1% of cattle farmers on East Java mainland are classified as poor, particularly those who reside in the outskirts of Malang, Pasuruan, Tuban, and Probolinggo. Poverty among cattle farmers on Madura Island is expected to be much higher.

As the largest inter-provincial exporter of live cattle, East Java is an important supplier of cattle for nearly the entire Indonesian archipelago. East Java exported on average 143,000 head of slaughter cattle per year between 2008 and 2012. It accounts for up to 25% of the inter-provincial live cattle trade. Its main regional export market is Jakarta, but demand from Kalimantan is growing. It also exports live cattle to West Java, Central Java, and Bangka-Belitung.

Given the province's large population, there is also significant local demand for beef. East Java accounted for 22% of national beef production in 2013, with 585,460 registered cattle slaughtered (an equivalent of 118,363 tonnes of beef). This is four times higher than the head of live cattle that East Java exports annually. Since the majority of beef is consumed within the province, local consumption is a significant driver of the cattle and beef sector in East Java.

In addition to the high level of commercial activity in the cattle and beef sector in East Java, there is also strong national and provincial government support for the growth of

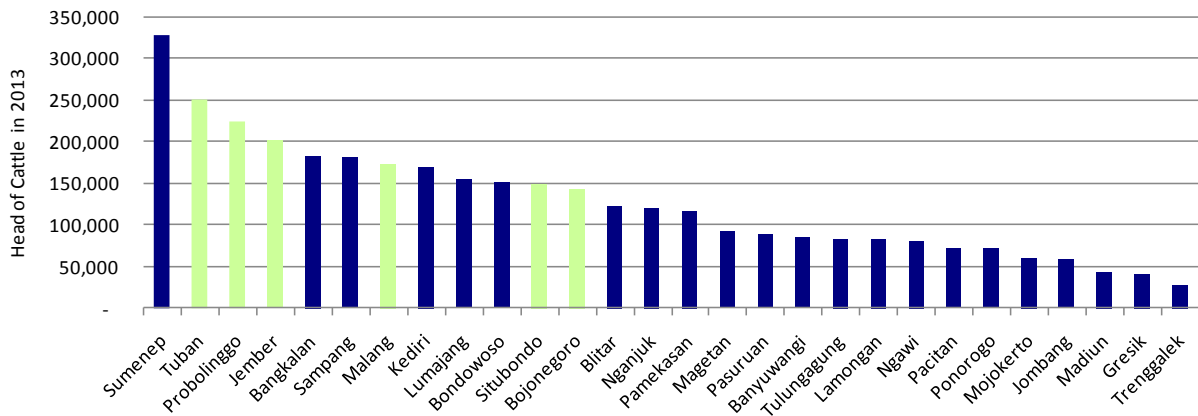
⁶Calculations based on BPS Indonesia statistics

the industry. East Java Governor Soekarwo has expressed his support to increase productivity in the sector, including through plans to develop Madura Island into a cattle farming area. The province’s recently concluded Diamond Cattle Program also aimed at increasing the cattle population and productivity.

At the district level, the 6 districts in which AIP-PRISMA is starting its beef sector interventions account for 32% of cattle farmers in East Java (nearly 381,000 farmers). These districts are Tuban, Probolinggo, Jember, Malang, Situbondo, and Bojonegoro. They include three of the top four cattle producing areas in East Java. These districts have a mix of upland and lowland production areas.

All of the initial intervention districts are on the island of Java because cattle farming on the main island is more commercially oriented than on Madura Island. Although Madura has a long tradition of cattle rearing, as well as the district with the highest cattle population (Sumenep), cattle farmers in Madura are not necessarily raising cattle for beef. There are different functions, including cultural roles, for cattle in Madura. There is also a preference for local cattle breeds such as the Madura breed, which is smaller than the European cross-breeds used on Java Island to supply the beef industry. Cattle are used primarily as work animals to plough fields and in bull racing (*karapan*) and cow conformation contests (*sonok*). Farmers in Madura are also known to maintain their traditional practices, making it difficult to introduce innovations such as more nutritious commercial sources of feed. However, given that 23% of East Java’s cattle population is in Madura and that poverty is particularly high on the island, PRISMA will be investigating opportunities in Madura after interventions are launched in the initial target districts.

Figure 4: Cattle population in initial intervention districts



There are high levels of commercial activity and supporting infrastructure for cattle farming and trading in the initial target districts. Tuban has the second largest cattle population in East Java, and its proximity to Surabaya makes it a critical source of live cattle for slaughterhouses in Surabaya and surrounding industrial zones. This is particularly relevant since Surabaya, Sidoarjo, and Gresik are the top three beef producing areas in the province, accounting for 32% of East Java’s beef production in 2013.

Malang municipality also has a vibrant slaughterhouse sector, which relies on cattle from Malang district. Furthermore, there is a National Artificial Insemination Centre in Malang, and a beef cattle research centre in the neighbouring district. A number of feedlots and feed companies are

present across the districts, along with food processing companies and rice production areas which provide raw materials for the production of cattle feed. Finally, while Situbondo and Bojonegoro have smaller numbers of cattle farmers than other initial target districts, there is already a small contract farming model in Bojonegoro, and a number of farmers in Situbondo have started to make their own concentrate feed.

3.2 Sector dynamics

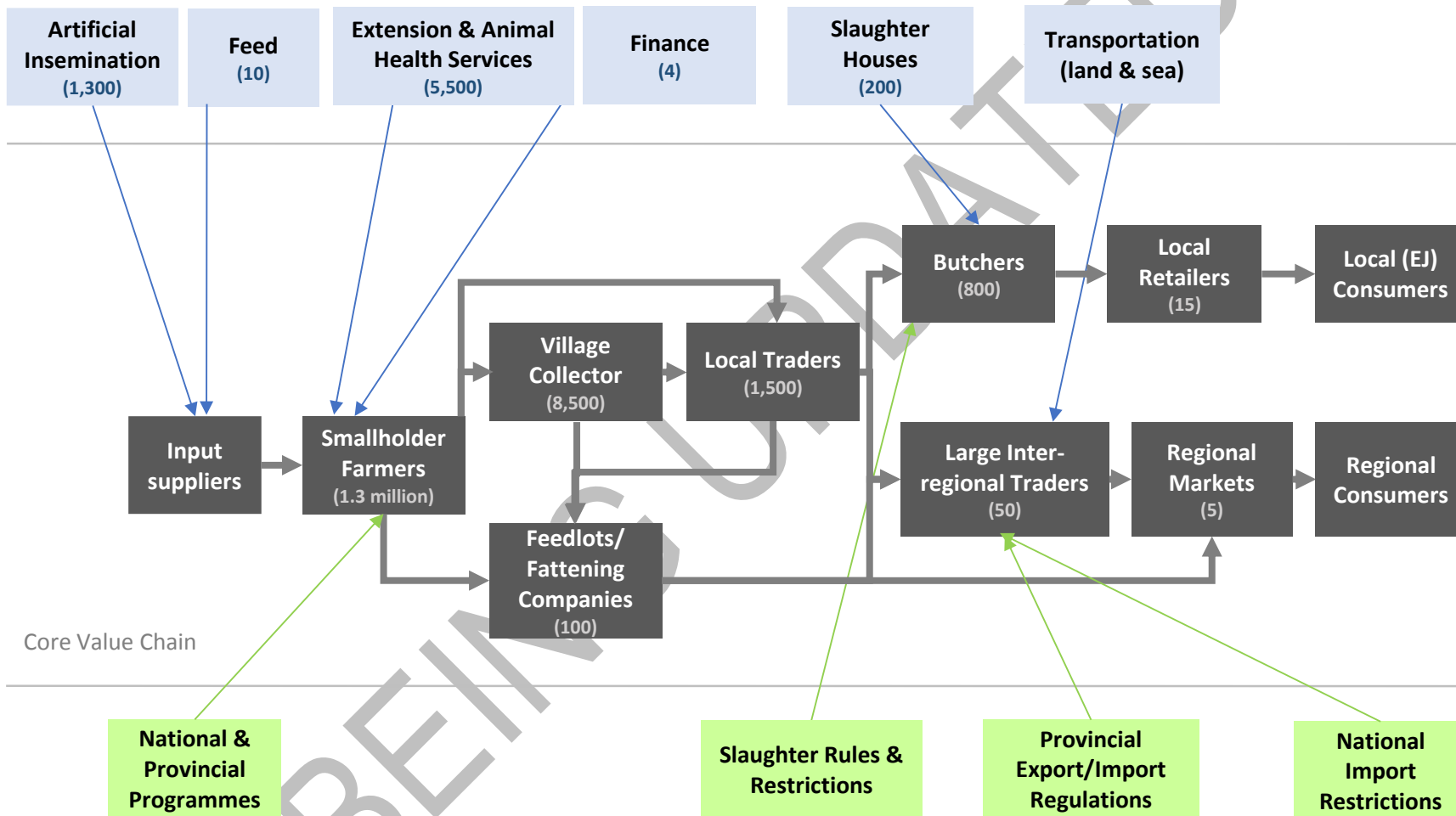
3.2.1 Market overview

Cattle farming in East Java involves production for two main markets: (1) the slaughter of cattle for local beef consumption and (2) regional export of live cattle for slaughter. Cattle and beef production in East Java is characterised by widespread use of artificial insemination, the emergence of a nascent feed sector, and by far the largest cattle trading and slaughter sector in Indonesia. Despite higher levels of commercial activity and supporting infrastructure, there is significant room for improvement and higher productivity.

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3.2.2 Sector Map

Supporting Services



Business Enabling Environment

3.2.3 Core value chain

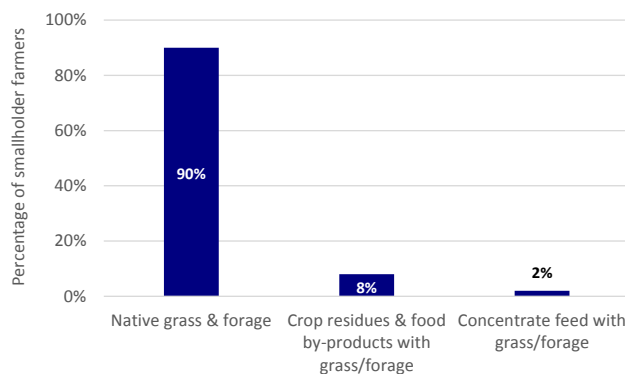
Inputs

Feed is considered to be the most important input into cattle production, affecting reproduction, mortality, and growth rates of cattle. Good cow nutrition is essential for high reproduction rates in cattle. Cows need to be fed a sufficient quantity and quality of feed to maintain body condition, especially in the few months before and after calving when the energy demands of pregnancy and lactation are highest. Poor cow condition at calving results in increased calving intervals and reduced calving percentages. At the same time, inadequate nutrition in growing calves can delay the development of puberty in heifers. It can also reduce growth rates of fattening cattle, thus resulting in long fattening periods. Good animal husbandry practices, involving water and medicines, are also important for the average daily weight gain (ADG) of cattle.

Approximately 90% of smallholders rely solely on native grasses and forage to feed cattle. Another 8% of farmers supplement the diet of their cattle with crop residues or agro-industrial by-products and a mere 2% use concentrate feed. Concentrate feeds are mixtures of grains, cereals, and minerals which are used to supplement the diet of cattle. They are used in high quality feed strategies mainly in commercial feedlots. It is, however, possible to still achieve significant improvements in smallholder ADGs through other nutritious feed strategies that do not involve concentrates. Crop residues and agro-industrial by-products (such as rice husks, palm oil and copra residues, and tofu waste) are often more nutritious than on-farm feed sources, with the price of these options varying depending on the raw materials used.

Farmers have low awareness of the value of better feed, and the majority of smallholders use native grasses and forages (including rice straw) from their own lands or nearby lands, including from government owned forestry lands and state-owned plantations. Cattle feeding and the collection of feed is done by men or jointly by men and women. At present, farmers are not planting improved grass or tree forages to supplement the diet of their cattle. Some households assist with the harvest of other households in return for feed (predominantly rice straw, which is a low grade feed source). This is possible year-round in areas with 2-3 crops per year and with staggered harvest periods. East Java produces about 19 million tonnes of rice straw, much of which was previously burnt. In recent years, there has been a rapid increase in the purchase and utilisation of rice straw.

Figure 5: Smallholder feed practices



A nascent feed market and trading industry for more nutritious feed options is developing in East Java. Increasing pressure on feed supply may encourage further growth of the commercial feed market. Plantations, food processing companies, and cottage food businesses generate large amounts of by-products which can be more fully utilised to improve cattle feed strategies. For example, wheat pollard, which is a by-product from flour milling, can be purchased from feed traders and distributors. One of the main producers of wheat pollard is PT Bogasari Flour Mills. Other common sources of supplementary feed include by-products from

tofu and tempeh production. Farmers purchase these by-products at the site of tofu and tempeh processors, but there are usually limited quantities available.

Existing suppliers of agro-industrial by-products and crop residues for cattle feed include CV AG Lestari and PT Antaboga Manunggal in Surabaya, PT Pakindo Pakan Ternak Indonesia in Sidoarjo, PT Rajaya Feed in Kediri, CV Mutiara Argo in Mojokerto, and Wahyu Utama in Tuban. Wahyu Utama is a fully integrated beef operation which sells crop residues and agro-industrial by-products such as rice bran, palm oil residues, coffee skin, molasses, etc. to cattle farmers. Antaboga, which mainly produces poultry and fish feed, also sells crop residues which cattle farmers can use to mix their own feed.

In addition to suppliers of agro-industrial by-products and crop residues, there are now several companies that produce concentrate cattle feed. Both Charoen Pokphand and Japfa Comfeed are primarily involved in poultry feed but also sell small amounts of cattle feed. NUFO, Charoen Pokphand's concentrate feed, is mainly sold to local collectors who use feed to maintain the weight of cattle as they search for buyers. Japfa Comfeed produces a concentrate feed for its own feedlot, and only a small amount is sold to the market.

Pusat Kegiatan Masyarakat (PKM) has a registered concentrate product for cattle fattening that can achieve an ADG of 1.2kg. This product sells for 2,000-2,500/kg. Despite having a production capacity of 14,400 tonnes/year, current production is 600 tonnes/year and nearly all the production is for internal use. Soegio Sukses Sejahtera, a new feed producer based in Bogor, produces three types of concentrates for commercial sales (feed for 0-6 month old calves, 6-18 month old calves, and cattle fattening). Soegio claims to be able to increase the ADG to 2.2 for cattle fattening, thereby reducing fattening periods to 3.5 months. The company already operates in 11 other provinces. Although it has launched a demonstration facility in Surabaya, they are currently prioritising other provinces (West Java, Kalimantan, and Lampung) and big commercial farmers and feedlots. Finally, Yellow Feed based in Probolinggo is producing a concentrate product, but their main market is the government.

Table 1: Details on several concentrate feed producers in East Java

Company Name	Description	ADG	Price
Charoen Pokphand	Started selling cattle concentrates 2 years ago (produces 20 tonnes/month). Cattle feed business is stagnant.	1.5 kg	3,900/kg
Soegio Sukses Sejahtera	Sells only 5 tonnes/month in East Java but produces 3,000 tonnes/month for the entire Indonesia.	1.5-2.5 kg	4,500/kg
PKM	Produces 600 tonnes/year. Only 3% sold commercially (mainly to feedlots).	1.2 kg	2,500/kg
Japfa Comfeed	Sells minimal amounts commercially. Production is mainly for own cattle operations.	1.5 kg	-
Eka Putra Jaya	Produces 20 tonnes/month but does not sell concentrates commercially. Production is used entirely for own cattle operations.	1.8 kg	4,000/kg
Wahyu Utama	Produces 20 tonnes/month but does not sell concentrates commercially. Production is used entirely for own cattle operations.	1.1 kg	1,850/kg

There are also a number of specialised feed trading households which assemble, prepare, sell, and transport feed for a price. Furthermore, under the government's "Increase Welfare of Cattle Farmers" project, some cattle farmer groups were given feed mill machines and training on producing and using concentrates. Unfortunately, there were issues around the availability of raw materials, and the project did not have a commercial orientation. Nevertheless, there are farmer groups with underutilised feed milling equipment that could potentially support the growth of specialised feed trading households.

Several other feedlots and fattening companies are also producing feed, which is available to a limited number of farmers who participate in contract farming arrangements with these companies. Wahyu Utama produces a concentrate feed product that can increase the ADG to 1.1 and a crop residue product that can increase ADG to 0.8-0.9. These products are mainly sold to participating contract cattle farmers at IDR 1,850/kg for concentrate and IDR 1,650/kg for the crop residue product. This is much cheaper than other commercially available feed options, which can reach IDR 5,000/kg. At the same time, the ADG is nearly comparable to other commercial options. Eka Putra Jaya also produces concentrate feeds for its own operations and contract farmers.

In terms of breeding inputs, artificial insemination (AI) is widely practiced in East Java with a coverage rate of 90%. AI expedites the breed improvement process by allowing for cross-breeding which can lead to rapid improvements in cattle productivity. There is a high demand from households to breed into larger-framed European breeds (Limousin and Simmental). However, farmers often lack knowledge on how to select appropriate female breeders for AI. For example, there is a high risk of mortality for the calf and breeder if a heifer (a young female cow that has not yet borne a calf) is inseminated with semen from larger-framed breeds. This risk is reduced if the female breeder has previously given birth to a calf through natural mating.

Although AI is widespread in East Java, the delivery of AI services is inefficient and improvements can be made to ensure that services are delivered in a timely manner. Timely delivery of AI services is a function of the ability of farmers to detect oestrus in their cows (mucus, riding, etc.) and for farmers to alert AI agents, and also of AI agents to deliver the AI service within the oestrus period. Women and men are both actively involved in animal husbandry and management (oestrus detection, animal health and disease, calf management, etc.). It is common for them to miss the oestrus signs because they are busy with other work or looking for other behavioural signs. The design of pens can also mean that cows are usually standing with their tails against a wall, making it difficult to detect signs of oestrus.

Furthermore, semen in straws must also be live, which is a function of collection, storage, and distribution. If quality semen cannot be delivered within a day or two, the oestrus period will be missed and delayed for another 21 days on average, further lengthening inter-calving intervals. Delays of this kind are common in East Java. Estimates based on a mixed cow-calf/fattening household in Malang show that household returns are highly sensitive to calving intervals and percentages. If more accurate oestrus detection and timely delivery of AI services can bring forward pregnancy by one oestrus cycle, then this increases annual calving percentages by 5.8% and gross returns from cattle by 14.3%.

The AI network is state-run, with a number of government and quasi-private agents administering the AI service. While the use of independent agents has allowed the government to improve outreach of the AI network, there are insufficient agents overall.

There are 1,251 government artificial inseminators, which is equivalent to 1 government inseminator per 995 cattle farmers. Quasi-private AI agents receive training through the independent inseminators program, and they report to Dinas Livestock (Department of Livestock) and use Dinas resources. These agents earn money through AI fees and are not on the government payroll. Semen and straws for AI originate from Singosari Artificial Insemination Centre in Malang, one of two national breeding centres that produce semen in Indonesia. The other centre is in Lembang in West Java. Currently, growth in the numbers of AI agents is constrained by the annual quota for the AI training (which allows only 5 persons per district in East Java). Not all of those who attend the course will actually receive a license from Dinas to operate as an artificial inseminator.

In addition to the limited numbers of inseminators, technical skills among inseminators are generally low.

Inseminators only receive a one-time training, which includes a classroom component at Singosari and a 5-day field training with a senior licensed inseminator. There is no continual upgrading of skills or coaching after the initial training. Although government AI agents were reported in some areas to be more highly trained and accurate than independent agents, AI success rates are not optimal and are estimated to be only 40%. Moreover, since the AI fee structure is based on attempts rather than successful conceptions, there is limited incentive for agents to achieve higher success rates. In-breeding (i.e. mother cows and their female offspring are being injected with semen from the same bull) also arises because neither farmers nor agents keep records on what semen has been used for each conception.

Other than the government's AI network, there are some skilled AI staff who belong to the only private breeding operation in East Java. Wahyu Utama, which has backward integrated into breeding, is the only private breeding operation in East Java. It has AI staff who administer semen obtained through the national breeding centre to its own cows. There are also private breeding operations in other provinces, which includes Santosa Agrindo's breeding operations in Lampung.

Inefficiencies in AI result in lower calving percentages and affect the overall supply of calves in East Java. While a shortage of female breeders would exacerbate the problem of a low supply of calves, it is unlikely that this is an issue in East Java.

Contrary to the mainstream belief propagated by universities and researches, farmers are not selling productive females for slaughter. In fact, households will only sell their females cows for slaughtering if the cows are no longer productive. The contradictory stories at the academic level and at the field level may be motivated by the political nature of the cattle sector. For example, if the mainstream belief is that there is a shortage of female breeders, this could justify increasing quotas on the import of breeders. However, since imports mainly go towards feedlots, they would be the ones to capture any benefit from changing the import quota. PRISMA plans to launch a breeding study which would provide evidence on farmers' behaviour with respect to female breeders and would investigate the population and growth trends of female breeders and calves. The study will also improve understanding around AI access and practices.

Production

Cattle production in East Java is more productive than provinces like NTT, but there is still significant room for improvement. Low productivity is evidenced by low calving intervals and calf growth rates in East Java, and the most important contributing factor is the availability of feed. An estimated 90% of feeder cattle are being fattened with low quality feed. As a result, it is no surprise that the productivity of farmers involved in fattening is also sub-optimal (ADG of <0.4kg) and that fattening periods are approximately 11-12 months for smallholder farmers. In contrast, feedlots in East Java can achieve an ADG of over 1 kg, requiring only 3 to 4 months for fattening.

Cattle farming in East Java is mainly intensive or semi-intensive, with production on the main island of East Java being dominated by Ongole cross breeds and other larger-framed European cross breeds. Limousin and Simmental breeds accounted for 95% of AI conceptions in East Java in 2010, an equivalent of 867,013 conceptions. These cross breeds have higher growth rates (with the potential to reach an ADG of 1.8-2 kg) but also tend to consume more feed than smaller breeds. Small land sizes, including limited communal lands for pasture land, have resulted in more intensive cattle farming systems whereby cows are kept in pens and raised on feed that has been collected from on- and off-farm sources. The cleaning of pens is typically done by men while women are in charge of providing water. Intensive farming allows farmers to easily collect manure, which can be sold for additional income. Currently, only a small number of farmers are exploiting this additional income generation opportunity as part of a development project in Bojonegoro.

Cattle production systems in East Java have traditionally been dominated by 'mixed' breeding-fattening systems where households hold cows and raise offspring to slaughter weight. This system still predominates, but a number of producers are becoming increasingly specialised in cow-calf production in recent years. Cattle are often regarded as important means for saving money. As a result, farmers are not necessarily focused on profit maximisation and expanding cattle operations. This means that there is often no pressure to increase the weight gain of cattle, shorten fattening periods, and increase overall turnover. While it can take a lot longer, farmers can eventually achieve the required slaughter weight for cattle through traditional husbandry practices which rely on free sources of feed. This is a key challenge that needs to be overcome when developing the business case to smallholder farmers for adopting better inputs and practices. On average smallholder farmers tend to raise 1-3 cattle per household. While many farmers are not growing cattle for commercial reasons, cattle farming can be quite profitable in East Java, especially for fattening operations. Cattle fattening households can obtain an income of up to IDR 4 million per slaughter cattle. This is three times higher than a household fattening operation in NTT.

There are a number of feedlots and fattening companies across East Java, which account for just 1% of the cattle herd but 6% of cattle turnover. Private companies have tended to focus on the cattle fattening business (rather than breeding) as it has higher and quicker returns. There are at least 5 commercial feedlots and fattening companies in the initial target districts: Agrisatwa Jaya Kencana (Sapindo) in Malang, Wahyu Utama in Tuban, Santosa Agrindo (Santori) in Probolinggo, Haji Suprpto in Situbondo, and Eka Putra Jaya in Bojonegoro.

Sapindo and Santori have the largest operations, but neither company has formal links with producer groups to secure a supply of feeder calves. Only Wahyu Utama, Haji Suprpto, and

Eka Putra Jaya have worked directly with producers through contract fattening models. Under these models, feeder cattle are distributed to contract farmers, and farmers are expected to provide land and cover their own production costs. Depending on the model, there may be a profit share arrangement and farmers receive varying levels of training and may or may not get access to concentrate feeds, materials for pens, or medicines. Despite having a contract farming program for over a decade, Wahyu Utama's outreach is only 100 farmers with 4 cattle per farmer. Eka Putra Jaya has a similar outreach number, and Haji Suprpto is only engaging 20 farmers with 1 cattle per farmer. These numbers are particularly low when compared to NTT. Even though NTT has lower levels of commercial activity than East Java, it can boast over 16,000 farmers under contract fattening arrangements.

Cattle Marketing

The majority of independent farmers sell their cattle through village collectors. They rarely sell directly to livestock markets or have relationships with feedlots and fattening companies. The decision to sell cattle is made jointly by both men and women and is usually based on household financial needs. Negotiations and trading are done exclusively by men. Village collectors typically pay farmers only after they have sold the cattle, and it can take approximately 20 to 30 days for farmers to receive payment. These collectors will sell slaughter cattle to other sub-district or district traders and butchers (including through live cattle markets).

There is a rotating market system for cattle trading, and in every district, there is at least one cattle market day during the week. Inter-districts traders will move from one district to another based on the market schedule. There are at least 110 cattle markets across East Java.⁷ Ponorogo has the largest cattle market, which is frequented by traders from other provinces. When village collectors bring their cattle to the local cattle market, they are usually approached outside the market by blantiks. Blantiks are brokers who control entry into the cattle market. The blantik will provide a down payment to the village collector after negotiating a price with the collector, and the rest of the payment is given after the sale of the cattle inside the market.

Overall, there are over 10,000 traders involved from village collectors to inter-regional traders, with most of these traders operating at the village level. The main destinations for inter-district trade of live cattle are urban areas such as Surabaya, Sidoarjo, Gresik, and Malang Municipality. There are no dominant trading families in East Java that control inter-regional trade. Inter-regional traders from West Java and Kalimantan will buy cattle directly from cattle markets in East Java. Trade to Jakarta, West Java, and Central Java is primarily overland while the main port in Surabaya is used to ship live cattle to other provinces.

Processing and Beef Marketing

East Java has by far the largest slaughter sector in Indonesia, with beef production centred around Surabaya, Sidoarjo, and Gresik. The sector is characterised by low cost, labour intensive, and efficient slaughter by individual butchers. There are 179 slaughterhouses in East Java, of which 113 are classified as RPH slaughterhouses. While both RPH and TPH slaughterhouses are registered facilities, RPH facilities are better equipped and have higher standards. The bulk of the sector consists of service kill slaughterhouses where local government or state-owned companies provide slaughter facilities and butchers retain ownership of the cattle, beef, and by-products. Men are responsible for killing animals,

⁷ East Java market schedule: <http://www.disnak.jatimprov.go.id/web/usahapeternakan/pasarhewan>

supervising slaughter to halal specification (Modin), and working on the slaughter line moving heavy carcasses. In some abattoirs, women play an important role in boning. There is also a high proportion of women involved in collecting and cleaning beef products and by-products.

Several feedlots have integrated cattle and beef operations. Eka Putra Jaya, Wahyu Utama, and Sapindo all have slaughterhouse facilities that are used for their own operations and as service-kill facilities. Wahyu Utama is also integrated to the retail level and has a number of restaurants and wet market stalls.

There are more than 15 large beef distributors and retailers in East Java. Most of the large distributors and retailers are concentrated in industrial and urban areas like Surabaya, Sidoarjo, and Gresik and will also sell imported beef from Australia. Beef produced in industrial zones is typically redistributed to retail outlets across the province, particularly to districts that have limited cattle and beef production. Large beef distributors and retailers include PT. Niaga Harmoni Indonesia and PT. Anugerah Pangan Sentosa in Surabaya, CV Mustika Global in Sidoarjo, UD Samudera-Asia in Gresik, and CV Muda Mandiri Pratama in Malang. Beef and by-products (tenderloin, sirloin, cube roll, tendon, heart, etc.) are sold to stallholders in wet markets, street vendors, meat shops, supermarkets, and the hospitality industry. Women play a significant role at the retail end of the market. End consumers purchase beef from these retail channels, and the vast majority of beef is consumed in a highly cooked or transformed form.

3.2.4 Supporting functions / services

Some technical and animal health extension services are provided by the government. This includes animal health centres (Pukeswan) at the sub-district level and animal health laboratories at the provincial level. The provincial and district level governments provide extension agents who monitor animal health, provide trainings and information to farmers, and supply veterinarian services, vitamins, supplements, and medicine. In 2012, there were 5,229 public extension agents (half of whom were government employees with the remaining as government contracted workers). This equates to approximately 1 extension agent per 228 cattle farmers.

Agents are expected to conduct all duties related to livestock, feed, forages, statistics, administration, and certification. This places major constraints on their expertise and ability to do commodity-specific work. Furthermore, many of the extension agents are not sufficiently trained in animal health, which is important given the prevalence of diseases such as brucellosis, bovine viral diarrhoea, etc. Aside from the public extension system, there are also approximately 2,119 independent agents in East Java.

Only a few private companies have extension staff, but these services are only accessible to targeted cattle farmers who are participating in contract farming arrangements with these feedlots. Feedlots such as Wahyu Utama and Eka Putra Jaya provide concentrate feeds, vitamins, medicines, and information to contract farmers. They also have technical extension agents who train contract farmers on good feeding practices and monitor the health and growth of the cattle. However, the outreach of these contract farming arrangements is limited, with only 220 cattle farmers participating in contract farming arrangements in East Java.

Financial services are limited for cattle farmers, and farmers tend get credit through moneylenders, cattle collectors, feedlots, and government programs. Feedlots who have contract fattening schemes with farmers often provided embedded finance where the price of cattle and inputs are deducted from the final sale price of the cattle. In Wahyu Utama's contract fattening scheme, they have a partnership with Bank Syariah Mandiri whereby the bank provides credit to farmers based on a loan guarantee from Wahyu Utama. But as previously noted, the outreach of these arrangements are limited, and most farmers are obtaining loans from moneylenders and cattle collectors. The process for getting a loan from moneylenders and collectors is relatively simple and does not require collateral, but interest rates tend to be high.

While the government provides subsidised loans that can potentially be accessed by cattle farmers, only large farmers or feedlots have been able to access these products in East Java. *Kredit Usaha Pembibitan Sapi* (KUPS) and *Kredit Ketahanan Pangan dan Energi* (KKPE) loans are distributed through national and provincial banks (Bank Rakyat Indonesia, Bank Syariah Mandiri, Bank BNI, and Bank Jatim/Jawa Timur). KUPS is targeted at the breeding sector, and breeders must form groups in order to access this product. Low disbursement and uptake of this loan product is related to the underlying financial viability of breeding operations. On the other hand, KKPE is targeted at smallholder fattening operations where fast turnovers make these businesses more commercially viable. Bank Jatim, a state-owned provincial bank, also has 3 loan products for livestock farming: (1) a credit scheme for micro-small-medium scale businesses (Kredit UMKM); (2) credit for people business (Kredit Usaha Rakyat/KUR); and (3) Pundi Kencana Kredit. However, requirements for collateral and proper business plans continue to make it difficult for farmers to access available loan products.

Shipping infrastructure is well developed, and there are numerous options for overland transportation. Loading/unloading facilities, quarantine facilities, and holding yards are usually provided by the local or national government while private sector companies own and operate the ships needed to transport cargo. Tanjung Perak is one of the biggest ports in Indonesia and the main port for the regional export of cattle to Kalimantan, Sulawesi, and Bangka-Belitung. Most traders use the services of shipping companies where cattle make up only a small cargo component for these companies. As a result, cattle are typically shipped on general cargo ships and not on purpose-built cattle ships.

In terms of regional exports to Jakarta, West Java, and Central Java, overland transportation (both trucks and trains) are used to move cattle. There are three types of truck operations: (1) trucks owned and operated by the traders, (2) chartered trucks, and (3) trucking companies that also provide livestock transport insurance. Traders from West Java tend to bring their own trucks to transport the cattle.

In terms of coordination in the sector, there is a Meat and Feed Lot Association (APFINDO) but not all the major feedlots are members of APFINDO. For example, neither Eka Putra Jaya nor Wahyu Utama are members of APFINDO. The association has 32 members, mostly from Java and Lampung. Many of these members are involved in the import of live cattle and also a number of them are producing their own feed and have technical expertise in good animal husbandry. APFINDO has regular meetings with the government (Minister of Agriculture, Minister of Trade, and Directorate General of Livestock) to discuss the livestock sector and to lobby for policy changes, including around import quotas. In collaboration with the Gajah Mada

University, APFINDO has developed a roadmap of the cattle industry and they plan to present the roadmap to the new president.

3.2.5 Supporting rules and regulations (enabling environment)

The beef industry is heavily impacted by an array of national sector policies, regulations, and programs, as well as bilateral partnerships to promote the industry. In order to achieve goals of national beef self-sufficiency, the previous government had rolled out a third beef self-sufficiency program (PSDSK) and had targets to increase the annual average growth rate of Indonesia's beef cattle herd by 12.4% and increase beef production by 10.4%. A budget of IDR 10.65 trillion was allocated for the 5-year program which ended in 2014. The Indonesia-Australia Partnership on Food Security in the Red Meat and Cattle Sector, which was approved by the Australian government in 2014, provides AUD 60 million over 10 years to develop the Indonesian cattle sector and improve prospects for long term investment and trade in red meat and cattle in Indonesia. This includes supporting investments in three priority areas – breeding, processing, and logistics.

The new president, Joko Widodo, is also prioritising the development of the agriculture sector in Indonesia, including the beef sector under the Swasembada Pangan program. His vision for the Indonesian beef sector includes the establishment of village-level breeding cooperatives in every cattle producing village and the provision of technologies and information to improve cattle feed and rearing management. This includes an AI program for 2 million cattle, with a target of 1 million new calves in the first year.

In line with national objectives, the government of East Java has been supporting the growth of the beef sector. The Diamond Cattle Program (Sapi Berlian), which started in 2009, aimed to produce 5 million calves within 5 years. The ultimate goal of the program was to increase the cattle population and productivity and improve the genetic quality of the breeding stock in East Java. It was the acceleration of a previous program, Intan Sejati, which focused on artificially inseminating 1 million cattle. Programs at the district level include the Intan Berduri Emas Program in Malang, which aims to produce 200,000 calves through AI by the end of 2015. The Sekolah Peternakan Rakyat program in Bojonegoro provides training to farmers on how to raise cattle, maintain cattle health, and improve feed practices.

Various regulations have been issued by the provincial government, mainly to restrict inter-regional cattle trade. Butchers have, in the past, complained about the declining number of cattle available for slaughter due to inter-regional live cattle exports to fulfil tenders from the central government. Urged by slaughterers, there have been temporary restrictions on the export of cattle from East Java. For example, a November 2012 Livestock Service Circular specified that only males weighing at least 275kg and not Ongole cross-breeds could be exported. Temporary bans have also been placed on the traffic of livestock from anthrax-infected regions, including Central Java, DI Yogyakarta, NTB, and NTT. In 2010, there was also a governor circular prohibiting the distribution of imported cattle, beef, and offal in traditional markets but supermarkets, hotels, and restaurants are still allowed to import these products with the appropriate permits.

Restrictions on the entry of cattle from outside of East Java have led to higher cattle prices. Although detrimental to consumers and slaughterers, this has benefitted cattle farmers. It is estimated that losses for consumers and slaughterers rose to IDR 1.5 trillion per

year in 2012-2013. Import bans have also made it more difficult to source affordable feeder calves for fattening operations. Nevertheless, cattle farmers have continued to benefit on aggregate, and there is also evidence that some feedlots are importing calves from Australia via Jakarta, suggesting that the bans are not being evenly or strongly enforced.

The slaughter of productive females is also banned under central and provincial regulations, including Provincial Regulation No 3/2012. There is no clarity on how to classify a female cow as being productive or unproductive and no apparatus for monitoring the implementation of this regulation. According to the Department of Livestock of East Java, there is currently only one inspector for the entire province, and they have not been able to fill the two other vacancies.

Other relevant rules and regulations include the national beef standards (SNI 3932:2008), but these standards are used as a reference only and don't form the basis of trade. These standards specify language and measurements used to define quality of cattle (age, breed, sex), beef (cuts, muscle and fat colour, marbling), processes (freezing), certification and labelling (Halal), and microbiological standards. However, they are not widely recognised, accepted, or used. There is no clear link between quality and price premiums.

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 beef 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:

- Farmers experience low productivity because of slow weight gain in calves and cattle
- Farmers are unable to increase production because of inefficiencies in AI

Farmers experience low productivity because of slow weight gain in calves and cattle.

Good nutrition is important for improving growth rates of calves and cattle. This leads to shorter growth periods, which can reduce the amount of time that capital is tied up in cattle and improve economic returns for farmers. Unfortunately, an estimated 90% of feeder cattle are being fattened with low quality feed, and smallholder farmers are only achieving an ADG of <0.4kg during cattle fattening. This leads to prolonged fattening periods of 11-12 months. In contrast, feedlots are able to fatten cattle in only 3 to 4 months. Farmers lack access to nutritious feed and good feed practices to accelerate weight gain not only for feeder cattle but also for calves. Farmers also have low awareness of the benefits of quality feed. As a result, they continue to use low grade feed sources (including rice straw), and relatively few farmers are purchasing more nutritious supplementary feed products. This also needs to be accompanied with better animal husbandry practices, including around drinking water and medicines for cattle.

Farmers are unable to increase production because of inefficiencies in AI. Farmers lack information on proper AI practices (including information on accurately detecting oestrus and selecting appropriate female breeders for AI) and have limited access to timely AI services.

Many farmers miss the oestrus signs because they are busy with other work or looking for other behavioural signs. At the same time, if quality semen is not delivered within a day or two, the oestrus period will be missed. These factors can affect AI success rates and in turn annual calving percentages.

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:

- Few commercial feed providers and limited providers of information on good animal husbandry
- Inefficient delivery of AI services because of the limited outreach of the current AI network, low technical capacity of AI agents, and weak information provision on AI

Few commercial feed providers and limited providers of information on good animal husbandry

Access to feed and good feed practices is important for improving the growth of calves and feeder cattle. Although the production and trade of cattle feed is growing in East Java, the sector is in its infancy, and overall there are few commercial cattle feed providers. Feed providers are also experiencing difficulties penetrating the smallholder market, and available commercial concentrates and supplementary feed products are often not affordable for smallholder farmers. At the same time, government is the main source of information about better feed sources and practices (as well as animal husbandry practices), but the knowledge and outreach of government agents are limited. Even in the rare cases where government has provided trainings on better feed practices to farmers, there has been minimal follow up after the trainings.

Inefficient delivery of AI services because of the limited outreach of the current AI network, low technical capacity of AI agents, and weak information provision on AI

With nearly all of breeding done through AI, access to timely AI services and information on proper AI practices are critical for increasing cattle production in East Java. The state-run AI network uses government agents and quasi-private agents to administer the AI service. Although the use of independent agents has improved the outreach of the AI network, these agents tend not to be as well trained as government agents, and there still remains inadequate numbers of technical agents to deliver AI in a timely manner and provide better information to farmers on improved AI practices (e.g. on oestrus detection, selection of female breeders, prevention of in-breeding). Delays are common in East Java, and this is problematic given the time sensitive nature of AI, where quality semen needs to be delivered within a narrow timeframe to ensure that the oestrus period will not be missed. AI success rates (which are 40%) are lower than optimum, and this is exacerbated by the current incentive system for agents, which is based on attempts rather than successful conceptions.

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 clear market opportunity to expand East Java's potential to supply local beef demand in the province and to fulfil national beef demand through increased inter-regional exports. Demand for beef is expected to continue increasing as Indonesian income and middle class population grow. Despite the growth in national production, Indonesia is still reliant on imports to sustain its demand for beef. There is significant potential for import substitution as 17% of total consumption comes from beef imports (an estimated 100,000 tonnes in 2014). While it is unclear what the breakdown is between imported feeder cattle for feedlots and imported slaughter cattle (which jointly contribute to 13% of total consumption), there is also potential for substituting imported slaughter cattle.

Based on this context, East Java has the potential to increase cattle production to satisfy both national and local beef demand. Within East Java, there are opportunities to meet the growing demand from Surabaya municipality and other urban and industrial areas like Gresik, Sidoarjo, Tuban, Malang, and Jombang. Outside of the province, there is potential to expand regional exports to existing destinations such as Jakarta, West Java, Central Java, Kalimantan, and Bangka-Belitung.

Based on our calculations, there is potential to unlock an additional AUD 43.6M in the 6 initial intervention districts for the beef sector in East Java.

Table 2: Business potential in target area

Description/Years	Total Business in the target area (s)
Existing Production (Head)	271,040
Potential New Production in Existing Areas (Head)	43,614
Total Potential Production (Head)	314,654
Average Selling Price Cattle per kg (IDR)	28,000
Current Value of Production (IDR in millions)	2,419,398
Current Value of Production (AUD)	219,945,309
Total value of potential production (IDR in millions)	2,899,157
Total value of potential production (AUD)	263,559,691
Total potential value of increased production (million IDR)	479,758
Total potential value of increased production (AUD)	43,614,381

5.2 Vision of change

Focusing on achieving the potential outlined above for the beef 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 and maximise smallholder cattle production and productivity. At the **service**

level, it is envisaged that farmers will have improved access to: (1) feed, (2) information and (3) AI services.

We envision feed and information services will be delivered through feedlots/fattening companies, feed companies, and feed traders. AI services will be delivered through feedlots/fattening companies and independent AI agents, in collaboration with Dinas Livestock and the national breeding centre.

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 beef 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
Intervention Area 1: Introduce affordable, nutritious commercial feed	<ul style="list-style-type: none"> • Promote crop residues for cattle fattening (Wahyu Utama in Tuban) • Promote concentrate feed for cattle fattening (PKM in Tuban)
Intervention Area 2: Promote professional AI services, including information on good AI practices	-

Intervention Area 1: Introduce affordable, nutritious commercial feed

The introduction of affordable commercial feed is expected to improve access to nutritious feed and good feed practices to accelerate weight gain in calves and cattle and to shorten the fattening period. Efficient use of nutritious feed (along with better animal husbandry practices) is of prime importance for securing better economic returns from cattle farming.

This will involve increasing awareness among farmers of the benefits of investing in cattle feed products and working with feed producers to improve the production, marketing, and distribution of feed (e.g. developing more effective formulas for feed composition, improving the sourcing of raw materials, establishing new retail networks) and delivery of embedded information. This may also include the introduction of appropriate cattle farming financial products if finance is consider a key constraint for smallholder adoption of feed products and other inputs. It will be important to ensure that exposure to the benefits of new feed products and embedded services (such as training on feed and other animal husbandry practices) are accessible to women and tailored to their needs. Measures to reduce the amount of time required to source and collect feed can be important for reducing the labour burden of women.

In order to introduce affordable, nutritious feed options, AIP-PRISMA is prioritising feed for fattening and has segmented this market into two groups. For 90% of farmers who are currently

only using grass and forage, the focus will be on introducing crop residues and agricultural by-products as affordable feed options. This is an incremental step which can be more easily achieved than promoting more expensive concentrate feed products to this market segment. For the 8% of farmers who already use crop residues and agricultural by-products, the focus will be on encouraging them to adopt concentrate feed products.

AIP-PRISMA will be starting two interventions—promoting commercial crop residues with Wahyu Utama and promoting commercial concentrate feed with PKM. Wahyu Utama already produces a low-cost nutritious feed product but is only providing it to its contract farmers. The idea is to expand its outreach beyond its contract farmers and to develop a retail network using lead farmers. There is potential to scale the model with small feedlots or large feed companies such as Antaboga. PKM produces an affordable registered concentrate feed product, which is used primarily for farmers participating in Holcim's⁸ cattle rearing CSR training program. The idea is to extend the training model beyond farmers in Holcim's immediate vicinity and to commercialise the concentrate feed by convincing both farmers and retailers of the benefits of the product. Potential candidates for scale-up include Charoen Pokphand, which has expressed interest in promoting concentrates for cattle fattening in Lamongan.

Intervention Area 2: Promote professional AI services, including information on good AI practices

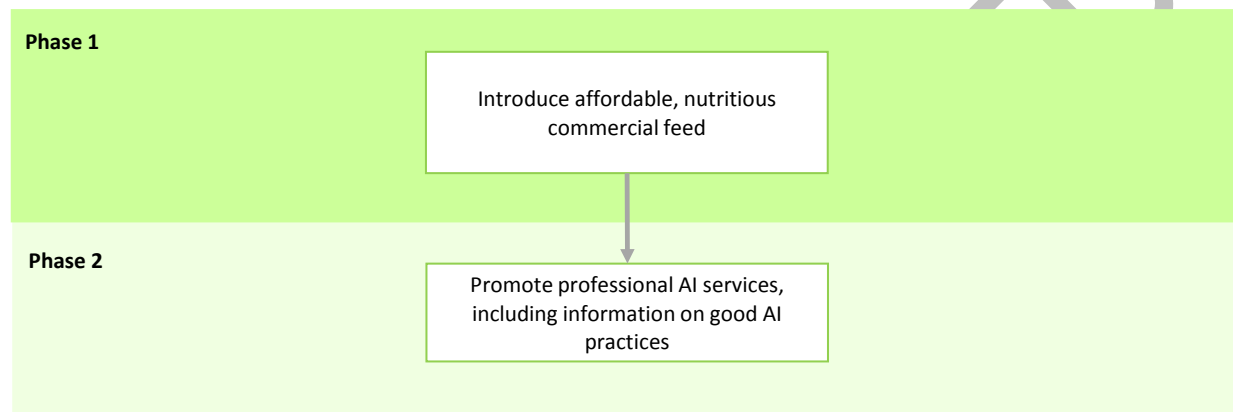
The goal is to increase cattle production by increasing the supply of calves through higher AI success rates. This will require more efficient AI delivery and better information on proper AI practices. Given the involvement of women in animal husbandry and management, they are an important target for any intervention involving improved AI practices and services. As with the feed intervention, it is necessary to ensure that AI services, trainings, and information provision are accessible to women and tailored to their needs.

There is potential to partner with the national breeding centre and Dinas Livestock to test alternative models to incentivise AI agents to achieve higher success rates. Fee structures that reward successful conceptions rather than the number of attempts could increase incentives for agents to have closer communication with farmers; increase knowledge transfer and the provision of training on oestrus detection and other good AI practices; and improve the quality, responsiveness, and timeliness of AI delivery. There is also potential to expand delivery models in collaboration with vertically integrated feedlots/fattening companies like Wahyu Utama and Santori. Both of these companies have private breeding operations and technicians in Indonesia that can provide AI services. In the case of Wahyu Utama, they have expressed interest in developing and supporting breeding groups to increase the supply of calves for their fattening operations.

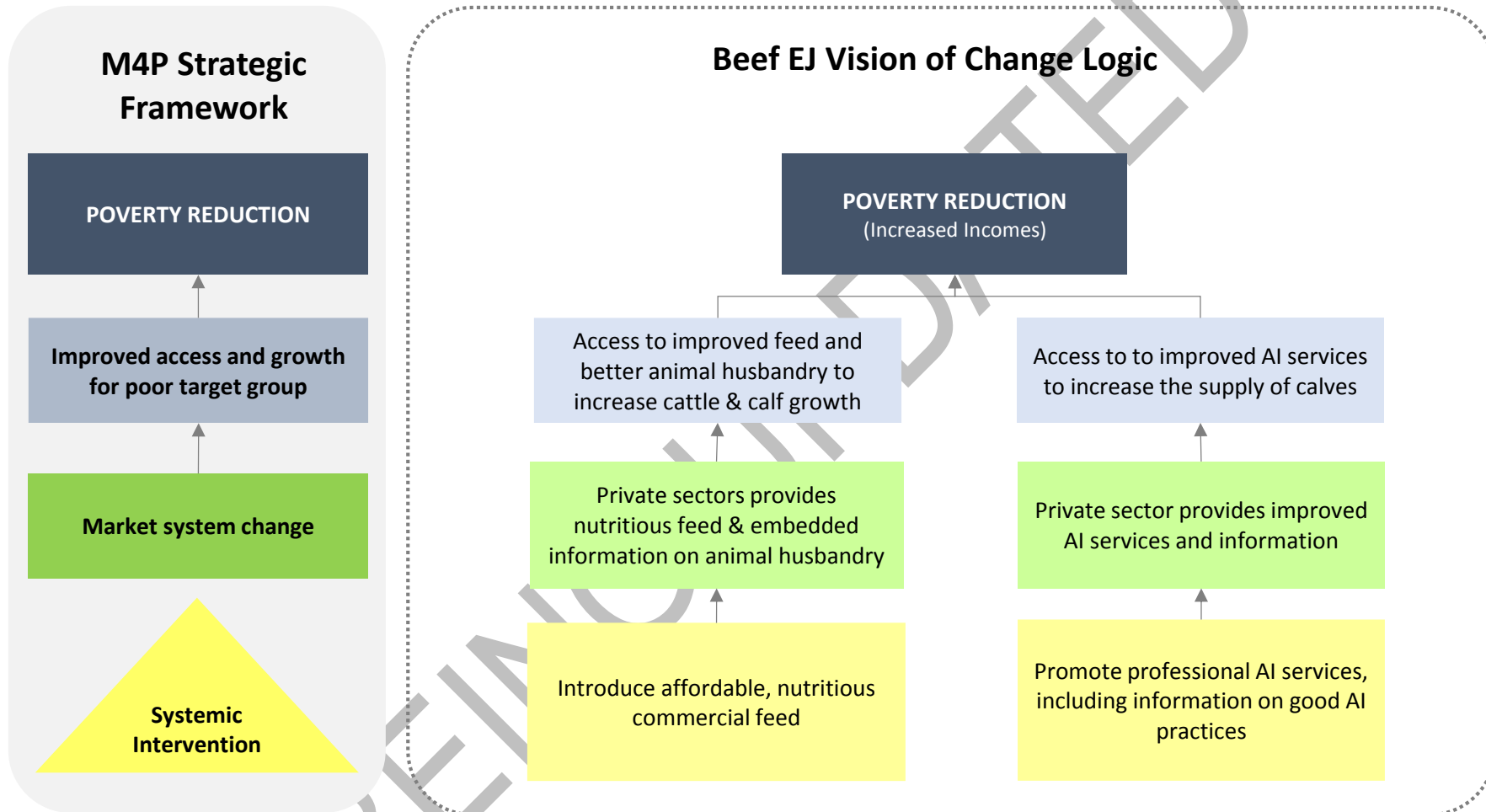
⁸ Holcim is the third largest cement producer in Indonesia. They have a CSR program which works with farmers in the vicinity around its cement factory in Tuban (Zone 1 farmers). PKM is a foundation established in 2012 by representatives of the 6 villages in Zone 1. It serves as a bridge between Holcim and the communities. As part of the CSR program, Holcim has established a 1 year on-the-job training program which trains approximately 130 farmers each year on cattle rearing. Holcim provides an advanced pen for cattle breeding and the equipment for two concentrate feed factories. The feed factories are operated by PKM, who also organises the selling of cattle to Wahyu Utama.

5.4 Sequencing and prioritisation of intervention areas

It is recommended that the intervention areas in the East Java beef sector be implemented in two phases. In the first phase, the focus will be on *introducing affordable, nutritious commercial feed*, which is a potential quick win for smallholder farmers and PRISMA. This will be followed in the second phase by *promoting professional AI services, including information on good AI practices*. Given the widespread familiarity and use of AI services by farmers, this intervention will not have to face the challenge of getting farmers to change their behaviour to adopt and pay for AI services. Improvements in feed (under the first phase) will also bolster efforts to improve the supply of calves under the second phase. Successful interventions in both areas can improve the commercial viability of cattle farming.



5.5 Sector vision of change logic



Annex 1: Intervention Logic Analysis Framework (ILAF)

(1) Problem/ Symptom	(2) Underlying cause	(3) (4) Services and Enabling Environment	(5) Service weaknesses/ underlying causes	(6) Intervention Area	Service Provider/Partner
Farmers experience low productivity because of slow weight gain in calves and cattle	<p>Farmers lack access to nutritious feed and good feed practices to accelerate weight gain</p> <p>Farmers have low awareness of the benefits of quality feed</p>	Feed services Information services	<p>Few commercial feed providers exist and the cost of available concentrate feed for calves and cattle are high</p> <p>Government is the main source of information but its outreach is limited</p>	Intervention Area 1: Introduce affordable, nutritious commercial feed	<ul style="list-style-type: none"> • PKM • Soegio • Wahyu Utama • Antaboga Manunggal Perkasa • Yellow Feed • Eka Putra Jaya • Charoen Pokphand • Japfa Comfeed • Feed Traders
Farmer are unable to increase production because of inefficiency of AI	<p>Farmers lack information on proper AI practices</p> <p>Farmers lack access to timely AI services</p>	AI services	Insufficient AI agents and independent AI agents are also not as well trained as government agents	Intervention Area 2: Promote professional AI services, including information on good AI practices	<ul style="list-style-type: none"> • Wahyu Utama • Santori • Independent AI agents • Dinas Livestock in District Level • Singosari Artificial Insemination Centre

Annex 2: Gender table

BEING UPDATED