

**EXTENSION AND ICT SERVICES GROWTH STRATEGY
DOCUMENT FOR EAST JAVA, WEST NUSA TENGGARA,
EAST NUSA TENGGARA
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PRISMA

BEING UPDATED

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2 Abbreviations

BPPSDMP	Badan Penyuluhan dan Pengembangan Sumber Daya Manusia Pertanian / Extension Service and Agricultural Human Resource Development Body
Bakorluh	Badan Koordinasi Penyuluhan / Provincial Extension Services Coordination Body
Bapeluh	Badan Pelaksana Penyuluhan / District Extension Services Executing Body
BPTP	Badan Pengkajian Teknologi Pertanian / Agriculture Technology Research Body
BUMDES	Badan Usaha Milik Desa / Village Owned Company
CP	Crop Protection
EJ	East Java
GAP	Good Agricultural Practices
ICT	Information and Communications Technology
NTB	Nusa Tenggara Barat / West Nusa Tenggara
NTT	Nusa Tenggara Timur / East Nusa Tenggara
PPL	Penyuluh Pertanian Lapangan / Government Field Extension Service Workers

1. Executive summary

Extension service is a common problem in most of the agricultural sectors that PRISMA is working on. The main reason why poor farmers in East Java, NTB, and NTT have low productivity and low income is due to inefficient farming practices. The lack of extension service, both in terms of quality and quantity, is a major contributor to this issue. As such the potential for outreach and systemic change is huge provided that we are able to craft the right interventions.

Public Extension Service is the main actor in this sector, however they are lacking both in terms of reach and capacity. Severely constrained by the decentralization process in Indonesia, the public extension workers are dwindling in numbers and they suffer from low morale and poor capacity building. Once respected and heeded by the farmers, today they are disregarded by most farmers and sought after only for the subsidised fertilizers or free inputs they can bring. Another actor that is an important source of information for the farmers is the input suppliers' agronomists. Unfortunately, these private agronomists' reach is even more limited due to cost constraints. A third category that we can see emerging is for villages to hire "extension workers" at the village level. These people will not be agriculture-trained, but through the support of application and technology, they will make a difference at the village level.

PRISMA vision of change for the sector is that farmers have access to timely and reliable information which can increase their income and productivity. That is our purpose when we intervene and although we are still far from understanding all the intricacies of this complex topic, we have taken a few important first steps as follow:

- a survey to find out farmers information sources and needs,
- a smartphone application to improve farmers or extension workers' capacity, and
- an agriculture value chain platform to reduce market inefficiencies.

The recent years have shown how ICT technology transforms sectors ranging from travel, public transportation, and holiday accommodations. Progress in the agriculture sector has been a lot slower but ICT still holds immense potential to improve agriculture practices and deliver critical information to farmers in a timely manner. That fact all the interventions in the sector involves ICT underlines this potential and how ICT has become intertwined with extension service.

Most of what we do in this sector are still in exploration stage. The sector and the interventions hold a great potential but they are still unproven, especially in terms of contribution to income increase. The attributions and results measurement may also be tricky as the interventions are indirect. Integration and synergy with other sectors are also important as it will be practically impossible to avoid outreach overlap. Therefore, we should thread carefully but also strategically, learning from every intervention while also being open to new opportunities.

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 smallholder farmer households in eastern Indonesia by end of 2018. PRISMA works in East Java, West Nusa Tenggara (NTB), East Nusa Tenggara (NTT), Papua, and West Papua. This report aims to provide a logic and rationale for market-based interventions which can support the cross-sectoral extension and ICT services to the benefit of smallholder farmers in East Java, West Nusa Tenggara, and East Nusa Tenggara.

3. Sector description

3.1 Sector profile

Agricultural extension is the application of scientific research and new knowledge on agricultural practices through education and training to farmer. The current extension covers some communication and learning activities held by educators from various disciplines, including agriculture, marketing, medicals and business study.

The goal of agricultural extension services is to facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technologies to improve their livelihoods. These services have a significant public-good attributes and therefore governments are the main actor. There are more than half a billion official extension workers worldwide and about 90% of them are located in developing countries (World Bank 2006b).

The majority of the extension personnel in developing countries is funded and employed by the public sector. However, reform efforts in the public sector, which included decentralization, cost-recovery and outsourcing, and an increasing involvement of the private sector and the third sector (non-governmental organizations, farmers' organizations) have led to the emergence of pluralistic forms of agricultural advisory services (e.g., Sulaiman and Hall 2002, 2006).

Agricultural strategic environment change, reduction of subsidy fund of production inputs, the opening of global market, are also challenges that should be promptly and appropriately responded in an effort towards agricultural self-sufficiency. One of the important aspects supporting this measure is by optimizing dissemination of information from the result of assessment and research on agricultural engineering through various media and technology.

While extension cannot be expected to be a single factor that can transform traditional agriculture, it usually has had maximum impact in the early stage of dissemination of a new technology, when the informational disequilibrium (and the "productivity differential") is the greatest. A new technology can be understood as a new innovation or simply an established technology that is not yet adopted and therefore is "new" for the farmers.

As in most developing countries, the farm sector comprises a large number of relatively small farmers who live in geographically dispersed communities. Transportation infrastructure are often poor, adding to the cost of reaching them. The incidence of illiteracy and the limited connections to electronic mass media can further limit the ability to reach farmers through means that do not require face-to-face interaction (e.g., written materials, radio, television, Internet). Thus, the number of clients who need to be covered by extension is large, and the cost of reaching them is high. The challenge is complicated further by the fact that farmers' information needs vary even within a given geographical area due to variations in soil, elevation, microclimate and farmers' means and capabilities. The large size of the clientele inevitably leads to a situation where only a limited number of farmers have direct interaction with extension agents.

Despite the challenges, there is potential to improve the situation through Information and Communications Technology (ICT). ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, mobile phones, computers, and so on. There are at least two potentials where ICT can play a part in agriculture extension service. First, by enhancing the knowledge flow and effectiveness of extension agents, we can improve their capacity and potentially increase their reach. Second, new and innovative business models can be made possible by ICT solutions and enable new forms of extension agents.

There is also another potential in the long run where farmers themselves are able to access these ICT solutions and benefit from it. However, with the current internet penetration rate of 5% among farmers, we have to accept the fact that extension agents will still play a key role in delivering information to farmers for the near future.

3.1.1 National context

In Indonesia, extension service is acknowledged as an important component to achieve food security. National legislation (UU No. 16 Tahun 2006) stipulates three types of extension workers: public, private, and self-help/voluntary. In reality, most extension services are conducted by the public workers because they are the only one with a clear mandate to do so. Private workers are usually employed by the input suppliers and, despite the regulation, they are not registered nor regulated by the Government. The last category of voluntary or self-help workers are lead farmers whom the Government train and provide with certificate of competency.

In terms of potential agricultural villages which are around 72.000 villages. Up to now, there are about 44.000 extension workers, meaning that Indonesia still lack 28.000 extension workers. As of 2015 data, there are 32,299 public extension workers for 71,470 farming villages throughout Indonesia. Government legislation (UU No. 19 Tahun 2013) stated that the ideal is to have one worker for every farming village which translates to a gap of about 39,190 workers. The situation is made worse by the fact that the bulk of the extension workers were recruited in the early 1980s, therefore the majority have already retired or are due for retirement within the next 5 years. The government is well aware that they cannot possibly add 39,000 workers to their payroll. Therefore, to cover the difference, they plan to recruit and train voluntary extension

workers instead. The main problem is that there is a lack of incentive structure for these voluntary workers to serve farmers beyond their immediate social circle. In fact, the role of extension workers is vital in supporting the success of agricultural development.

In early 2000, there was a wave of decentralization in Indonesia which includes the extension service. As a result, the budget allocation and responsibility for extension service activities now lies with the district government. Compared to before the decentralization, the public extension service is now operating with a constrained budget and also reduced manpower. However, recently, since the enactment of UU Desa / Village Law, the government has paid more attention to village development. One positive aspect of this law and the accompanying flow of funds to the villages is that now villages are allowed to recruit agricultural cadres who can function as extension worker or information agent.

ICT on the other hand, is cross-sector and cross-provinces by nature. Therefore, an overview of the national context is more appropriate rather than looking at the situation in every province. PRISMA's recent large-scale farmers survey in East Java, NTB, and NTT points to a number of potentials for utilizing ICT in Indonesia. Majority of farmers (80%) watch TV regularly and use mobile phones (75%). Smartphone ownership and internet usage are still low however, at 15% and 5% respectively. Nevertheless, the low internet penetration rate does not temper the exuberance of the local start-up industry. No less than 20 agriculture start-ups were setup in recent years and most of them have received funding.

Interest to leverage on ICT potential is also demonstrated by the industry players with various input producers releasing or working on smartphone applications. Majority of these applications are for internal use or limited to their distributors and partners. However, a few companies have also envisioned a wider use of such applications to include farmers, Government extension workers, and other non-competing input producers. One of the input-producers even invited an agriculture start-up company from India to pilot their solution in Indonesia.

3.1.2 East Java context

East Java is one of the most important agricultural provinces in Indonesia. Based on 2011 official statistics, East Java contribution towards national production is 16.08% for rice, 30.85% for maize, and 43.11% for soybean. There are 2.1 million hectares of crop area in East Java and with average land ownership of less than 0.5 hectares, there are at least 4.2 million farmer households in East Java.

East Java farmers are frequently regarded as the most advance farmers nationally. This is probably because some districts such as Malang or Banyuwangi are open to innovations and they tried their best to support their farmers. Farmers in East Java also benefit from the presence of strong government research bodies that focus on high yield seeds and agriculture technologies. In majority of the districts, private agronomists have a significant presence, therefore collectively they become a valuable source of information for the farmers.

However, there are only 4,812 public extension workers for the whole province, which means that a single public extension worker has to cover 873 farmer households. Assuming 260

working days per year, and a single worker is able to serve 3.35 households per day, then every farmer household will only see the public extension worker once a year.

3.1.3 West Nusa Tenggara context

West Nusa Tenggara (also known as Nusa Tenggara Barat / NTB), similar to East Java, is one of the important agricultural provinces in Indonesia especially for main food crops such as soybean and maize. For soybean, NTB is one of the epicenters of soybean production in Indonesia, accounting for 9% of national production while the harvested area amounts to 10% (62.9 thousand ha) of Indonesia's total soybean harvested area in 2012. Meanwhile, maize has expanded rapidly in NTB. Based on 2012 statistic official, NTB accounted for 3.3% of Indonesia's maize production compared to 2007 where maize production contributed only 0.9% of national maize production. Harvested area for maize has grown rapidly and in 2012 reached 116,817 ha, with productivity of 5.4 tonnes / ha which is higher than the national average of 4.7 tonnes / ha.

Key challenges for NTB farmers are pest and diseases management as well as post-harvest expertise. Average losses due to pest attack in NTB reaches 30% per harvest. Farmers are lacking reliable information source regarding pest and diseases. Majority of farmers relied on information from other farmers and some of them used information from kiosk. Meanwhile, the public extension service workers lack of knowledge due to limited source of information regarding pest and diseases. Private agronomists' presence in NTB is still very limited with even the largest input suppliers deploying only a handful people to cover the whole province.

In NTB, there are 1,785 public extension workers with routine schedule to field visit from Monday to Thursday per week. A public extension worker provides technical assistance to a few farmer groups while one group may have more than 200 members. Limited number of public extension workers combined with remote and hard to reach areas means that there are a lot of farmers not served by public extension service.

3.1.4 East Nusa Tenggara context

East Nusa Tenggara is one of the provinces whose agricultural conditions with a large number of farmers as many as 778,854 households in 2013, an increase of 6.77 percent from 2003 which recorded 729,483 households.

Food crops subsector seems to dominate agricultural business in NTT Province. Data from the ST2013 results note that the largest number of agricultural business households in NTT province is in the food crop subsector and livestock subsector. The number of household of agriculture business of food crops subsector is 701,852 households and the number of livestock farmers is 600,865 households. Meanwhile, the number of horticultural farmers is 426,970 households.

The area of non-irrigated land managed by the farmer's household is wider than that of the wetland, i.e. 0.76 Ha versus 0.12 Ha. This means more farmers are working on non-irrigated land or dry land.

Main challenges for NTT farmers are pest and diseases management as well as post-harvest expertise. For farmers who plant on dry land, crop failures due to pests and diseases will cause them to wait for results until the next year. Farmers are lacking reliable information source regarding pest and diseases. Majority of farmers relied on information from other farmers and some of them used information from kiosk. Meanwhile, the public extension service worker lacks of knowledge due to limited source of information regarding pest and diseases. Private agronomists' presence in NTT is still very limited with even the largest input suppliers deploying only a handful people to cover the whole province.

In NTT, there are 2,505 public extension workers with routine schedule to field visit per week. A public extension worker provides technical assistance to a few farmer groups while one group may have more than 20-40 farmer members. Limited number of public extension workers combined with remote and hard to reach areas means that there are a lot of farmers not served by public extension service.

3.2 Sector dynamics

3.2.1 Market overview

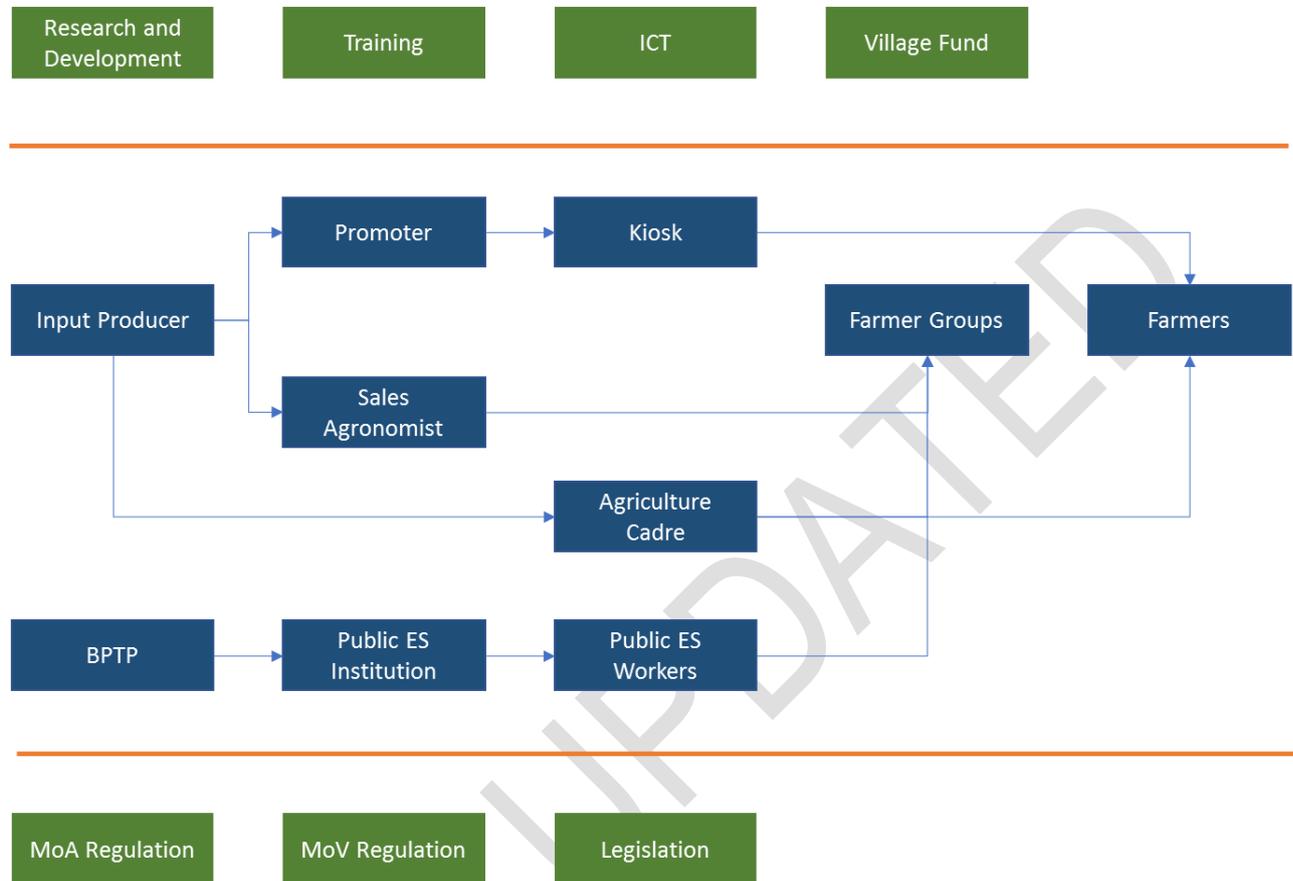
The main actor for Extension Services in Indonesia is the Public Extension Service (PES) workers. These PES have a good grasp of basic farming knowledge and they regularly visit the farmer groups in most farming villages. However, due to the limited number of PES leads to However, limited number of PES causes each PPL to cover 3-4 villages. This has led to the small frequency of their visits to farmers. The other issue is most PES are lacking in terms of pest and diseases management as well as latest seeds or farming techniques.

The second most important market player is the private sector agronomists. The multitude of both multinationals and local producers creates a very competitive market (especially in Java Island) where the different players continuously jostle for market share. The private agronomists generally possess superior knowledge than the PES, however extension service is still seen merely as a part of marketing rather than as a value-added embedded service. The focus therefore is on sales numbers and engagement are usually limited to hit-and-run events.

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3.2.2 Sector map



Legend:

BPTP - Government body responsible for agricultural technology research

3.2.3 Core value chain

There are two main information sources in the core value chain: Government, through its agriculture research body (BPTP), and Private Sector, through their own Research and Development (R&D). The private sector's R&D is usually centralized while the BPTP is decentralized, every province will have its own BPTP. BPTP disseminate its research results to the Districts' Public Extension Service Office and from there it is supposed to reach the farmer groups through the extension service workers. On the other side, knowledge creation in the private sector is dominated by the fertilizer and pesticide producers. These companies will then task their own employees, also known as private agronomists, to promote their products to the farmers. As part of the promotion process, the private agronomists share information to the farmers.

Between the public and private, the private sector is more active and aggressive in spreading their knowledge, which is not surprising considering that they are driven by financial motive.

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Although the public sector has a mandate to disseminate its research results, it is unable to do this function effectively due to different priorities and mismatch of incentives among the government agencies.

A poignant example is regarding the rational use of fertilizer. BPTP has a detailed recommendation of fertilizer dosage for food crops in each district which they passed on to the extension workers to disseminate to the farmers. The recommended dosage is lower than what most farmers are currently applying and very few extension workers are emphasizing this recommended dosage. The reason is because the extension workers themselves are worried that by reducing the fertilizer dosage, at least in the short run, there may be a dip in the production yield. Even if the recommended dosage is better for everyone in the long run, no extension worker is willing to face the farmers', and also their superior's, wrath when the yield goes down. This example underlines the importance of extension service to increase farmers' income and to conserve the environment by reducing excessive agriculture-inputs usage.

The sector focus therefore is not in the generation of information, but in the dissemination of information. Public extension (PES) male and female workers are the main actor for information dissemination for the simple reason that they have the largest number and they are the only one with a mandate to do so.

Following UU (Law) no 19/2003 about Protection and Empowerment of Farmers, there has to be one extension worker for one village. To fill the lack of extension workers, Ministry of Agriculture has conducted a recruitment for three years through Contracted Extension Worker (Tenaga Harian Lepas - THL). To fill the lack of agricultural extension workers, Ministry of Agriculture promotes self-help extension program in each village to strengthen the extension and organising of farmers through farmers group to help the extension workers' performance.

Since villages have bigger development role, each village can allocate the budget to provide services to farmers, among others by employing resources who give information to farmers. They are often referred to as different names, but in general, these resources are called agricultural cadres.

The existence of agricultural cadres is not evenly distributed in each village, due to the low understanding of village government about the important role of agricultural cadres. Other cause is the perception that having agricultural cadres is not considered a priority compared to building infrastructure and basic service expenses.

Another actor who actively disseminates information to the farmers are the private sector's agronomists. They are employed by the input suppliers and their main role is to generate demand for the suppliers' products. The agronomists from larger companies can also play a more strategic role as a relationship manager to maintain brand loyalty, however this is usually limited to the key customers and not the bottom of pyramid farmers. With an overwhelming focus on product sales, the extension service provided by this group of actor is a hit-and-run marketing events which amounts to nothing more than a one-time sweetener to gain customers. This is a pity because the private sector's knowledge is more aligned to the market needs and their agronomists are well-trained.

Extension services are generally provided to male farmers as they are viewed as the decision maker by both PES and agronomists. However, there is no restriction for female farmers in accessing extension services and in some areas they form female farmer groups, in which case they receive the same attention from PES and agronomists alike. With regards to the actors, agronomists are almost all male in contrast to the PES where female worker is common. Within the PES, the female workers have equal task and responsibilities with the male workers, there is no difference in terms of workload or coverage area.

3.2.4 Supporting Functions / Services

Supporting services such as Research and Development or Training are available but for in-house participants only. Both Government and Input Suppliers have their own R&D or training functions, and there is little evidence of collaboration or information sharing between these actors.

There is however a lack of agriculture information providers, both in terms of mass media and also private information providers. This lack of attention from the media and also private players reduces the options available to farmers and also extension service actors to increase their capacity beyond the above-mentioned private R&D or training.

ICT has played an important role in disseminating agricultural information and promoting innovation in agricultural sector. The advancement of ICT has a potential to be a big opportunity for agricultural development agent. Mobile phones/smart phones have been the most widely used technology media. However, the use of technology in agricultural development needs competence of the ICT users. Farmers are those with less access to information sources so they rely on the capacity of extension workers to assist them to get the information and learn the growing innovation in agriculture area.

At present the main focus of ICT application in the field of agriculture is fulfilling the farmers' need for information. Some important information needed by farmers among others information about market, current technique and technology, village development program, weather forecast, post harvest technology, general news on agriculture, agriculture financing and insurance, information of market and crop harvest availability, early warning and management of diseases and pests, and information on land test and sample.

3.2.5 Supporting Rules and Regulations (Enabling Environment)

There are two aspects regarding regulations that influences the sector. The first is the decentralization rule which stipulates that every district is responsible for funding their own public extension workers. The second is the lack of regulations surrounding input kiosks. Input kiosks are treated just like some normal daily needs kiosks while in reality they function more like a pharmacy than a minimarket.

On the village level, the government of Indonesia has disbursed Village Fund to all villages in Indonesia since 2015. Village Fund is used to finance village development, aimed at improving the prosperity of the villagers, improving the quality of human life, as well as poverty alleviation. Among the spending which can be allocated from Village Fund is productive-scale agricultural economy business based on the policy “one village one product” covering the production, distribution, and marketing aspects.

Ministry of Village regulation stipulates that village government can allocate the budget for agricultural development, including the provision of information services through agricultural cadres. Other regulation governing the recruitment of agricultural cadres is MOHA regulation no 7/2007 about Community Empowering Cadres (Kader Pemberdayaan Masyarakat, KPM). In this regulation, KPM have to have knowledge, willingness and capacity to activate the community to participate in community empowerment and participatory development.

4. Analysis

4.1 Problems in the Core Function and underlying causes

4.1.1 Problems and their underlying causes faced by Farmers

The key problem faced by farmers can be summarised as:

Farmers have little knowledge of appropriate and efficient farming techniques due to limited provision of good extension services

The main reason why poor farmers have low productivity and low income is due to outdated and inefficient farming practices. Lack of extension service, both in terms of quality and quantity, combined with Government subsidies are the main culprits. The fertilizer subsidy encourages over usage which ruins the soil, while the seed subsidy destroyed the private market for quality seeds and creates barrier for farmers to pay for seeds. However, it is beyond this sector’s focus to tackle the government subsidy policy and therefore we focus on the extension service.

Extension services are currently provided by multiple actors with varying reach and quality. The summary of the main actors and their characteristics are as follow:

Actors	Coverage	Quality	Remarks
Public ES Workers	Poor	Poor	The main actor but with multiple weaknesses.
Private Agronomists	Very limited	Good	Generally good but only very few farmers can reach them.
Fellow Farmers	Very good	Poor	Most communities share information liberally. However, it is usually a close loop where there is not much of new information coming in.
Input Kiosks	Good	Very poor	A skewed incentive structure combined with lack of knowledge means that their advice probably do more harm than good.

It is obvious from the summary that most farmers lack reliable sources of agriculture information. As a result, they implement poor agricultural practices, they do not apply fertilizers properly, their land quality degrades, they use retain seeds, and so on.

4.1.2 Problems, underlying causes and their impact on farmers faced by other actors

The key problem faced by other actors in the core function that affect the farmers can be summarised as:

Public Extension Workers have low capacity and low motivation in providing service to the farmers

The PES has been in serious decline from its heyday in the 1980s. It suffers from lack of budget, smaller workforce, and lack of knowledge compared to the farmers. The lack of budget severely constraints the range of activities that PES can conduct due the decentralization process in the late 1990s. Without a strong commitment and a sound fiscal situation, it is unlikely that any districts' legislative body will provide sufficient funding for the PES. This situation leads to other problems such as lack of manpower, low morale, and lack of capacity building.

Being the only actor with a clear mandate to provide extension service to the farmers, the decline of PES has a strong causal-link to the problems at the farmers' level. Left with an ineffective PES and a serious lack of alternative source of information, the farmers experienced information stagnancy and were unequipped to face the increasingly challenging agriculture landscape. Facing irregular weather patterns and increased pest attacks, these smallholder farmers who cling to their hereditary farming practices are slowly pushed aside to the periphery and fall into poverty.

Meanwhile, the agricultural cadres as a new actor in facilitation and provision of information services in villages are still not yet proven due to the limited number and lack of support.

4.2 Weaknesses in services and rules / regulations

The key weakness in rules/regulations that we have identified is the fact that agriculture input retailers are not regulated. Acting purely out of commercial interests, these input retailers often provide advices that may actually be harmful to farmers' income, public health, and also the environment. As the kiosks owners are given incentives by the input producers to achieve sales target, they often ruthlessly promote products to farmers without much regards to the product's suitability, recommended application quantity, or proper handling and storage. This is a serious problem as these input retail kiosks reach practically all farmers. Especially for smallholder farmers in remote areas, fellow farmers and retail kiosks are probably the only information sources available to them.

A common practice to mix pesticides usage for example, is most likely driven equally by both lack of proper pest management information source and poor advice by the input kiosk owners.

The presence of regulation with weak monitoring and enforcement may not be sufficient to prevent such issues. However, it is likely to be better than the current environment where such practices are not only common but perfectly legal. With no deterrent or consequences to their actions, the kiosk owners' financial gains are creating a lot of negative externalities with smallholder farmers bearing the brunt of its costs.

A lot of village governments are also hesitant to allocate village funds for the provision of agricultural information services due to ambiguity of the regulation from higher levels of government regarding the use of village funds.

While the current situation shows a clear need for government intervention, much further analysis has to be done before we can arrive at even preliminary solution, one has to be careful not to fall to the other extreme of excessive regulations. We need to aim for a light regulation (e.g. a voluntary licensing scheme) which can balance the need for quality standards and consumers protection against barriers of entry and opportunity for abuse of power.

4.3 Cross cutting issues (gender and environment)

Preliminary study shows no sign of gender issues within the sector's context. There may be gender issues within extension services that we are simply unaware of at this juncture. This section will be kept updated with observations from field visits, interviews, and also FGD as the intervention progresses.

On the other hand, a few environment issues can already be pointed out. Improper application or overuse of pesticides and fertilizers is a common issue which affects the farmers themselves, soil fertility, and also human who consumes the end product in some cases. There is a vicious cycle where fertilizer overuse causes the soil quality to degrade which in turn means more fertilizer has to be applied for the plant to receive enough nutrients. Similarly, with regards to pesticide, improper application creates resistance among the pests and wiped out natural predators that are actually beneficial. As a result, the pest problem returns with a greater intensity in the follow cycle which prompts farmers to increase their pesticide usage. These environment issues are not unique to the sector but nonetheless relevant, and the hope is that our work in this sector can contribute to the solution.

5. Strategy for Change

5.1 Market Potential

There is a significant potential for income increase through more effective Extension Services in East Java, NTB, and NTT. Most of the market actors identified are present in every district and the number of smallholder farmers are huge. Even after limiting the sector focus to food crops only, TNP2K data indicates that there are more than 3,5 million poor male and female farmers in East Java, NTB and NTT.

The potential for income increase varies from intervention to intervention. Taking for example pest and disease management, a conservative rough estimate by an Indonesian Agriculture Professor puts the average losses from pest and diseases in Indonesia at 30% of the potential yield.

5.2 Vision of change

“Farmers have access to timely and reliable information
which can increase their income and productivity”

5.3 Interventions

Below are three interventions currently being developed to get us from the current situation to the Vision of Change. Three is not enough as there are still underlying causes that are unaddressed or insufficiently addressed so there will be more in the future. Out of the three interventions, the first one is an action research where although we acknowledged the outreach potential and incentives are not as strong as we would have liked them to be, it is a necessary first step into the sector. Extension service is a complex cross-sector topic and therefore substantial learning and preparation are required before we can effectively facilitate a systemic change.

5.3.1 Agriculture Information Application

We partner with Karsa, an agriculture startup which aims to become the Bloomberg for farmers. Through the application, farmers will have access to latest market price, good agriculture practices, and even loans. PRISMA supported Karsa with content and also link them to agriculture input suppliers. PRISMA also developed a marketing and promotion strategy and activity plan to help KARSa introduce their application to more farmers effectively.

This intervention addresses the lack of reliable information providers for smallholder farmers. Although not all farmers will have access to smartphone, but through the presence of progressive farmers or village agriculture cadre, information from the application will spread to or copied by other farmers. It also has the potential to broaden female farmers' access to information since the existing extension services are male oriented. It is practically impossible for a female farmer to attend a farmer group's meeting without a special invitation, but using an application can be done from the privacy of their home without fear of any social judgement.

5.3.2 Provision information and agri-business services at village level

In this intervention, PRISMA will promote the provision of services in village level focusing on information and extension services as well as agricultural business services which can promote the access of farmers and other stakeholders in terms of input, cultivation, processing, and

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market. Through this intervention, PRISMA supports utilization of agricultural cadres' role in village level. Utilization of role here means that the agricultural cadres are encouraged to function the provision of information services as well as facilitating agricultural business through BUMDES (Village owned company) which connect farmers with stakeholders and other business actors.

Agricultural cadres are actually individuals recruited by village government and paid with Village Fund to help the village promoting the agriculture in the village level by cooperating with BUMDES. The existence of agricultural cadres will help accelerating the village in supporting BUMDES agricultural business .

This intervention will address the problem of limited information service provision in village which is often faced by some parties including private sectors who intend to have business in a village.

5.3.3 Connecting Farmers to Value Chain through Agriculture Platform

In this intervention PRISMA supports a private big data company to enter into a Public Private Partnership with the Ministry of Village. The private sector partner will build a smartphone-based application platform to help agriculture actors sell and buy products from farmers at the village level.

This intervention is relying on village agriculture cadre to distribute information from the application and also to submit information regarding the village's agriculture potential to the platform. As such it is an extension or scale-up plan from the previous intervention where the village cadre is doing something similar but in a smaller scale and without the support of ICT. This intervention addresses the information gap between farmers, input producers, and offtakers. Through better flow of information and coordination, smallholder farmers will benefit from more suitable product offering / promotional activities and/or higher offer price for their produce.

5.4 Sequencing and prioritization of interventions

We are now just one year away from the end of PRISMA's phase one. The team is fully aware that majority of our interventions may only mature and bear fruit after phase one. Nevertheless, we believe that it makes sense to sow the intervention seeds from now despite the obvious pressure to still produce some immediate results.

With that in mind we adopted a parallel approach where we do not wait for one intervention to work before we start another one. We start work on all three interventions at the same time and keep a close coordination to ensure synergy between the interventions. This approach make sense for the sector as it is trial and error by nature and we will waste too much time if we rely to much on one or two interventions.

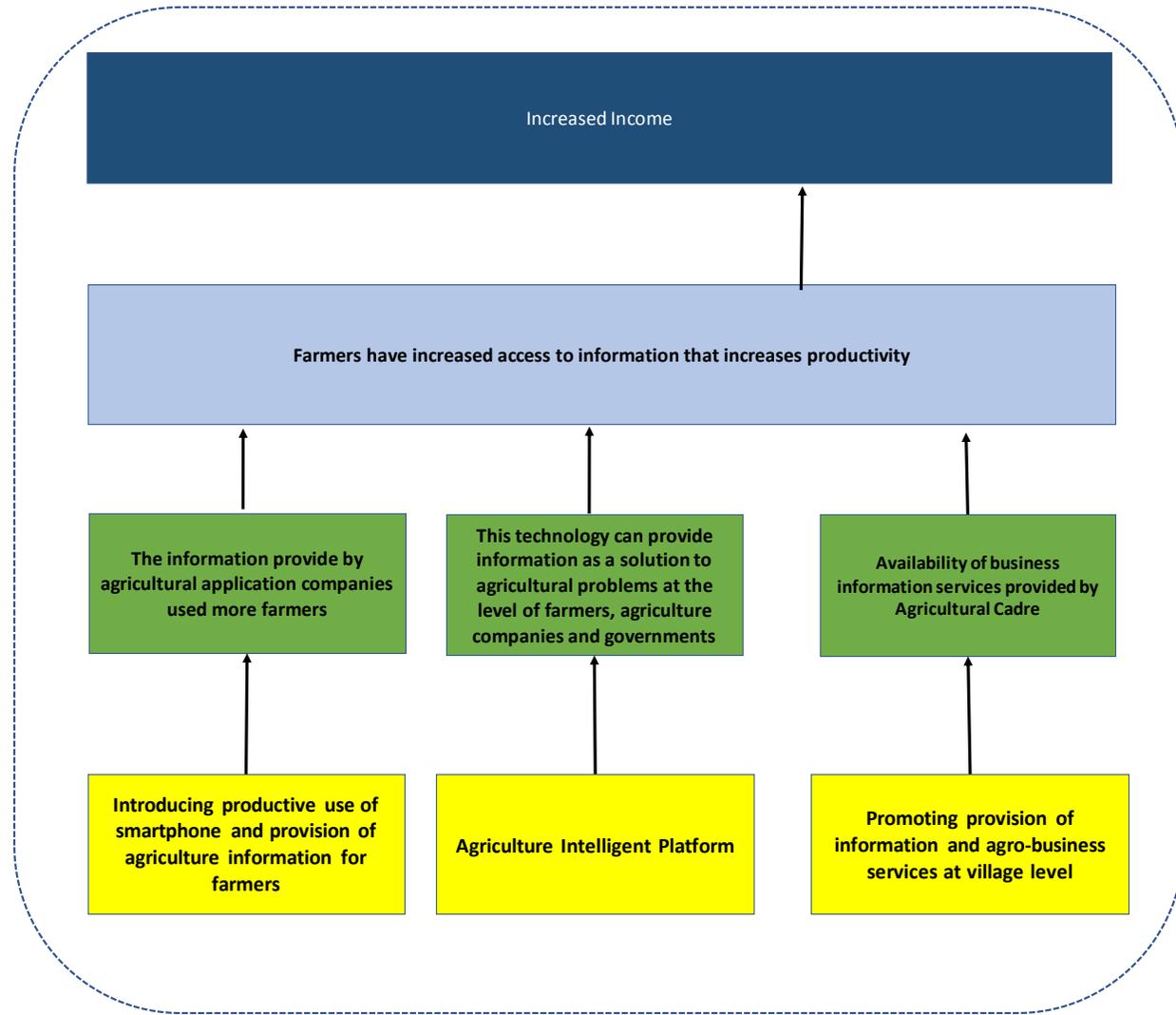
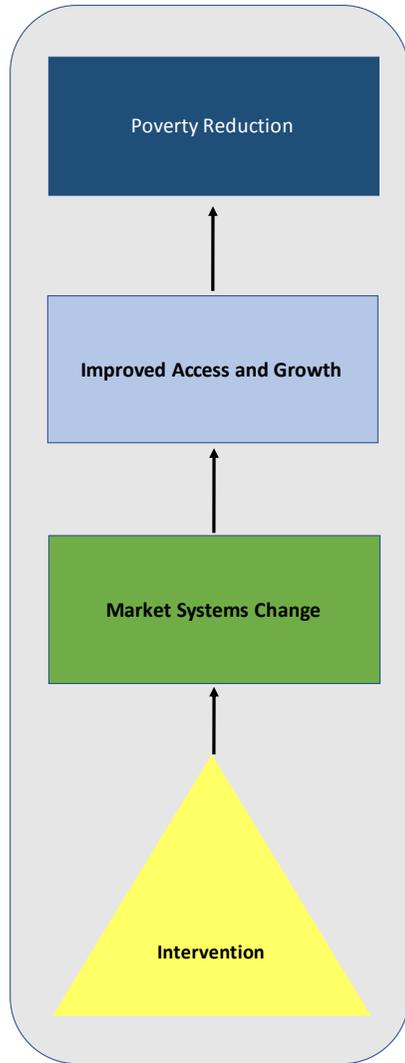
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In terms of priority, intervention two and three are our top priorities for they hold the biggest potential of systemic change. The village fund is a national strategic program which touches every village in Indonesia. Therefore, the Ministry of Villages is a strategic partner which can help us to scale the interventions to national level.

BEING UPDATED

5.4 Sector Vision of Change Logic



Annex 1. Intervention Logic Analysis Framework (ILAF)¹

(1) Problem/ Symptom	(2) Underlying cause	(3) (4) Services and Enabling Environment	(5) Service weaknesses/ underlying causes	(6) Intervention Areas	Service Provider/Partner
Farmers are lacking reliable information source regarding pest and disease management, good agricultural practices, market prices, weather, agriculture busines, etc.	Private agronomists' reach is very limited and their focus is very narrow.	Information and extension services	The resources to provide crop protection consultation remotely exists but it is not being branded and promoted to farmers.	Intervention Area 1: Expanding Input Supplier's Embedded Services' Reach through their Agronomist, and collaborate with Villages Agriculture cadres	<ul style="list-style-type: none"> Villages (Villages Agricultural Cadre)
	Public Extension Service workers are not equipped to advice on pest and disease issues.	Information and extension services	Lack of capacity building and poor segregation of duties between the Ministry of Agriculture and Extension Service Office.	Intervention Area 2: Increase Public Extension Workers Capacity through Smartphone Application	<ul style="list-style-type: none"> Districts' Extension Service Office
	Existing extension services are either limited in terms of reach or quality.	Information and extension services	There is lack of private agriculture information providers	Intervention Area 3: Develop an Agriculture Intelligent Platform	<ul style="list-style-type: none"> IT start-up Company as a Agriculture Infromation provider (KARSA, Dattabot, Eragano)
					<ul style="list-style-type: none"> Input companies (BASF, Ewindo, Nasa, Penangkar Benih)
					<ul style="list-style-type: none"> IT start-up Company as a Agriculture Infromation provider (KARSA, Dattabot, Eragano)

¹ Adapted from Toolkit for Market System Analysis, International Development Enterprises (iDE), 2012

Annex 2. Identified market actors

Function	Market actors	Company's name	Contact details	Remark
Private Partner	Start-Up Company	PT.EHR Indonesia	<p>"Ming" Alihan Tjohjono Co-Founder and CEO</p> <p>Phone Number: 08161392688 Email: ming.alihan@ingkarsa.com</p> <p>Yudha Kartohadiprodjo Co-Founder and CEO</p> <p>Phone Number: 08119702655 Email: yudha.kartohadiprodjo@ingkarsa.com</p> <p>Komplek Ruko Pluit Junction SH-03. Jalan Pluit Raya No 1 Jakarta Utara, Indonesia 14440</p>	KARSA Application
		PT. Mediatrac Indonesia (Dattabot)	<p>Serly Marcelina Graha Tirtadi Jalan Senopati No 71 - 73 Jakarta Selatan</p> <p>Phone Office: 021 - 5202568 Email: Serly.marcelina.dattabot.oi</p>	HARA Application
		PT Eragano Agritech Indonesia	<p>Stephanie Jesselyn Co-Founder and CEO</p> <p>Phone number: +62 217 3910333 / +62 821 22633306 Email: partners@eragano.com / stephanie@eragano.com</p> <p>Postal address: Jalan Kyai Maja No. 39, RT.12/RW.2, Gunung Kby Baru, Kota Jakarta Selatan, DKI Jakarta, 12120, Indonesia</p>	ERAGANO Application

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	Input Producer	PT. BASF Indonesia	Muhammad Khabib Head of Crop Protection Indonesia Phone: +6221 29886303 Mobile: +62 8126641834 Fax: +6221 29885930 Email: muhammad.khabib@basf.com Postal Address: PT. BASF Indonesia, DBS Bank Tower, 26th - 27th Floor, Ciputra World 1 Jakarta, Jl. Prof. Dr. Satrio Kav. 3-5, JAKARTA 12940, INDONESIA	
		EWINDO		Dana Desa in Maumere
		NASA		Dana Desa in Maumere
		PENANGKAR JAGUNG (Dalasika)	Bapak Dalasika Penangkar Jagung phone number: 082236718348 Alamat: Maumere	Dana Desa in Maumere

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Annex 3. People Interviewed

Below is a list of the key people interviewed during the research.

No	Date	Location	Title / Organization	Name	Contact details
1	27-03-2015	Lamongan, EJ	Agriculture Retail Kiosk Owner	Pak Didik	0812 3245 353
2	27-03-2015	Lamongan, EJ	Smallholder Male Farmer	Pak Yuri	0858 5406 8791
3	9/7/2015	Malang, EJ	Sub-District's Public Extension Service Office	Bapak Sutrimo Adi Wibowo	-
4	9/7/2015	Malang, EJ	District Head of Maritime and Fisheries Office	Bapak Nasri Abd. Wahid	0817 381 703
5	10/7/2015	Kediri, EJ	Input Producer Agronomist	Bapak Robert	0812 3319 7101
6	10/7/2015	Kediri, EJ	Agriculture Chain-Retail Store Manager	Bapak Windra	0813 5807 2780
7	16-09-2015	Imogiri, Central Java	Farmer Group's Leader	Pak Blondo (ngatijo)	0817 5412 817
8	17-09-2015	Pajangan, Central Java	Public Extension Service Worker	Pak Banu Subekti	0817 0408 856
9	12/8/2015	East Lombok, NTB	Extension Worker in Selong District	Kurratul Aini	0818 0360 5453
10	13-08-2015	Bima, NTB	Head of Extension Worker in Madapangga Sub-District	Ibu Attika	-
11	13-08-2015	Bima, NTB	Coordinator Extension Worker in Bima (Bapeluh)	Bapak Tanto	0813 3954 1513
12	13-08-2015	Bima, NTB	Head of division Human Resource (Bapeluh)	Bapak Mahmud	0823 5905 6236
13	12/8/2015	East Lombok, NTB	Head of Extension Worker in East Lombok (Bapeluh)	Bapak Qudratullah F	-
14	12/8/2015	East Lombok, NTB	Farmer	Lalu Ahmad Firdaus	0877 6305 7453
15	10/26/2017	Desa Watugong Kec. Alok Timur Kab. Maumere	Pengurus Bumdes Watugong	Stefanus	081337768477

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16	10/24/2017	Desa Wolanwalu Kec. Bola Kab. Maumera	Pengurus Bumdes Wolanwalu	Laurentius	081353900377
17	10/25/2017	Desa Paga Kec. Paga Kab. Maumere	Pengurus Bumdes Paga	Gregorius Gili	082145488629
18	10/25/2017	Desa Masabewa Kec. Paga Kab. Maumere	Kepala Desa Masabewa	Herman Bupu	081353028000
19	10/25/2017	Desa Paga Kec. Paga Kab. Maumere	Kepala Desa Paga	Sabinus Sura	082145433343
20	10/26/2017	Desa Watugong Kec. Alok Timur Kab. Maumere	Kepala Desa Watugong	Yohanes Kapisrano	082147766021
21	10/24/2017	Desa Wolanwalu Kec. Bola Kab. Maumera	Kepala Desa Wolanwalu	Inosensia	085239453149
22	10/25/2017	Desa Masabewa Kec. Paga Kab. Maumere	Sekretaris Desa Masabewa	Zakarias Sudin	081239434848

Annex 4. Investigation Team

Arief Mahmudi – NTB Provincial Manager, AIP-PRISMA
Ferry Dzulkifly - Senior Business Consultant, AIP-PRISMA
Devin Marco – Principal Business Consultant, AIP-PRISMA
Ike Septi Yastari – Senior Business Consultant, AIP-PRISMA
William Soe – Senior Business Consultant (Results Measurement), AIP-PRISMA
Wesley Natanael - Business Consultant, AIP-PRISMA

Annex 5. External Sources

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