

# Market System Development Assessment for Milkfish and Carrot

Final Report Presentation

---

2024



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# **OUTLINE**

**INTRODUCTION**

**CONTEXTUAL ANALYSIS**

**MARKET SYSTEM ANALYSIS**

**STRATEGIC RECOMMENDATION**

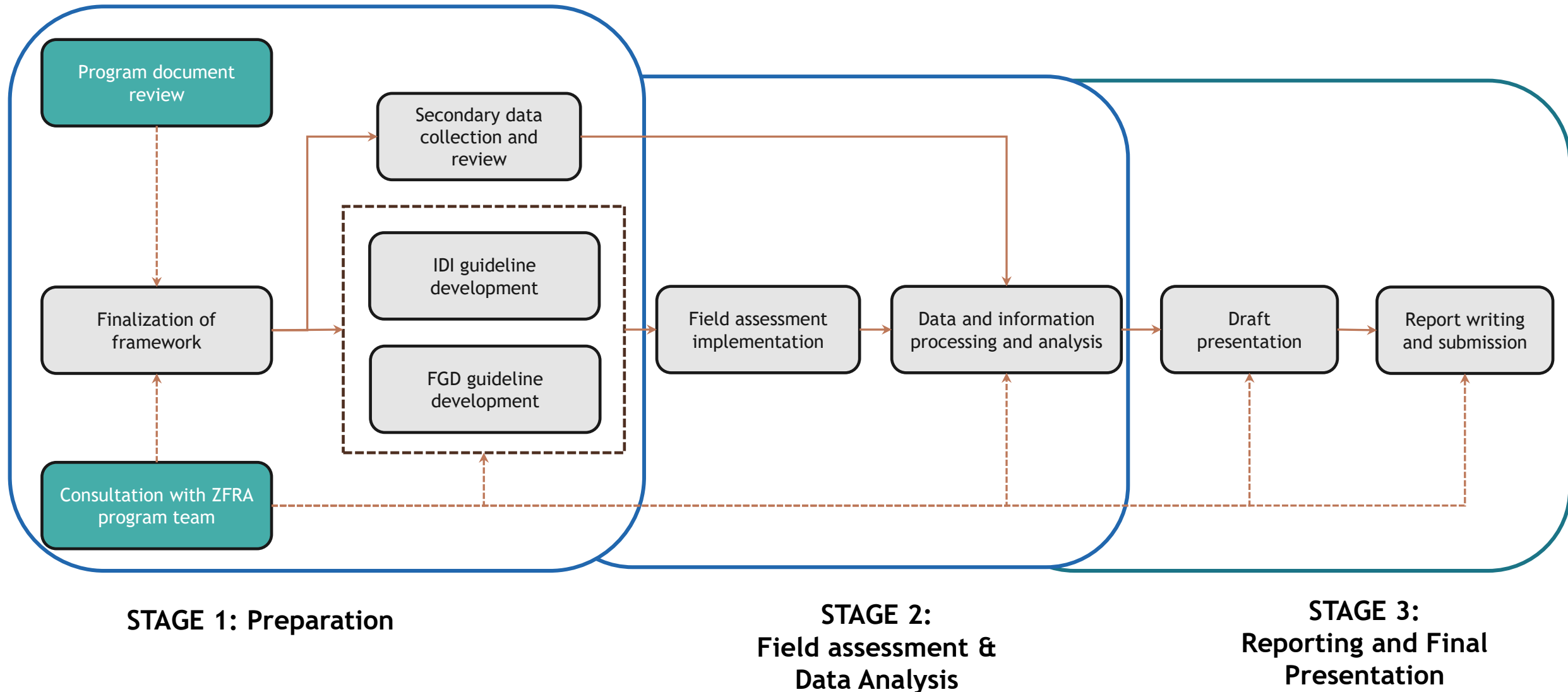
**STRATEGIC RECOMMENDATION  
ROADMAP**

**CONCLUSION**

# Introduction

*This section comprises of demography area and sector overview*

# Consultancy Assignment and Design Process



# Methodology

## Assignment



Value chain information gathering



Market actors' identification



Innovative financing model identification and policy analysis



Existing financial product used identification



Innovative financing models recommendation development

## Secondary data

- Desktop research;
- Program document review

## Primary data

- In-Depth Interviews (IDIs)
- Focus Group Discussions (FGDs)

## CSI

- Desk research from relevant sources

## MCI

- Share relevant program documents, such as the log-frame, previous stages of project reports, and other relevant documents.

## CSI

- Develop list of respondents
- Develop IDI guidelines based on type of respondent;
- Develop FGD guidelines based on type of participants
- Develop itinerary for 1<sup>st</sup> field visit.

## MCI

- Review and approve the documents;
- Support for contacting and gathering FGD participants before FGD implementation
- Inform which stakeholders have been contacted by MCI.

# Methodology: In-Depth Interview

| Focus Group Discussion           | Session |
|----------------------------------|---------|
| Farmers and Trader (Carrot)      | 1       |
| Farmers (Milkfish fry and fresh) | 1       |
| Milkfish Processors (Presto)     | 1       |

| In-Depth Interview (Carrot)                                                                                                                  |    |
|----------------------------------------------------------------------------------------------------------------------------------------------|----|
| Farmers                                                                                                                                      | 6  |
| Trader                                                                                                                                       | 3  |
| Government (PPL)                                                                                                                             | 3  |
| Financial Institutions <ul style="list-style-type: none"> <li>• BPR BKK</li> <li>• BRI</li> <li>• Nanobank Syariah</li> <li>• PNM</li> </ul> | 4  |
| Input Supplier                                                                                                                               | 1  |
| BMKG                                                                                                                                         | 1  |
| Total                                                                                                                                        | 18 |

# Methodology: In-Depth Interview

| In-Depth Interview (Milkfish) | Person Interviewed |
|-------------------------------|--------------------|
| Milkfish fry Farmers          | 2                  |
| Milkfish fresh Farmers        | 5                  |
| Milkfish Processors           | 5                  |
| Traders                       | 2                  |
| Local Government              | 3                  |
| Financial Institution         | 1                  |
| Input Supplier                | 1                  |
| Technology Provider           | 1                  |
| Universities                  | 2                  |
| BMKG Maritim                  | 1                  |
| Others (PT MBP)               | 1                  |
| <b>Total</b>                  | <b>24</b>          |

# Contextual Analysis

*It provides comprehensive understanding of the environment where the market system development assessment for carrot and milkfish commodities takes place in Pekalongan City and Regency, Central Java. It covers the current conditions of both commodities*

# Carrot

# Geography and Demography: Village Level

## Simego Village



**634 HH**

with total population is **1,963**  
(1034 L; 929 P)



### Agriculture

is the main livelihood in the village. The main commodities are:

- *Carrot, Potato, Spring onion, Cabbage, Chilli*



### Accessibility of the village:

- Traditional Market: 12 km
- Subdistrict centre: 24 km
- Regency centre: 80 km

## Telogoهندرو Village



**660 HH**

with total population is **2,762**  
(1459 L; 1303 P)



### Agriculture

is the main livelihood in the village. The main commodities are:

- *Carrot, Potato, Spring onion, Cabbage, Chilli*

**Husbandry** is the second main livelihood in village.



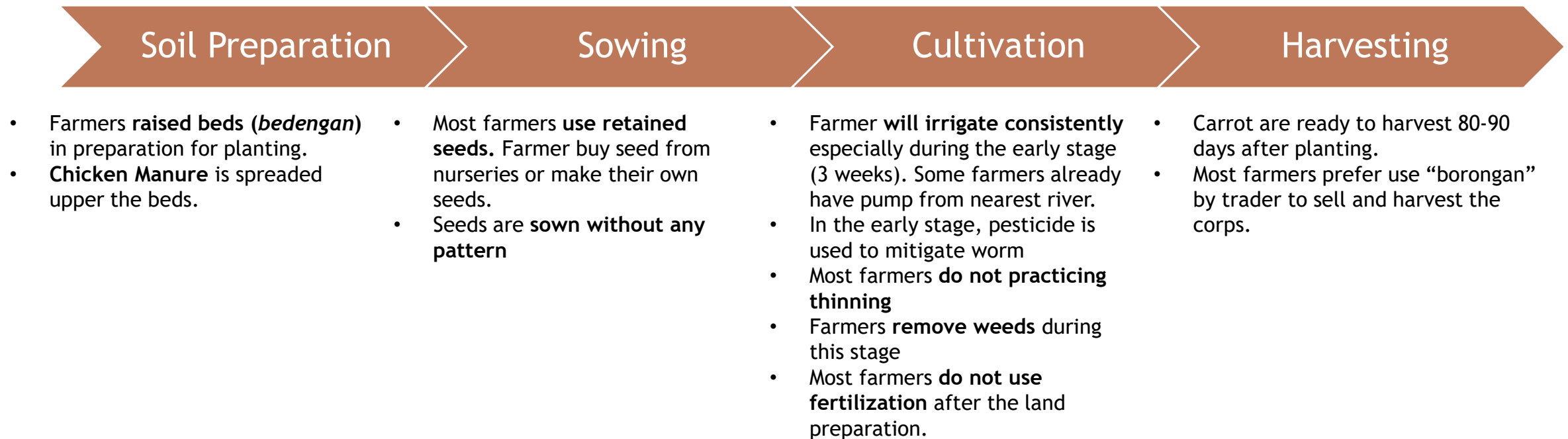
### Accessibility of the village:

- Traditional Market: 11 km
- Subdistrict centre: 8 km
- Regency centre: 48 km

# Carrot Cultivation Practice: Local Varieties

*Most farmers cultivate carrots year-round with traditional practice, usually practicing intercropping with other commodities*

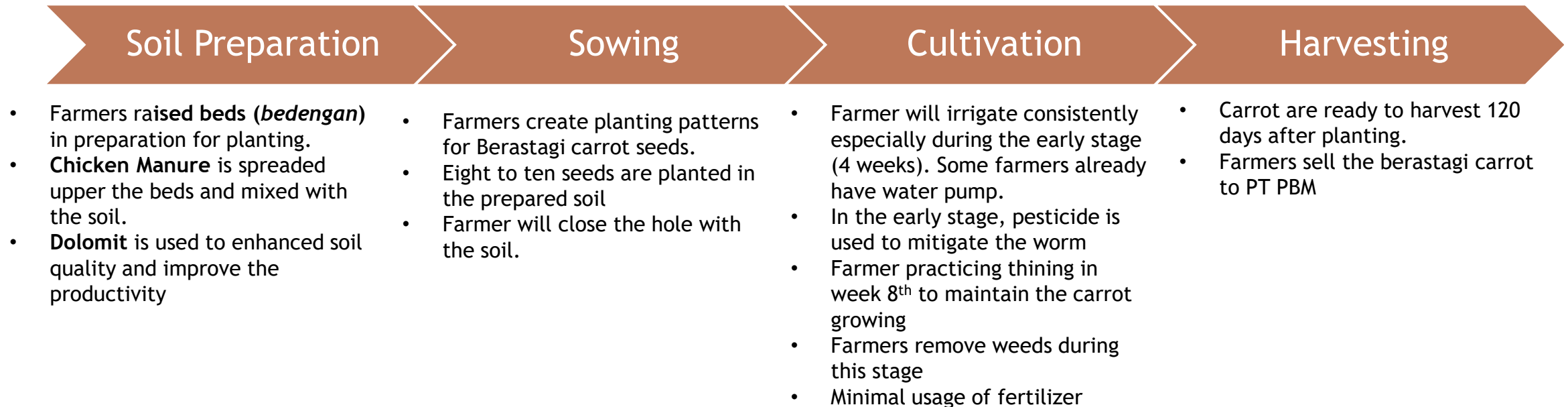
Productivity in Village : 0.3 tonnes for 500 m<sup>2</sup>  
Productivity in District : 0.7 - 0.9 tonnes for 500 m<sup>2</sup> (BPS, 2021)  
Price of Local Carrot (Aug 2024): Rp3,000



# Carrot Cultivation Practice: Berastagi Varieties

*Berastagi cultivation has higher productivity and fetches a higher price; nevertheless, there is still a gap compared to national productivity*

Productivity : 0.5 tonnes for 500 m<sup>2</sup>  
Price (August 2024) : Rp4,000

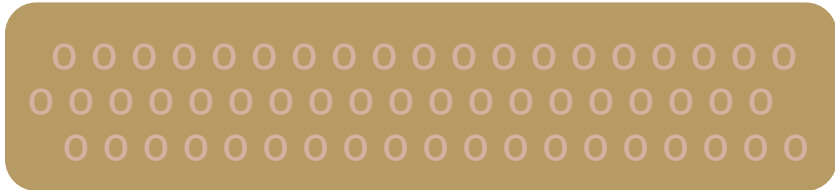


# Carrot Cultivation Practice

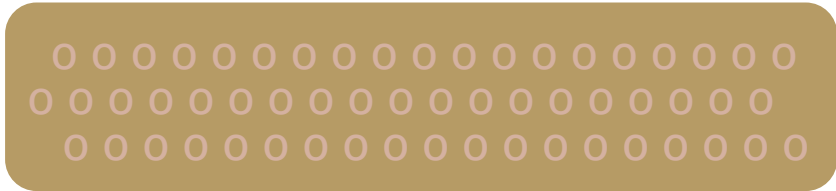
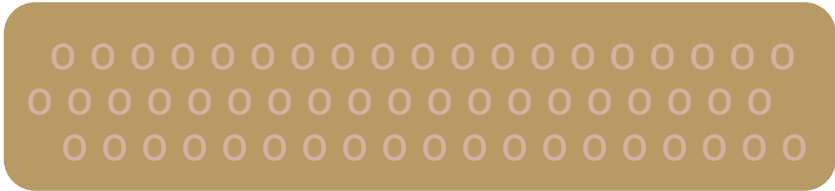


Local carrot will grow densely and smaller in size

## Common Practice



No pattern for local seed



## Berastagi Cultivation



Berastagi seeds are sown with proper planting distance



80 - 100 cm

80 - 100 cm

# Milkfish

# Geography and Demography: Village Level

## Jeruksari



**2.525 HH**

with a total population of 8.264.



### Aquaculture

is one of the main livelihoods in the village. The main commodities are:

- *Milkfish and whiteleg shrimp*
- Manual labor (convection/garment and construction) and Trading are the other main livelihoods.



### Accessibility of the village:

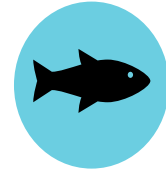
- Traditional Market: 3.9km to Banjarsari, 3.5km to Kraton, 5.9km to Poncol.
- 5km to the sub-district capital (15 mins) and 30km to the district capital (1 hour). The orbital conditions and distance between Jeruksari Village and these areas are relatively accessible.

## Krapyak



**5.792 HH**

with a total population of 18.527



### Aquaculture

is one of the main livelihoods in the village. The main commodities are:

- *Milkfish, whiteleg shrimp, parrot fish, tiger prawn, etc.*
- Manual labor, Fishing and Trading are the other main livelihoods.



### Accessibility of the village:

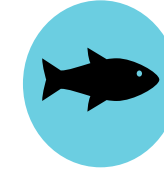
- Traditional Market: 1.8km to Banjarsari, 3.5km to Kraton, 2km to Poncol.
- 3km to the sub-district capital and 5km to the district capital (around 10 mins each). The orbital conditions and distance between Krapyak Sub-district and these areas are relatively accessible.

## Degayu



**2.457 HH**

with a total population of 8.049



### Aquaculture

is one of the main livelihoods in the village. The main commodities are:

- *Milkfish, whiteleg shrimp, parrot fish, tiger prawn, etc.*
- Masonry, Trading and Husbandry are the other main livelihoods.



### Accessibility of the village:

- Traditional Market: 4.9km to Banjarsari, 6.3km to Kraton, 4.1km to Poncol.

# Milkfish Cultivation Practice

## Milkfish Fry (Pendederan/ Pembesaran Nener)

### Common Practice in Project Location

Milkfish are cultivated throughout the year (1-2 months for each cycle).

Production capacity per farmer : 2.000-3.000 (small business), 100.000-150.000 (medium to big business) per cycle,

with approx. 50-80% *Survival Rate*

Selling price of Milkfish fry : IDR 140-200 (for size up to 5 cm), IDR 500 (for size up to 15 cm)

#### Pond Preparation

- The pond for the milkfish fry is filled with water and well prepared (paying attention to salinity, light, pest/predator control, etc.)
- Most farmers have basic knowledge and tools regarding the impacts of climate-related factors on cultivation practices (precipitation, lights, water quality, testing of water salinity level, etc.)
- Most farmers use simple traditional method using net or gauze ("Kasa") with varied production capacity (based on pond sizes and business capital.)
- Most farmers rent the field/ pond from local land-lords.

#### Sowing

- After the fry are delivered to the farmers, the fry are released to start the *acclimatization* process, where the purchased fry are gradually adapted to the pond water for 15-20 minutes, by opening the bag slightly in the pond before fully released to avoid shock due the new water's temperature and quality.
- The price of milkfish fry is around IDR 50-60 per fry (size ~1 cm).

#### Cultivation

- The fry are then left to eat natural food (e.g. plankton) for the first 7 days. Alternatively, they can also be given special type of feed (fine-textured and small-sized feed) 2 times a day, with a dosage according to the size and number of fry.
- After 1 week, the feeding frequency is increased to 3 times a day.

#### Harvesting

- The fry are ready to be harvested after 25-30 days (~3 cm) or later (~5-6 cm for > 1 month).
- The size is usually adjusted to meet the market demand and/ or the farmers' capacity.
- The milkfish fry are picked up by the local traders, or directly sold to milkfish farmers to be cultivated further.

# Milkfish Cultivation Practice

## Milkfish Fresh (Pembesaran Bandeng Segar)

### Common Practice in Project Location

Milkfish are cultivated throughout the year (4-5 months for each cycle).

Pekalongan's avg. annual productivity : 131 kg/ ha (estimated)

Production capacity per farmer : 30-150 kg/ cycle (small-sized business) to 4.000 kg/ cycle (medium to big-sized business)

Selling price of Milkfish Fresh : IDR 25.000-29.000/ kg (normal-high), IDR 17.000-19.000 (low)

#### Pond Preparation

- The ponds are cleaned and prepared properly (paying attention to salinity, light, pest/predator control, etc.).
- Most farmers have basic knowledge and tools regarding the impacts of climate-related factors on cultivation practices (precipitation, lights, water quality, testing of water salinity level, etc.)
- Most farmers use simple traditional method using fixed net and bamboo with varied production capacity (based on pond sizes and business capital.)
- Most farmers rent the field/ pond from local land-lords.

#### Pond Preparation (2)

- For permanent (closed) type of ponds located in the south of the embankment (Krapyak and Degayu), farmers usually wait ~1 month to refill the water due to the construction of the embankment that limits the entry of brackish water. The ponds also need to be cleaned so that natural food (i.e. plankton) can grow.
- For ponds located in the open sea (Jeruksari), no drugs or inputs allowed since they can easily spread to other ponds.

#### Sowing & Cultivation

- Start the *acclimatization* process.
- Fish are fed 2 times a day with a dose according to the size and number of seeds. Can also be combined with bread to reduce feed usage. If farmers rely on natural feed, milkfish seeds are left free and only eat natural feed available in the pond (plankton, etc.).
- Additionally, farmers tend to have additional commodities to breed to compensate the long downtime of milkfish cycle.

#### Harvesting

- The feeding frequency can also be increased in the 3rd or 4th month before harvest to achieve the desired milkfish growth (The size is usually adjusted to meet the market demand and/ or the farmers' capacity).
- Milkfish is ready to be harvested 3-5 months after release, or when the size is in accordance with the farmer's wishes or consumer demand.
- The milkfish fresh are picked up by the traders, or sold directly to Presto producers to be processed further.

# Milkfish Cultivation Practice

## Milkfish Processing (Bandeng Presto)

### Common Practice in Project Location

Presto production takes approx. 1.5 to 8 hours, depending on each producer's pace and capacity/ quantity of fish processed.

Production capacity per processor: 10-15kg (small), 25-35kg (medium) per cycle or 160kg/ day (large)

Selling price : Rp6.000-7.000/ pack (small business), Up to Rp50.000/ pack (medium to large business)

#### Preparation & Cleaning

- **Fish Sourcing & Sorting:** Producers buy fish from local markets or traders, depending on their financial capacity. After transportation, the fish are sorted to remove any that are of poor quality.
- **Preparation Process:** Fish, whether fresh or frozen, is cleaned, gutted, and soaked in salt water before further processing.
- **Spice Preparation:** Spices are measured based on the fish's weight, ground, and cooked until the water evaporates, with each producer having their own preferred seasoning blend.

#### Cooking/ Processing

- The fish are cooked in pressure cooker for about 1-2 hour, depending on the size and quantity of the fish as well as the pressure cooker's capacity.
- The fish are usually moved to oven for more process to further soften the bones.
- The fish are then left to cooled down for about 30 mins before being packed.

#### Packaging

- The fish then being vacuumed sealed to ensure the quality and hygiene.
- For mid to big-sized businesses, the fish then are being packed using their own label/ brand in a box, along with the spices.

#### Sales & Marketing

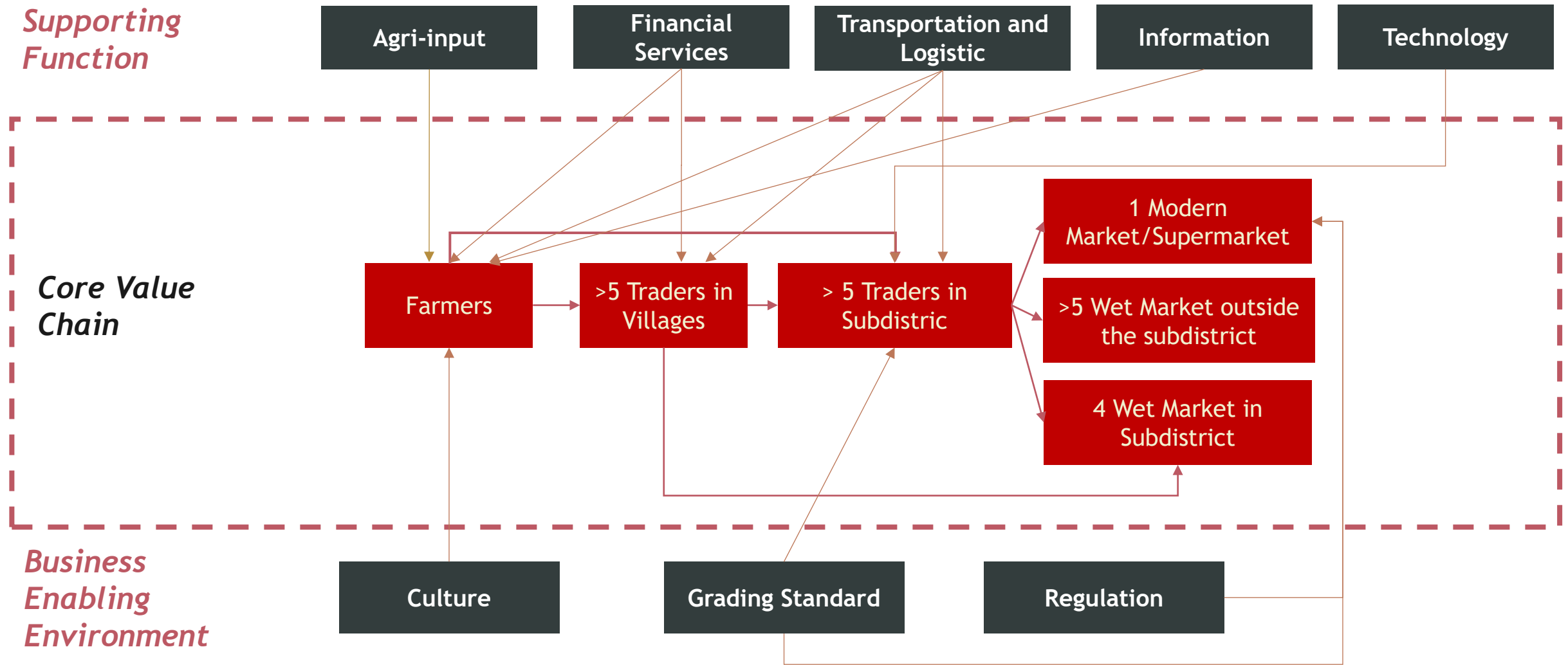
- The products are ready to be sold to traditional markets or directly to customers (individuals or agencies).
- Small-sized business usually use door-to-door method for sales and marketing in the local area, with minimum digital platform usage.
- Mid to large-sized businesses usually produce in big scale and sold to agencies, events, households or outlets in bulks, utilizing *e-commerce* platforms to reach more customers.
- The remaining or unsold products are kept in a storage or chiller to keep them fresh.

# Market System Analysis

*This section provides an in-depth analysis of the carrot and milkfish value chains in Pekalongan, Central Java. It explores market dynamics, the roles of value chain actors, root cause analysis, and potential incentives from collaboration*

# Carrot

# Market Map of Carrot



# Relationship of Market Actors

## Core Market Actors

| No | Actors                                 | Detailed Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Farmer                                 | <ul style="list-style-type: none"> <li>There are approximately ±1,000 households cultivating local carrots (carrots that use retention seeds).</li> <li>There are 2 farmers in Simego Village (Tunut and Nafsiah) who are still actively cultivating Berastagi carrots</li> </ul>                                                                                                                                                                                                                                   |
| 2  | Trader                                 | <ul style="list-style-type: none"> <li>There are more than 5 collectors at the village level.</li> <li>The maximum load that can be transported by the collectors each day is 2-3 tons.</li> <li>If the load exceeds the maximum capacity, the collector will reschedule the plan for the following day.</li> <li>The collectors of local carrots sell at the wet market (to traders) in the sub-district area.</li> <li>If demand is low, the carrots will be sold at markets outside the sub-district.</li> </ul> |
| 3  | Trader in Sub-district (larger trader) | <ul style="list-style-type: none"> <li>Berastagi carrots are sold outside the subdistrict by larger traders, mostly outside the village.</li> <li>One large trader was identified during the visit, U.D Dieng. U.D Dieng has sold Berastagi Carrot to Jakarta, West Java, and East Java</li> </ul>                                                                                                                                                                                                                  |
| 4  | Modern Market                          | <ul style="list-style-type: none"> <li>One of the market for Berastagi Carrot is Modern Market, such as Lotte Mart.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      |
| 5  | Wet Market in Subdistrict              | <ul style="list-style-type: none"> <li>There are four markets that serve as the target for selling local carrots in Petungkriyono Sub-district. Collectors from Simego and Tlogohendro villages will sell the carrots, which are packaged in plastic bags, to traders at the wet markets.</li> </ul>                                                                                                                                                                                                                |
| 5  | Wet Market outside Subdistrict         | <ul style="list-style-type: none"> <li>The market areas for Berastagi carrot sales include wet market in Cirebon, Majalengka, Kudus, Jogja, Mutilan, and several areas in East Java (although on a smaller scale)</li> </ul>                                                                                                                                                                                                                                                                                        |

# Relationship of Market Actors

## Supporting Functions

| No | Actors                      | Role                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Relationship                                                                                                                                                                                                                                                                                        |
|----|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Agri-input                  | <ul style="list-style-type: none"> <li>• <b>Seeds:</b> Local carrot seed producers conduct self-seedling and sell seeds to farmers.</li> <li>• <b>Fertilizer:</b> There are two fertilizer supplier (manure) in Simego and Tlogohendro villages.</li> <li>• <b>Crop Protection:</b> Can be purchased at local kiosks in the village. There are about 6 (in Simego) people selling commonly used plant treatments (e.g., herbicides). Farmers purchase a wider variety in the sub-district kiosks at Pasar Kalibening</li> </ul> | Farmers (buyer)                                                                                                                                                                                                                                                                                     |
| 2  | Financial Services          | <b>Three financial service providers have been identified in the project location</b> , namely: BRI, PNM, and BPR BKK. The loan product most commonly used by the community is the <b>seasonal scheme product</b> .                                                                                                                                                                                                                                                                                                             | Farmers (borrower)                                                                                                                                                                                                                                                                                  |
| 3  | Transportation and Logistic | <ul style="list-style-type: none"> <li>• The road infrastructure from village to sub-district and regency is well established, since it has been paved.</li> <li>• Road access to Tlogohendro village is more challenging because some roads are unpaved, with several inclines and sharp turns.</li> </ul>                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Traders: own their own trucks with a capacity of 2 tons per truck (open-bed trucks)</li> <li>• Farmers: Some farmers with fields/gardens located in hilly areas (high and steep terrain) transport their agricultural produce using motorcycles</li> </ul> |

# Relationship of Market Actors

## Supporting Functions

| No | Actors      | Role                                                                                                                                                                         | Relationship                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Information | Information related to the agriculture practice can be accessed from extension service providers (PPL), however, PPL is not too active, since they have large coverage area. | <b>Farmers:</b> Some farmers obtain information on disaster and climate management through MCI programs, such as the Climate Field School (SLI). Farmers also continue to use Pranoto Mongso (seasonal guidelines), a traditional Javanese method for determining planting seasons.                                                                                                                                                                                                                                                                                                                                             |
| 2  | Technology  | Technology is being used by traders and farmer. There no extensive or modern technology is used by farmers                                                                   | <ul style="list-style-type: none"> <li>• <b>Traders:</b> The technology is used by the traders (U.D Dieng) in the sub-district and district area. This technology involves the <b>storage</b> media for Berastagi carrots. The carrots, which are collected from the Pekalongan district, are then stored in a <b>cooler/freezer</b> for 2 days before being sold outside the district.</li> <li>• <b>Farmers:</b> The irrigation technology used by the community in the village is a large diesel pump to transfer water from the river to agricultural land. About 40% of the community owns a large diesel pump.</li> </ul> |

# Relationship of Market Actors

## Business Enabling Environment

| No | Actors           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Culture          | <ul style="list-style-type: none"> <li>Horticultural farming has become a generational livelihood carried out by the community in the village. The youth in the village generally do not leave because they will continue their parents' farming activities.</li> <li>Farmers use <i>Pranoto Mongso</i> (Seasonal Guidelines), which is a Javanese calendar related to agricultural activities (some are also used for fishing), such as planting. Farmers in the project location village use the <i>Pranoto Mongso</i> calculation for planting. However, currently, farmers state that the <i>Pranoto Mongso</i> calculation often deviates or no longer aligns with the actual conditions.</li> </ul> <p><b>Relationship</b></p>                                                                                                                                |
| 2  | Grading Standard | <ul style="list-style-type: none"> <li>Regulations related to sorting and quality control are implemented for Berastagi carrots. For local carrots, there are 2 quality grades, while for Berastagi carrots, there are 3 quality categories: (FS, S, and M).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3  | Regulation       | <p><b>Peraturan Menteri Pertanian Republik Indonesia Nomor 22 Tahun 2021</b> concerning Good Agricultural Practices (GAP) governs the guidelines for horticultural farming practices aimed at improving the quality and safety of production, preserving the environment, and strengthening the competitiveness of horticultural products in both domestic and international markets.</p> <p><b>Peraturan Menteri Pertanian Nomor 46/Permentan/PP.130/11/2019</b> concerning the Development of Strategic Horticultural Commodities regulates the guidelines for developing horticultural commodities deemed strategic for the national economy. This regulation aims to increase production, competitiveness, and the welfare of farmers through effective and efficient management. The commodities include vegetables such as chili, shallots, and tomatoes.</p> |

# Challenges and Opportunities of Sector

## Challenges

### Agriculture Practice

- Low productivity due to suboptimal cultivation techniques.
- Limited agri-input access
- Limited irrigation access, with water shared among farmers and households.
- Poor planting preparation reduces crop quality – *soil preparation based on type*.
- Improper pest control harms soil quality

### Market Access and Distribution

- Limited market information
- Price volatility

### Finance and Investment

- Limited financial literacy

### Technology Adoption and Innovation

- Limited access to technological knowledge
- High cost of technology adoption
- Farmers resistance to change

## Opportunities

- Increasing productivity and quality with climate adaptive approach
- Soil and water conservation
- Increasing farmer capacities in post-harvest

- Expanding market access
- Assessing potential derivative product for carrot

- Innovative financing by involving community, cooperation, and digital financing
- Establish partnership with financial service provider

- Establish partnership with technology provider (e.g., smart farming provider)
- Increasing technology capacity for farmer and engaging youth in the implementation
- Build demonstration plot (demplot) for technology implementation

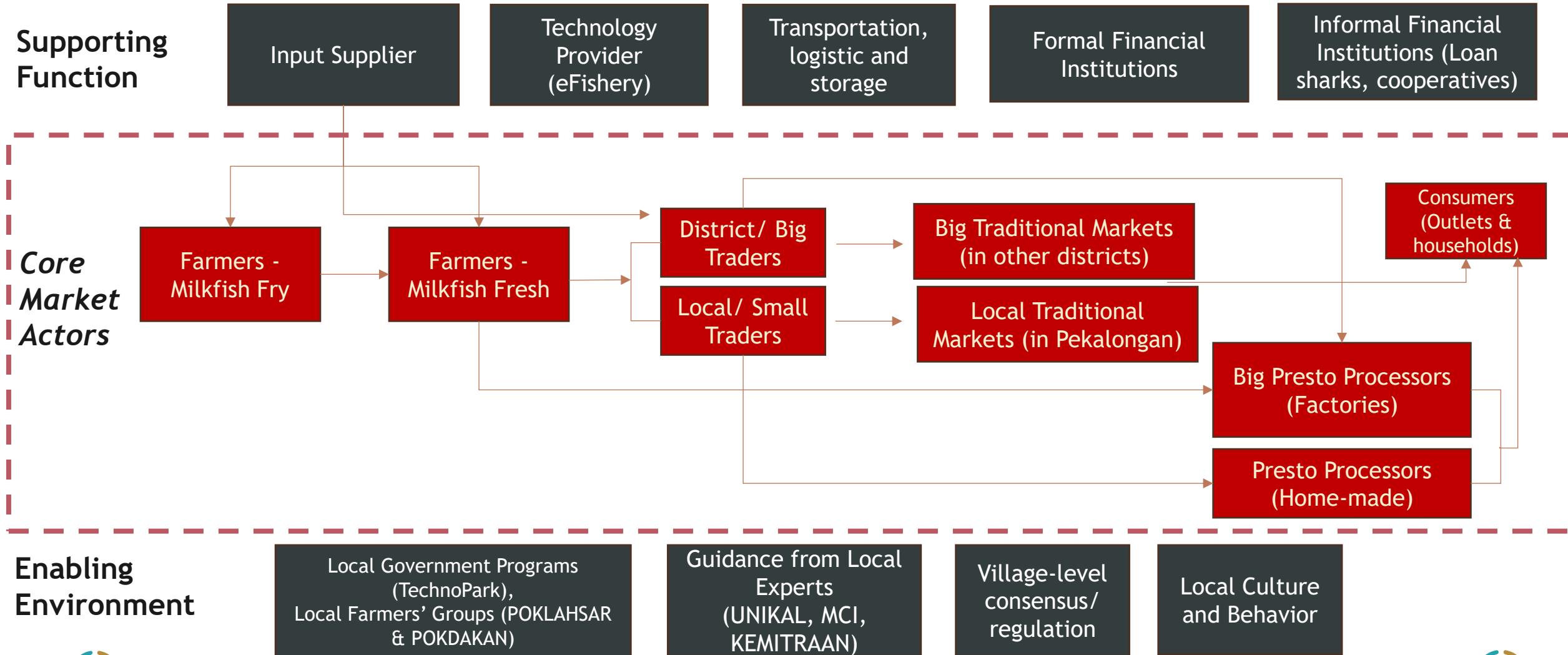
# Closed-loop Business Model

## Practices in Agriculture Sector

| Practice                                             | Market Actor/Stakeholder                                                                                                                                                                                                                                         | Lesson Learned                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Closed-loop business model for Horticulture in Garut | <ul style="list-style-type: none"> <li>• Government (Dinas Pertanian)</li> <li>• Financial Service Provider</li> <li>• Agri-input companies (seeds and fertilizer)</li> <li>• Non-profit organization</li> <li>• Farmer groups</li> <li>• Academician</li> </ul> | <ul style="list-style-type: none"> <li>• Institutional and operational standards present challenge for closed-loop model, it need to be robust</li> <li>• All market actors in the collaboration must have credibilite and capacity to meet their commitment.</li> <li>• Closed-loop business model is involving numerous actorrs, identifying incentive and risk is needed as a mitigation and create same expectation</li> </ul> |
| Closed-loop model for horticulture in Sikka, NTT     | <ul style="list-style-type: none"> <li>• Government</li> <li>• Technology provider</li> <li>• Agri-input company (seeds, fertilizer, and crop protection)</li> <li>• Financial Service Provider</li> <li>• Farmer groups</li> </ul>                              | <ul style="list-style-type: none"> <li>• Involving youth farmers is prominent for fostering technology adoption</li> </ul>                                                                                                                                                                                                                                                                                                         |

# Milkfish

# Market Map of Milkfish



# Relationship of Market Actors

## Core Market Actors

| No | Actors                                                        | Detailed Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Milkfish fry farmers<br>( <i>Pendederan nener</i> )           | <p><b>Description</b></p> <ul style="list-style-type: none"> <li>Approx. 200 farmers (inc. Milkfish fresh) in the project locations, where ~100 are SLBB participants. They cultivate/ breed the milkfish fry to be further raised by local milkfish farmers.</li> <li>SLBB participants (PT MBP): Utilize semi-intensive method to cultivate 3.000 fry from BBPBAP Jepara in 4 bioflocs in Jeruksari and Krapyak. Supply for internal use (KJA in Jeruksari).</li> <li>Non-SLBB participants: Utilize traditional method to cultivate fry sourced from local traders or non-local suppliers (e.g. BBPBAP Jepara, Gondol village in Bali) in their permanent or closed ponds. Supply to local traders and farmers. Cultivate other commodities (e.g. shrimps and parrot fish) for additional income.</li> </ul> <p><b>Relationship</b></p> <ul style="list-style-type: none"> <li>SLBB participants (PT MBP): PT MBP's milkfish fresh farmers, BBPBAP Jepara, input kiosk</li> <li>Non-SLBB participants: Local traders &amp; farmers, non-local supplier (e.g. BBPBAP Jepara, Gondol village in Bali), input kiosk</li> </ul> <p><b>Incentives</b></p> <ul style="list-style-type: none"> <li>The SLBB participants (PT MBP) have guaranteed supply and market (supply directly to PT MBP's milkfish fresh farmers) as well as equipped with training and facilities.</li> <li>Non-SLBB participants usually cultivate other commodities to compensate the long cultivation cycle of milkfish and for additional income to cover their daily needs.</li> </ul> |
| 2  | Milkfish fresh farmers<br>( <i>Pembesaran bandeng segar</i> ) | <p><b>Description</b></p> <ul style="list-style-type: none"> <li>Approx. 200 farmers (inc. Milkfish fresh) in the project locations, where ~100 are SLBB participants. They cultivate milkfish fresh for consumption or further process (e.g. presto).</li> <li>SLBB participants (PT MBP): Has 2 ponds of KJA in Jeruksari, with fry supplies directly come from PT MBP's biofloc. Priority supply to Moya Bandeng Presto, or local traders.</li> <li>Non-SLBB participants: Utilize traditional method to cultivate fish sourced from local traders or non-local suppliers (e.g. BBPBAP Jepara). Supply to small and big traders or local presto producers. Cultivate other commodities (e.g. shrimps and parrot fish) for additional income.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

# Relationship of Market Actors

## Core Market Actors

| No | Actors                       | Detailed Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | (cont'd)                     | <p><b>Relationship</b></p> <ul style="list-style-type: none"> <li>SLBB (PT MBP): PT MBP's milkfish fry farmers, other SLBB participants (milkfish fry farmers), local traders, Moya Bandeng Presto, input kiosk, local experts and government</li> <li>Non-SLBB: Non-local supplier (e.g. BBPBAP Jepara), local and district traders, local presto producers, input kiosk, local government</li> </ul> <p><b>Incentives</b></p> <ul style="list-style-type: none"> <li>SLBB (PT MBP) have guaranteed supply (from PT MBP's biofloc) and market (to Moya Presto) as well as equipped with training and facilities.</li> <li>Non-SLBB participants usually cultivate other commodities to compensate milkfish's long cultivation cycle and for additional income to cover their daily needs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3  | Milkfish processors (Presto) | <p><b>Description</b></p> <ul style="list-style-type: none"> <li>Process milkfish fresh into a value-added products (presto) for public consumption.</li> <li>SLBB (Moya Bandeng Presto): Sourced fish from PT MBP's KJA or other SLBB participants (local farmers). Production runs for approx. twice a month. Have standards licensing (PIRT, NIB, Halal, SKU) with their own labels. Serves local outlets or bazaars, institutional and individual orders using (mostly) outright buy system.</li> <li>Non-SLBB: Produce other processed milkfish products such as grilled fish cake, chips, and steamed as well as products from other commodities (parrot fish, iridescent fish, skipjack tuna, etc.). Sourced fish from local traders (mid to large) or traditional market (small businesses). Production runs 1-3 times a week (small-mid) to daily (big businesses). Have no BPOM or SNI for modern market and nation-wide distribution. Serves local outlets or bazaars, souvenir shops, and individual orders using consignment and outright buy system.</li> </ul> <p><b>Relationship</b></p> <ul style="list-style-type: none"> <li>Moya Bandeng Presto: PT MBP, local traders and traditional market, customers, local experts and government</li> <li>Non-SLBB participants: Small and big traders, local traditional market, local government</li> </ul> <p><b>Incentives</b></p> <ul style="list-style-type: none"> <li>Moya have guaranteed supply (from PT MBP's KJA) as well as equipped with training and facilities.</li> <li>Non-SLBB have other product variations and wider customer base. For <i>CV New Istiqomah</i>, it is equipped with <i>Surat Kelayakan Pengolahan</i> and has a nation-wide market coverage, with regular supply to souvenir shops and traditional markets.</li> </ul> |

# Relationship of Market Actors

## Core Market Actors

| No | Actors                                 | Detailed Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4  | Small/ Local Trader                    | <ul style="list-style-type: none"> <li>Mainly sell Shrimp and Milkfish (each about 75kg of total transport capacity of 200kg per day). Runs for 5-6 days per week using a motorcycle.</li> <li>Selling fish at the Banjarsari traditional market (has a shop outlet) and local pressure cooker producers (in the Pekalongan area and surrounding areas).</li> </ul>                                                                                                                                                                                                                                                                                                      |
| 5  | Big/ District Trader                   | <ul style="list-style-type: none"> <li>There are approx. &gt; 10 big traders in Pekalongan.</li> <li>Usually the fish supply comes from &gt; 200 fish farmers spread across Pekalongan (Jeruksari), Pemalang, Kudus, Batang.</li> <li>Have 2 fleets (trucks) with a capacity of 5-6 tons each and transport to wet/traditional markets in big cities such as Jakarta, Semarang, and Solo with a capacity of tens of tons in one week (6-7 days) of delivery.</li> <li>Usually can give financial aid to farmers in a form of <i>kasbon</i> or feed products to support the farmers. In turn, the big traders will take the harvest production of the farmers.</li> </ul> |
| 6  | Traditional Market in Subdistrict      | <ul style="list-style-type: none"> <li>Approx. 13 traditional markets in Pekalongan city including Pasar Banjarsari, Pasar Poncol, Pasar Kraton, etc.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7  | Traditional Market outside Subdistrict | <ul style="list-style-type: none"> <li>Large markets outside the city of Pekalongan include Jakarta (Karanganyar), Semarang, Bandung, Purwokerto, Solo, Boyolali, Salatiga, Karawang, etc.</li> <li>Customers in Boyolali and Solo are large-scale home presto producers (dedicated up to 2-3 tons/ day) while Jakarta market only demands for big-sized fish (dedicated 16-20 ton/ week). Presto factory in Semarang demands up to 6-18 tons/ week.</li> </ul>                                                                                                                                                                                                          |

# Relationship of Market Actors

## Supporting Functions

| No | Actors                       | Role                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Relationship                                                                                                                                                                    |
|----|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Technology Provider          | <ul style="list-style-type: none"> <li>eFishery provides a one-stop-solution platform for value chain businesses in the milkfish sector: eFeeder, eFisheryku (Contract Farming), eFresh, eFarm, and Kabayan.</li> <li>17 Pekalongan farmers have partnered with eFishery, each with a productivity of 27 tons/ cycle.</li> <li>eFishery also covers almost end-to-end value chain business: As the off-taker/ trader, financing and technology provider, local technical assistance to farmers, as well as feed supplier.</li> </ul>                                                                                                                                          | <ul style="list-style-type: none"> <li>Input suppliers</li> <li>Big traders</li> <li>Individual farmers and local farmers group (POKDAKAN)</li> <li>Local government</li> </ul> |
| 2  | Financial Institutions       | <ul style="list-style-type: none"> <li>Identified several financial institutions operating in the project locations (i.e. BRI, Bank Jateng, BCA, BTPN Syariah) with BRI dominating the market.</li> <li>Provide financing, usually in a form of KUR, to farmers and presto producers. Tend to use personal and cluster approach for better reach and minimize default risk.</li> </ul>                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Individual farmers and local farmers group (POKDAKAN)</li> <li>Presto producers</li> <li>Small and big traders</li> </ul>                |
| 3  | Input Supplier               | <ul style="list-style-type: none"> <li>Identified 1 local kiosk in Wonokerto (i.e. Kios Tani Makmur) and 2 input (milkfish fry) supplier outside of Pekalongan (i.e. BBPBAP Jepara, Desa Gondol Bali). Sell vitamin, feed and fry for farmers.</li> <li>In addition to local input kiosks and eFishery, big traders also play a role in input supply through their cash advance system (kasbon) or direct non-monetary aid (feed products).</li> </ul>                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Farmers</li> <li>Big traders</li> </ul>                                                                                                  |
| 4  | Logistics and Transportation | <ul style="list-style-type: none"> <li>Dedicated vehicles are owned by small (motorcycle) and big (trucks) traders that are used to transport fish to traditional markets in Pekalongan area and other districts.</li> <li>Farmers do not have their own vehicles for transportation and cold storage for stocks since the harvest are being picked up directly by the traders.</li> <li>Home-made small presto producers usually do not have their own vehicles and storage. Medium to big presto producers usually have motorcycle or car to transport their products to customers (households or outlets) or utilize local delivery services (e.g. JNE, Gojek).</li> </ul> | <ul style="list-style-type: none"> <li>Farmers</li> <li>Presto producers</li> <li>Small and big traders</li> </ul>                                                              |

# Relationship of Market Actors

## Business Enabling Environment

| No | Actors                            | Role                                                                                                                                                                                                                                                                                                                 | Relationship                                                                                                                                |
|----|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Culture                           | Low financial literacy: Strong preference to avoid formal financing due to income instability and to avoid credit risk. Prefer to use their own savings or loan from relatives to cover businesses' needs.                                                                                                           | <ul style="list-style-type: none"> <li>• Farmers</li> <li>• Presto producers</li> <li>• Financial institutions</li> </ul>                   |
| 2  | Local government                  | The local government (DKP) supports and guides the cultivation and processing practices of local businesses in the milkfish sector through TechnoPark (inc. Gerai UMKM or Rumah Kemas) and field counseling and guidance by the staff (PPL). Also collaborates with other parties or experts, e.g. local-based NGOs. | <ul style="list-style-type: none"> <li>• Local farmers and producers' groups</li> <li>• Local-based NGOs</li> </ul>                         |
| 3  | Local farmers & producers' groups | <ul style="list-style-type: none"> <li>• Approx. 52 POKDAKAN and 30 POKLAHSAR in Pekalongan city, each with approx. 10-25 members.</li> <li>• As platforms for information-sharing on climate and disasters, as well as cultivation and processing practices and trends.</li> </ul>                                  | <ul style="list-style-type: none"> <li>• Local government</li> </ul>                                                                        |
| 4  | Local experts                     | Other than eFishery, several experts are identified that provide technical assistance and facilities to farmers and presto producers, such as universities (UNIKAL, UNDIP) and NGOs (MCI, KEMITRAAN). Conducts piloting projects and programs to improve the local farmers and presto businesses.                    | <ul style="list-style-type: none"> <li>• Farmers</li> <li>• Presto producers</li> <li>• Universities</li> <li>• Local-based NGOs</li> </ul> |
| 5  | Local regulation/ consensus       | Jeruksari village agrees to consent to a regulation on prohibiting the use of chemicals or other harmful inputs in their ponds due to their nature of being in open waters.                                                                                                                                          | <ul style="list-style-type: none"> <li>• Local farmers' groups</li> <li>• Local government</li> </ul>                                       |

# Challenges and Opportunities in the Milkfish Sector

| Challenges                                                                                                                                                                                                                   | Opportunities                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Business Practice</b> <ul style="list-style-type: none"> <li>Limited production capacity, efficiency and management</li> <li>Climate-related impacts</li> <li>Brackish water supply shortage due to embankment</li> </ul> | <ul style="list-style-type: none"> <li>Use semi-intensive method and relevant technology for cultivation and post-harvest</li> <li>Provide access to local milkfish fry's supplier for better SR</li> <li>Provide access to high quality and probiotic feed</li> </ul> |
| <b>Market Access and Distribution</b> <ul style="list-style-type: none"> <li>Limited Market Information</li> <li>Barriers in transportation &amp; infrastructure</li> <li>Price Fluctuations</li> </ul>                      | <ul style="list-style-type: none"> <li>Develop value-added products</li> <li>Strengthen distribution networks</li> <li>Utilize digital channels for marketing</li> </ul>                                                                                               |
| <b>Financing and Investment</b> <ul style="list-style-type: none"> <li>Collateral Requirements and other indicators by FIs</li> <li>Limited Financial Literacy</li> <li>Income Instability</li> </ul>                        | <ul style="list-style-type: none"> <li>Partnership with microfinance institutions or fintech</li> <li>Implementation of cultivation insurance schemes</li> <li>Development of financial literacy training programs</li> </ul>                                          |
| <b>Adoption of Technology and Innovation</b> <ul style="list-style-type: none"> <li>Low digital literacy</li> <li>High cost of technology</li> <li>Businesses' resistance to change</li> </ul>                               | <ul style="list-style-type: none"> <li>Increasing technology adoption through pilot programs or incentive scheme</li> <li>Partnerships with technology providers</li> <li>Sustainable technical training for businesses</li> </ul>                                     |

# Closed-loop Business Models

## Practice in Aquaculture Sector

| Practice                                                                                                         | Market Actor/Stakeholder                                                                                                                                                                                                                            | Lesson Learned                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Value chain financing for milkfish and shrimp commodities by eFishery - “Kabayan” (Kasih, Bayar Nanti) Financing | <ul style="list-style-type: none"><li>• eFishery</li><li>• Big traders</li><li>• Input suppliers (e.g. STP)</li><li>• Individual farmers and Local farmers group (POKDAKAN)</li><li>• Government (KEMENKOPUMKM/ LPDB, KEMENKEU/ PIP, OJK)</li></ul> | <ul style="list-style-type: none"><li>• Ownership of ponds/fishponds among farmers in the project location, most of which are still rented, is one of the biggest obstacles in accessing financing.</li><li>• Lack of digital infrastructure in rural areas can hinder the adoption of technology-based models</li><li>• Lack of financial literacy among farmers and small business actors is an obstacle to adopting innovative financial products.</li><li>• Personal approach and clustering scheme (grouping) in socialization, coaching and community assistance have proven effective in increasing community knowledge and interest in accessing these products and minimizing the risk of default.</li></ul> |

# Strategic Recommendation

*This section provides strategic recommendations focused on market development, farmer and fish farmer capacity building, innovative financing, and partnership opportunities. The goal is to identify sustainable strategies, including stronger institutional roles for farmers and fish farmers to enhance their market position.*

# Strategic Recommendation

## Carrot and its Farmers



### Market Development Strategy

- Market expansion and create added value
- Foster market linkages
- Commodity diversification



### Capacity Development and Technical Support

- Integrated training program
- Technical support for market information
- Knowledge sharing forum



### Innovative Financing Model

- Tailored financial services product
- Development of risk transfer schemes such as Weather Insurance

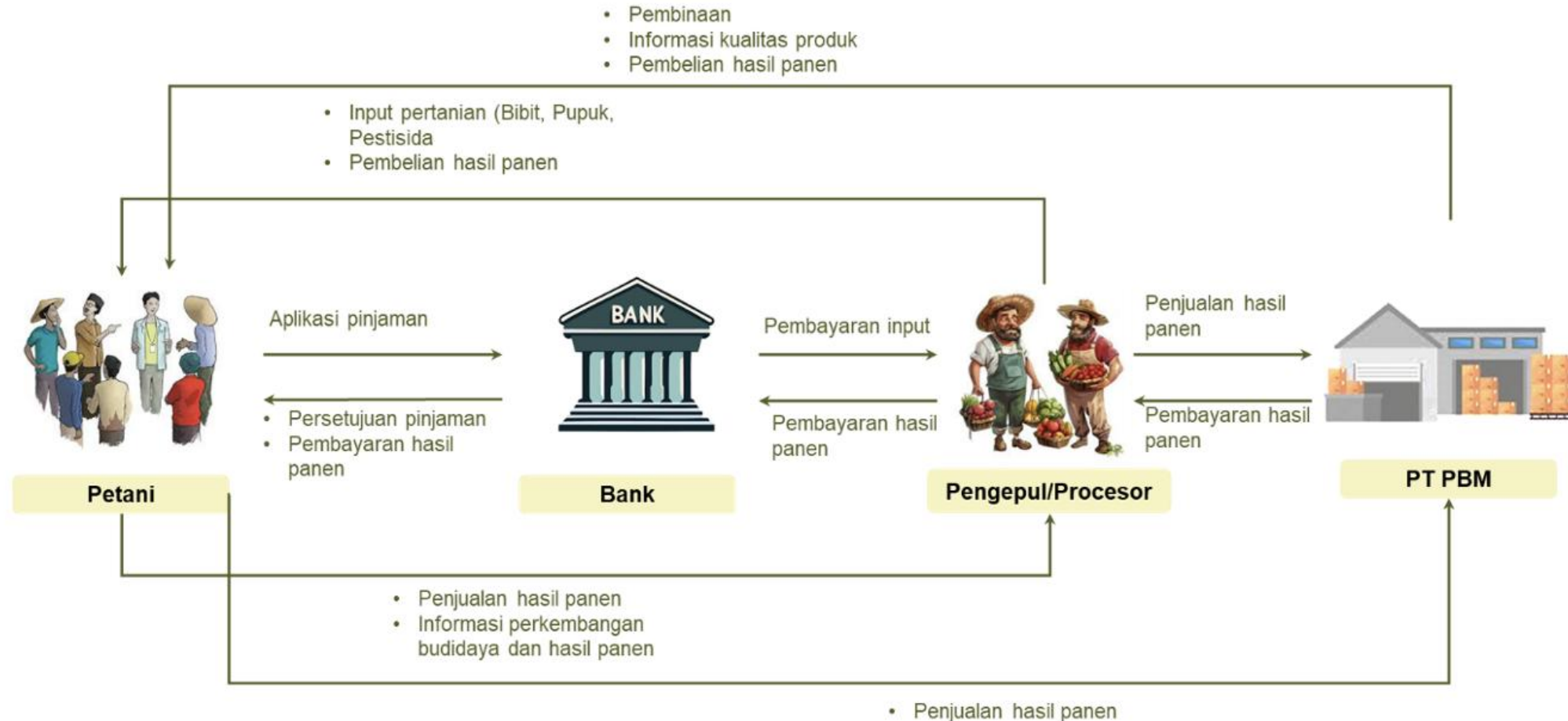


### Partnership and Collaboration

- Establish partnership with relevant private sector and government

# Potential Strategic Role for PT. Petung Bumi Makmur

Petung Bumi Makmur take a role as a value chain ecosystem driver, providing guidance, quality monitoring and manages product distribution to market



# Strategic Recommendation

## Milkfish



### Market Development Strategy

- Market expansion and create added value
- Product innovation



### Capacity Development and Technical Support

- Sustainable cultivation method
- Improve processing and storage skills
- Knowledge sharing forum



### Innovative Financing Model

- Tailored/ commodity-based financial services product
- Development of risk transfer schemes such as Weather Insurance



### Partnership and Collaboration

- Establish Public-Private Partnership with relevant private sector and government
- Collaborative network and research partnerships

# Potential Strategic Role for **PT. Moya Bahari**

PT MBP plays a strategic role in developing a closed-loop milkfish farming system by coordinating value chain actors, enhancing internal capacity in logistics and quality management, facilitating market access through partnerships, and providing digital platforms for market and climate information.



# Strategic Recommendation

## Climate Adaptive Integration – Carrot and Milkfish

### Promoting sustainable aquaculture and agriculture

#### Practice

- Adoption of climate-adaptive practice: climate-adaptive input
- Reducing chemical substance in the practice

### Providing climate and weather information

- Creating local information related climate and weather
- Providing cultivation practice based on climate and weather information

### Developing Incentive for Farmers for Conservative

#### Practice

- Incentive scheme for farmer
- Subsidy for environmentally-friendly input

### Implementing monitoring system to track environment impact

- Monitoring and evaluation with environment standard

### Increasing awareness and knowledge of conservation and climate resiliency

- Educational campaign
- Integrate climate-adaptive and nature based solution in the agriculture and fisheries practice

# Strategic Recommendation Roadmap

*This roadmap provides a strategic guide for building a resilient and sustainable carrot and milkfish market system in Pekalongan Regency. It emphasizes climate adaptation, technological innovation, and cross-sector collaboration, outlining key actions and expected outcomes to ensure long-term sustainability and local impact.*

# Timelines: Short Term (0-12 months)

|                   | Technical Training                                                                                                                          | Resource Distribution                                                                                                      | Climate Information and Market Prediction                                                                                                       |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Key Activities    | Focus on carrot and milkfish cultivation, including water-efficient irrigation, pond water management, and biofloc technology.              | Provide climate-resilient carrot seeds, aerators for ponds, and biofloc technology to enhance milkfish farming efficiency. | Develop a weather and market information app and offer training for farmers and fish farmers on its use.                                        |
| Expected Output   | <b>Skill Enhancement:</b> Improve farmers' and fish farmers' skills in efficient production techniques that are adaptive to climate change. | <b>Productivity Increase:</b> Achieve up to a 15% productivity improvement in the first 12 months.                         | <b>Better Decision-Making:</b> Enable farmers and fish farmers to make informed decisions about planting, harvesting, and product distribution. |
| Main Stakeholders | <ul style="list-style-type: none"> <li>Local Government</li> <li>Non-profit Organization</li> <li>Training Institution</li> </ul>           | <ul style="list-style-type: none"> <li>Input Providers (company, kiosk)</li> <li>PT MBP</li> <li>PT PBM</li> </ul>         | <ul style="list-style-type: none"> <li>BMKG</li> <li>Application Development</li> <li>Non-profit organization</li> </ul>                        |

# Timelines: Medium Term (1-3 Years)

|                   | Infrastructure Development                                                                                            | Expanding Market Access                                                                                                    | Commodity Diversification                                                                         |
|-------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Key Activities    | Build cold storage facilities for carrots, milkfish processing, and local distribution infrastructure.                | Link farmers and fish farmers to domestic and international distribution networks, including modern retail and e-commerce. | Promote intercropping for carrot farmers and develop silvofishery integration for milkfish ponds. |
| Expected Output   | 20% reduction in post-harvest losses and increased value-added production capacity.                                   | A 25% increase in farmers' profit margins through access to premium and modern markets.                                    | Economic risk mitigation through income diversification for farmers and fish farmers.             |
| Main Stakeholders | <ul style="list-style-type: none"> <li>Local Government</li> <li>Private Sector</li> <li>Donor Institution</li> </ul> | <ul style="list-style-type: none"> <li>National Distributor</li> <li>E-commerce platform</li> </ul>                        | <ul style="list-style-type: none"> <li>PT. MBP</li> <li>PT. PBM</li> <li>University</li> </ul>    |

# Timelines: Long Term (3-5 Years)

|                   | Sustainability and Institutions                                                                                                     | Environmental Conservation                                                                                                                 | Sustainable Financing Scheme                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Key Activities    | Strengthen farmers' and fish farmers' organizations and encourage local institutions to become centers for innovation and training. | Restore coastal ecosystems to support milkfish ponds, and promote organic fertilizer use and crop rotation for sustainable carrot farming. | Develop harvest-based financing schemes and weather index-based insurance across target areas.                               |
| Expected Output   | Farmers and fish farmers will have sustainable access to technology, financing, and training.                                       | Local ecosystem restoration and improved sustainability of farming practices.                                                              | Increased access to financing that aligns with the business cycle of farmers and fish farmers.                               |
| Main Stakeholders | <ul style="list-style-type: none"> <li>PT MBP</li> <li>PT PBM</li> <li>Local Government</li> <li>Research Institution</li> </ul>    | <ul style="list-style-type: none"> <li>Non-profit organization</li> <li>University</li> <li>Local Government</li> </ul>                    | <ul style="list-style-type: none"> <li>Financial institution</li> <li>Government</li> <li>Non-profit organization</li> </ul> |

# Conclusion

# Key Findings and Strategic Implications

## Key Findings

- **Market Value Chains:** Carrot and milkfish value chains face challenges like market uncertainty, dependency on conventional inputs, and climate risks.
- **Innovation:** Technological and financial innovations (e.g., water-efficient irrigation, sustainable feed) can improve sustainability and productivity.
- **Opportunities & Gaps:** Opportunities in product diversification and value-added products. Gaps in infrastructure (cold storage, logistics) and innovative financing adoption.

## Recommendations

- **Market Development:** Diversify products, improve market access, and add value to products.
- **Capacity Building:** Provide ongoing training and climate-resilient technologies.
- **Innovative Financing:** Access to risk-based credit and weather insurance to reduce vulnerability.
- **Climate Resilience:** Incorporate climate-resilient practices and environmental monitoring systems.

# Thank You