

A Review of The National Programs and Research on Chili Commodity Development Strategy in Indonesia

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Abstract.

Chili has a significant contribution in inflation, therefore government continue implementing various programs and conducting researches on chili to obtain maximum production (2.33 million tons in 2020). This paper aims to generate information as the base of the policy for chili development by reviewing the previous national program and conducting three years of research from 2016 to 2018. The 2016 research observed the chili resiliency to drought climate at East Java and West Nusa Tenggara, in 2017 examined the access of chili to export market at West Java and North Sumatra, and in 2018 traced the chili supply chain of Toko Tani Indonesia (TTI) Program at Central Java and West Java. The results informed that from the six national programs, there were three programs that result good impact on the chili development, namely Climate Field School (SLI: *Sekolah Lapang Iklim*), Annual Water Allocation Forecast (RAAT: *Rencana Alokasi Air Tahunan*), and Water Rescue Partnership Movement (GNKPA: *Gerakan Nasional Kemitraan Penyelamatan Air*). The farmers' resilience index on drought was 62-67%, meaning farmers could solve the drought problem. The access of chili to export market constrained by high production input. The TTI program significantly shortened the chili supply chain. The proposed strategy to achieve chili development is through good farming practice by integrating the *SLI*, *RAAT* and *GNKPA* supported with the marketing system. Through these efforts the quantity and quality are guaranteed so that they can penetrate the export market.

Keywords: chili, national program, strategy

1. Introduction

1.1 Background

The production of chili in Indonesia in 2016 is 1.929.831 tons, meanwhile the target of consumption is 1.998.762 tons, therefore additional of 689.31 tons (3.45%) are needed (SUSENAS, 2016). This fact caused that during the year 2010-2016 the value of chili exports decreased as 0.19% and the volume of import increase at 0.25%. At the same time the price of chili was increased both in the domestic market and the

world market proxied from the implicit price of Indonesian chili exports to the world market of around 0.05%/year (Kustiari et al., 2017).

A focus effort should be done for the solution, therefore the long-term plan for chili development in Indonesia has been compiled in a road map document until 2045 (PUSDATIN, 2016). The focus of the development of chili commodities is directed to: (1) meet domestic consumption needs; (2) import substitution; and (3) filling export market opportunities (Kementerian Pertanian Republik Indonesia, 2017). Until 2019 the program of chili development in Indonesia will be directed at efforts to stabilize supply and prices. During 2016 - 2019 the program includes improvements in the intensification and extensification of technological innovations and machinery, supply and distribution chains, pricing policies, institutions and human resource capacity building. While in 2020 - 2024 the development will be directed towards achieving self-sufficiency and competitiveness through efforts to provide seeds for the mobile cold storage industry in the diversification of the second market products, market information industry partnerships and foreign diplomacy. Achievement of self-sufficiency and exports is targeted to be achieved in the period of 2025 - 2034 through efforts to use satellite farming, export institutions, as well as trade diplomacy and foreign market expansion. In 2035 - 2045 Indonesia is targeting to become the main exporter of chilies in ASEAN, that would be done by maintaining competitiveness and expansion of the production.

This paper focus on chili development in Indonesia directed at efforts to stabilize supply and prices in the period of 2016 to 2019 that includes improvements in intensification and extensification through internal and external factors. The internal factors included such as managing the chili cropping pattern/production that targeted 2.33 million tons in 2020 (SUSENAS,2016) through national programs on chili development that had been implemented while the external factors were from the research reports on factors to reach maximum production such as climate change, export market opportunity and supply chain of chili.

1.2 Objective

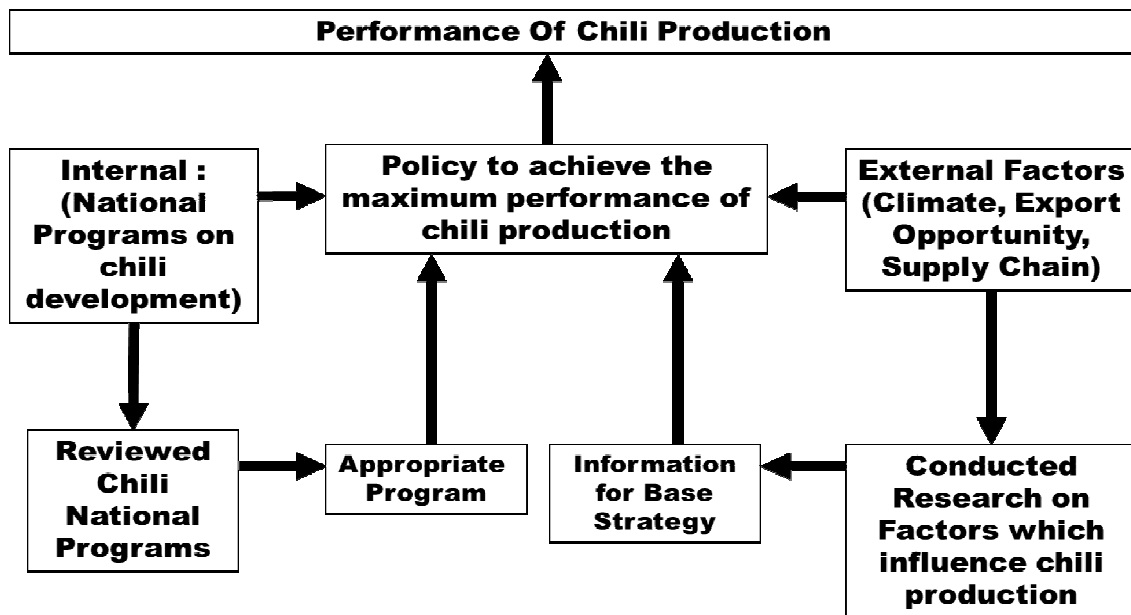
This paper generate a base strategy for policy on chili production development by reviewing the previous national programs on chili development that have been implemented and identify external factors, namely climate change, export markets and value chain of chili that have been reported from some research to get the appropriate strategy to be implemented.

2. Methodology

2.1.Theoretical Framework

To achieve the maximum performance of chili production, a policy should be developed based on the factors that influence the performance of chili production. There are internal factors such as National Programs on chili development and external factors such as climate, export market opportunity and the chili supply chain. To get the appropriate program, the implemented Chili national programs should be reviewed and research on external factors such as climate, export market opportunity and supply chain should be conducted (Figure 1).

Figure 1: Theoretical Framework for Policy on Performance of Chili



Source: (Author, 2019)

2.2 Location

The research location was selected purposively, in the center of chili production. The observation on chili resilience to drought climate, was conducted in 2016 at Kediri - East Java and West Lombok - West Nusa Tenggara by Sayaka et al.,(2016) and information on access of chili to export market were referred from report of Kustiari et al., (2017) research conducted in Pengalengan-Bandung-West Java and Karo - North Sumatra while the information on Chili supply chain in Indonesian Farmers or Toko Tani Indoensia (TTI) were traced from Anugerah et al.,(2018) research at Magelang - Central Java and Lembang - West Java.

2.3 Data

The secondary data were obtained from the related institution of each location. The primary data were collected from the farmers through interviewed based on a structured questioner done by the researchers team, where the author was one of the member' team (Table 1).

Table 1: The Data Source of Each Research

No.	Source	Climate Change		Chili access to export		Chili supply chain		Total
1	Secondary	East Java	West Nusa Tenggara	West Java	North Sumatra	Central Java	West Java	
	Related Intitution	10	9	7	7	8	8	49
2	Primary	36	35	27	27	4	8	137
	Total Each province	46	44	34	34	12	16	186
	Total sample	90		64		28		

Sources: 1) Bambang, S., et.al.(2016); 2) Kustiari, R., et.al., (2017) ; 3) Setiajie, I.A., et.al, (2018)

2.4 Analysis

- a. The appropriate national programs on chili were analyzed qualitatively and presented descriptively.
- b. Farmers Resilience: Analyzed by Vulnerability index refer to Nelson et al., (2005) such as: 1) The human resources. 2) Social aspects. 3) Natural 4) The physical condition 5) The farmers' income. The total variables are 17 and each variable scored 1 to 100, the higher the score means the better resilience.
- c. Opportunity on Export Market: in order to find out farmer's access to the market, the important information will be presented includes: 1) The mapping of export opportunities for farmers 2) The characteristic of the chili products and demands. 3) The performance of chili export market and 4) The factors that influence farmers' access to the export market .
- d. The Supply Chain were analyzed qualitatively and presented descriptively by comparing the supply chain of the TTI supply chain to the existing marketing chain, referred to (Anantan and Ellitan, 2008).

2.5 Results

2.5.1. Performance and Impact of Chili National Program

There were six famous Chili National Program that had been implemented namely

- 1) Shallow-well pump or government's aid in the short term to deal with drought was shallow-well pump with the depth up to 15 meters. Only few farmers' groups got water pumps aid utilized it due to very deep ground water level or distant water sources during drought (*Balai Besar Wilayah Sungai Nusa Tenggara I, 2015^a*).
- 2) Information of precipitation forecast The Meteorological, Climatological, and Geophysical Agency (*BMKG: Badan Meteorologi, Klimatologi dan Geofisika*) offers forecast data on rainfall to anticipate water supply for cropping seasons annually, especially for rain-fed lowland (*Balai Besar Wilayah Sungai Nusa Tenggara I. (2014)* and *Balai Besar Wilayah Sungai Nusa Tenggara I., 2016*).
- 3) *BMKG* also implemented Climate Field School or *Sekolah Lapang Iklim (SLI)* intended to improve farmers' awareness on climate change impacts. The farmers are expected to be capable gradually to adapt with extreme climate including drought. This such program was very useful for long term policy (Boer, 2009)
- 4) Planting Chili Movement on Dry Season or introduced by Directorate General of Horticulture had relatively limited impact. The area size of demonstration farm was relatively narrow and technology introduced was not good enough to deal with drought affecting most chili farmers significantly.
- 5) Brantas River Area Office in East Java and River Area Office in South East Nusa Tenggara (NTB) I in NTB always conduct Annual Water Allocation Forecast (*RAAT*) based on rainfall forecast conducted by *BMKG*. *RAAT* is very useful to determine cropping calendar including crops to be planted by farmers in accordance with irrigation water supply (*Balai Besar Wilayah Sungai Brantas, 2015^b*).
- 6) Water Rescue Partnership Movement or *Gerakan Nasional Kemitraan Penyelamatan Air (GNKPA)* was also conducted in East Java and NTB

provinces. *GNKPA* involve all stakeholders to conserve river basement such that water sources are sustained and erosion and its impacts are controllable (*Balai Besar Wilayah Sungai Brantas*, 2015).

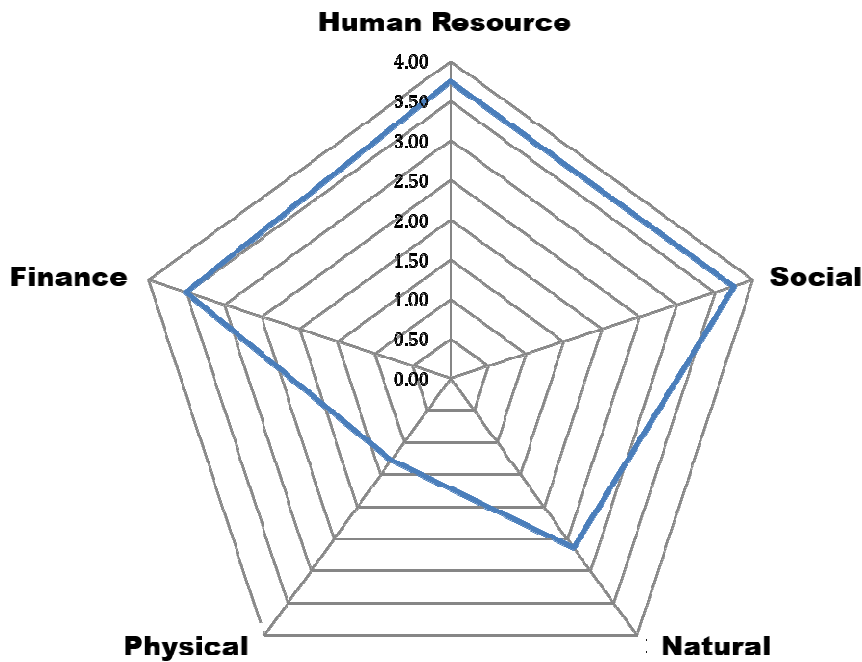
2.5.2. The Resilience Index

Resilience is the capacity of people, communities, countries and global institutions to anticipate, prepare, for cope with, and recover from the shock and not only bounce back to where they were before the shocks occurred but becomes better-off (Department for International Development, 2012). To overcome the drought situation, some of the chili farmers tried their best to overcome the lack of water during drought. Individually or in groups chili farmers tried to overcome drought that affects their agricultural land. Some farmers left their agricultural land fallow, planting drought-resistance crops, or delayed to plant crop until the early wet season (Rahayu, 2011).

To tackle climate change, a practical book has been published by the Ministry of Environment (Kementerian Lingkungan Hidup, 2014) while a guidelines for the Prevention of Disaster Impacts in Agriculture have also been established by the Ministry of Agriculture of the Republic of Indonesia (Kementerian Pertanian Republik Indonesia, 2007). However, the success in overcoming drought depends on the sufficient water supply for irrigation even though the water volume was limited. Despite its expensive cost, irrigation water could be supplied from distant water sources. Chili yield exposed to drought was lower, however to some extent, more expensive chili price during drought compensated the relatively lower yield therefore the benefit from the chili farming was no significant difference (Sayaka et al., 2016).

Based on indicators compounding the indicators of resilience index such as: 1) The human resources namely the education level of the husband and wife; 2) The social capitals include access on internet, mobile phone, the participation in farmers' group and water association; 3) The natural resources such as the farmers' unplanted land, unirrigated land during dry seasons and the unirrigated area; 4) Physical conditions namely the land holding, area of the irrigated land, farmers who have access on irrigation, the rainfed area, numbers of farmers who have rainfed land and 5) Finance condition include cash income, income from onfarm, nonfarm and various source of income generating. Each indicator of the resilience was scored from 0 to 100, the higher score means the better resilience. It was reported that the chili farmers in Kediri Regency, East Java Province had a resilience index value of 62.86 (Figure 1). The higher farmers' resilience index was achieved by chili farmers in East Lombok Regency, NTB Province, i.e. 67.49 (Figure 2). Meaning that both provinces have high resilience and could overcome the drought conditions.

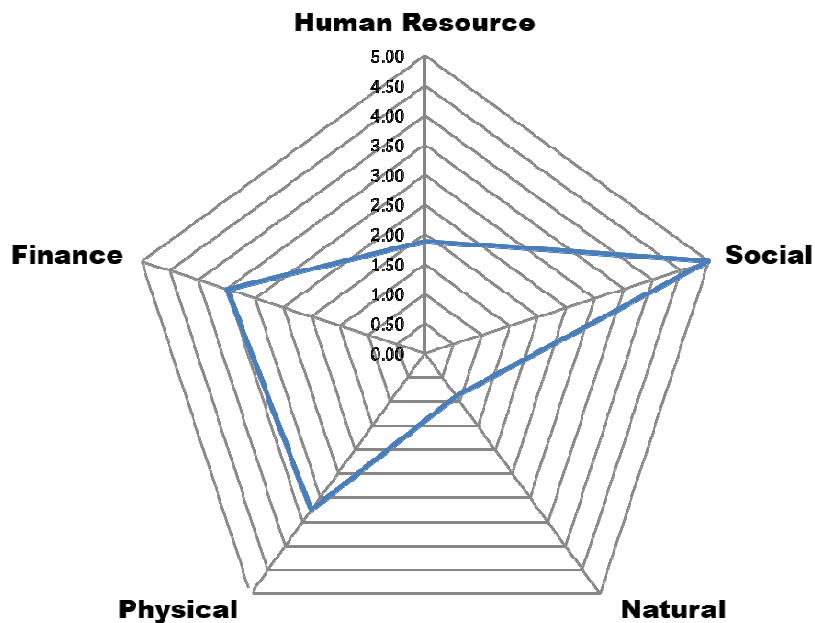
Figure 2: Multi-dimensional Degree of Farmer's Resilience in East Java



Source: (Sayaka et al., 2016:40)

Farmer's resilience index on drought at East Java is 62,8%

Figure 3: Multi dimensional Degree of Farmer's Resilience in West Nusa Tenggara



Source: (Sayaka et al., 2016:)

Farmer's resilience index on drought at West Nusa Tenggara is 67%

2.5.3.Export Market Opportunity

The mapping of export opportunities showed that world chili market was dynamic, as in 2016, the main supplier of chili in the world market were Mexico, Spain, Canada, USA, and Marocco. During 2010–2015, the Netherland was counted in the ten main supplier of chili to the world market, but not in 2016. Indonesia,

however also considered as small chili export in a relatively limited volume. The export even decreased in the average of 0.19%/year of value and 0.25%/year of volume during 2010-2016 (UN Comtrade, 2016). The increasing trend of domestic price of chili has influenced the volume of export during the past few years and that would not be competitive in the world market as the price of Indonesia's chili is higher than that of world market (Darwis, 2011). During March 2018 to March 2019, Central Bureau of Statistics (Badan Pusat Statistik, 2019) reported that the price of chili were decreased about 20-28%. Similar trend also reported by Farid and Subekti (2012).

On chili demand, the largest world importer of chili that imports as high as 1 (one) million tons in 2016 (US\$ 1.6 billion) was the USA. The second to five largest were, respectively Germany, England, France, and Canada. These five countries have shared about 87% of the total import volume of the world market (UN Comtrade, 2016).

The characteristic of the chili products for export market needs standard and certificate as an important reference to measure the quality of product and or services in trade activities. The application of the quality standard is intended for Indonesia's agricultural product in its attempt to be listed in the prime and export market-oriented products and at the same time to list the specific products of Indonesia to be considered in the strategic position of products within the global market. Codex, ISO, and HACCP are among the international quality standards that directed to be met by the local products for export. The products that meet the national and international standard should be well accepted and globally acknowledged for international markets (Kementerian Perdagangan, 2017). This idea is in accordance with IFAD (2003), that it is very important to promoting market access for the rural poor in order to achieve the millennium development goals.

According to Balgah and Buchenrieder (2011) the access to international market is significantly influenced by the constraints faced by the farmers such as uncertain price, unqualified in getting the standard certification, difficulties in implementing the contract, as well as physical aspect such as infrastructure. The performance of chili farmers in Indonesia (Kustiari et al., 2017) could be illustrated in three factors such as technical, economic and social. Technically farmers had not implement yet the recommended technology of Good Farming Practices. Moreover, farmers were not fully meet technical requirements in respect to product characteristics as conditions applied by the importer countries. From the economic point of view, farmers still face problems in making available farm working capital. Farmers are heavily depending on the government's subsidies and capital loan from traders/production input shop with the consequence of high interest rate. Socially, farmers have a lot of difficulties to access international markets due to uncompetitive price leading to selling the products at local/rural level with local traders and or large traders as their trade partners.

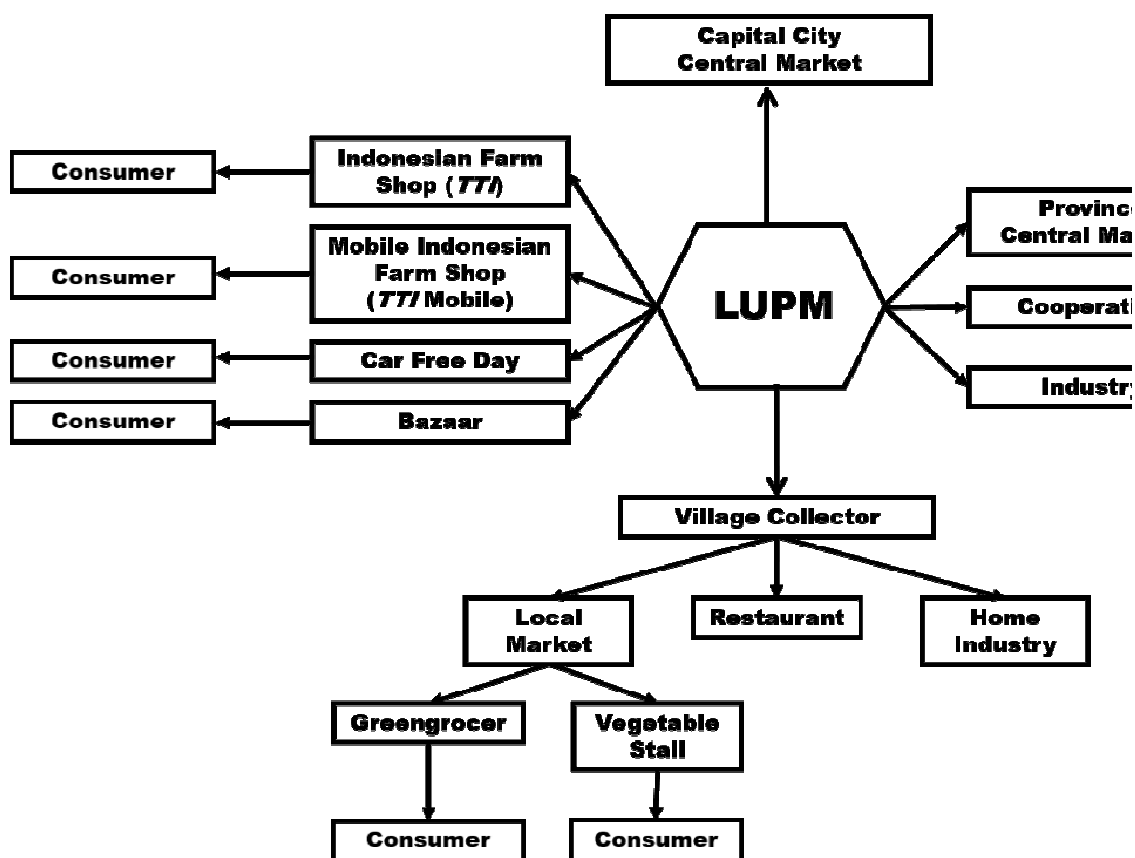
2.5.4. Chili Supply Chain

One of the Indonesian government efforts to achieve the community food security (Kementerian Pertanian Republik Indonesia, 2016)) is the Community Food Business Development (*PUPM: Pengembangan Usaha Pangan Masyarakat*) through the Indonesian Farmers Shop (*TTI : Toko Tani Indonesia*). One of the objectives of the *TTI* is shortening the chili supply chain by directly buy the chili production from the farmers with higher price and sell to *TTI* which 10% lower than the market price

with detail guideline outlined in Agricultural Ministry (Kementerian Pertanian Republik Indonesia, 2017). This effort is carried out because shortening the structure of the supply chain will increase the efficiency of the activities of the farming (Rasoki, 2016) while Ahmadullah (2013) stated that forces of collaboration in supply chain should be done directly with farmers or the *LUPM*.

The existence of *TTI* is very helpful for consumers from the economic aspect because of the lower price and the ease of getting good quality of chili at *TTI* which in 2019 there were 1,562 TTIs spread in 34 provinces (Sulaiman et al., 2018). There are also *TTI* mobile available in certain area, bazaar and car free day. To reach consumers through *TTI* program only need 2 (two) chain from Farmer's Group and *TTI* (Figure 4) compare to other chain such as from *LUPM* to village collectors then local markets and greengrocer or vegetable stall. While the price of *TTI* product were lower than the market price (Darwis,2011).

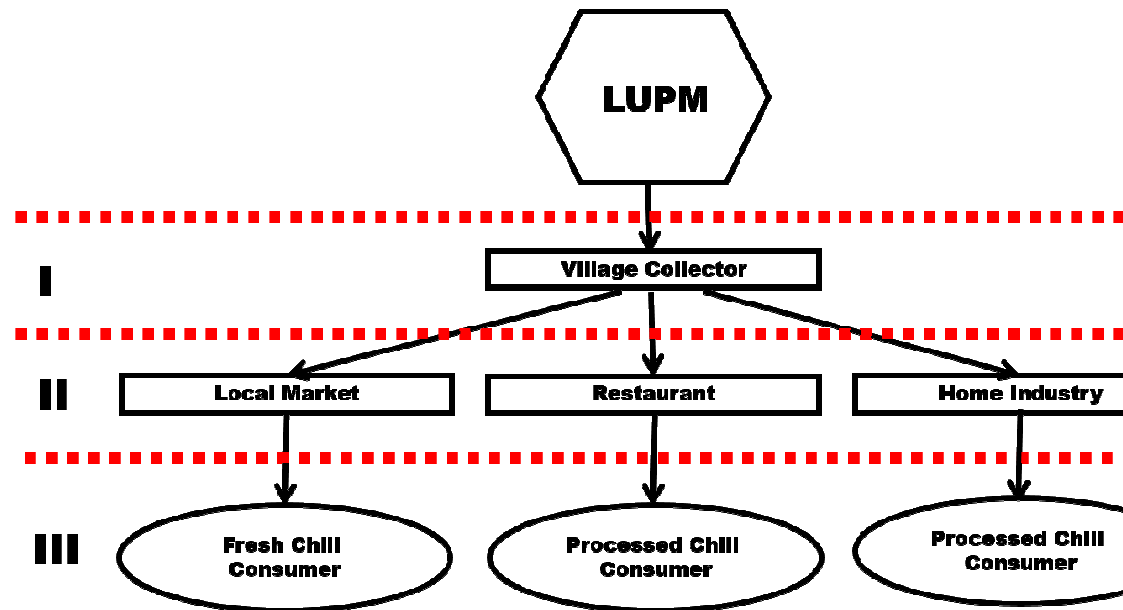
Figure 4: The Existence of *TTI* in the Traditional Chili Supply Chain in entral Jawa



Source: (Primary data, 2017)

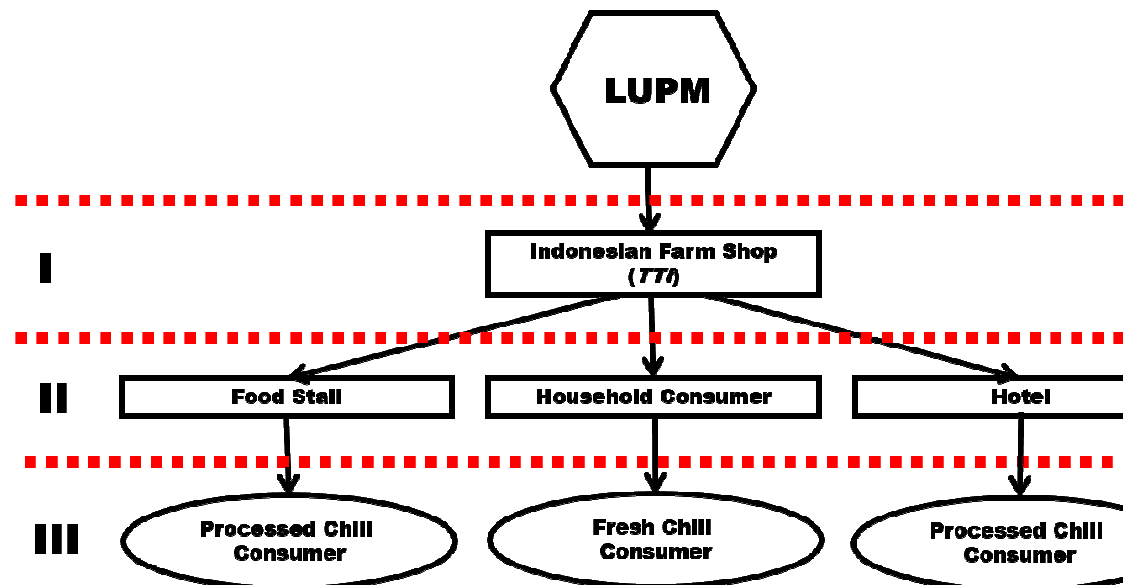
The benefit for the farmers from the existence of *TTI* is to provide more marketing channels so that avoid losses due to unsold chilies. This benefit also recognized by rice farmers' who get *LUPM* program (Anugerah and Wahyuni,2019). This means that government policy to increase the farmers' welfare had successful. The variation of the chili supply chain in different *PUPM* were found as (Figure 5), which need at least three chains for the consumers to get the chili. There will be more chain when the consumers by chili to *warung* or peddle shop. The supply chain from *TTI* illustrate in (Figure 6), its only needs maximum of two supply chain to reach fresh as well as processed chili.

Figure 5: Chili Supply Chain from TTI and Consumer



Source: (Anugerah et al., 2018)

Figure 6: Chili Supply Chain from POKTAN to Indonesian Farm Shop



Source: (Anugerah et al., 2018)

3. Conclusion

From the six national programs, there are three programs that resulted good impact on the chili development, namely Climate Field School (SLI), Annual Water Allocation Forecast (RAAT) and Water Rescue Partnership Movement (GNKPA).

Access of chili to export market constrained by high production input, especially for irrigation and other factors includes thecnical, economic and social factors.

The TTI program significantly shorten the supply chain that help farmers and consumers surround the TTI, therefore the program should be continued and

implemented in other area, especially in areas where the people are less well off or under the poverty line.

4. Policy Implication

Efforts to increase market access to international/foreign market should be continued. The strategy to achieve chili development is implementing, a good farming practice that is integrating the *SLI*, *RRAT* and *GNKPA* supported with the marketing system. Through these efforts the quantity and quality are guaranteed so that they can penetrate the export market.

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