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Model for Empowering Farmers at Dry Land through Quadruple Helix Approach

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ABSTRACT

There are many potentials in the sector of *silvoagriculture*, *silvopastura* and *silvoagrofisery* at Kandri and Cepoko district as “green belt” areas of Semarang. Unfortunately, these potentials do not give a significant impact on society yet. This is due to the lack of farmer’s institution system, limited human resource, and infrastructure. The Triple Helix approach involving academician, businessman, and government is found to be less optimal. The study aims to assess the effectiveness of the model used for empowering the farmers at dry land area through the Quadruple Helix approach as the development of Triple Helix one involving academician, businessman, civil society, and government. The locus of the research area is Kandri and Cepoko district at Gunungpati subdistrict in Semarang City of Central Java Province, Indonesia. This research employed qualitative and quantitative approaches. In the qualitative approach, the data are analyzed using an interactive model. While the quantitative approach, Human Development Index (HDI) analysis is employed. The results find that farmers' empowerment program is conducted through the Quadruple Helix approach by involving academicians, businessmen, local governments and civil society groups at the villages. Then, the HDI calculation results show that the index of human development in Kandri has decreased 0.09444. Before the program, it was amounted from 0.82367 to 0.72923. Whereas, the human development index of farmers in Cepoko before the program has increased from 0.83142 to 0.84085. Its increase reaches 0.09425. This indicates that the farmer group at Cepoko district is more resistant to national economic issues such as the weak exchange rate than the farmers in Kandri district. Therefore, this study makes recommendation that farmers should organize integrated farming by establishing integrated economic region so that they can make use of existing resources efficiently and effectively.

Keywords: Dry land, Farmers Empowerment, Quadruple Helix.

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1. Introduction

Semarang city, the capital of Central Java, has a geostrategic position because it is located on a traffic lane economy of the Java island. Topographically, Semarang is divided into three areas, including coastal

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areas, lowlands and the hilly terrain. However, population growth and the land conversion make farmers are increasingly pressured even though agriculture is recorded as one of contributors to Semarang GDP reaching at 0.97% (Bappeda, 2014).

In accordance with Semarang City Regulation No. 14 in 2011, Gunungpati subdistrict is considered as an area of "green belt" serving as a conservation as well as a balancing region. Geologically, this district has Latosol-kind soil old reddish brown making its soil has the ability to grow annual crops, and good horticulture plants having slopes up to more than 40% at mountainous region.

Cepoko and Kandri district have become the target group of this program because Cepoko village has 258 farmers, 264 laborers and 77 breeders. In Cepoko, there is a land owned by Government usually called *bengkak* land, which is managed as orchards and is also potentially developed as an area of fruit agrotourism.

Table 1: List of fruit trees at Cepoko orchads

No.	Local Name	Scientific Name	Number of Trees
1	Avocado	<i>Persea Americana</i>	12
2	Durian	<i>Durio zibethinus</i> L.	47
3	Pong Longan	<i>Dimocarpus longan</i>	317
4	Kristalin Rose Apple (in Indonesia, it is called <i>Jambu</i>)	<i>Psidium guajava</i> L.	391
5	Honey Soursop	<i>Annona muricata</i> L.	260
6	Srikaya	<i>Annona squamosa</i> L.	12

Source : Soesilowati (2016)

Meanwhile Kandri has a population of 3797 people. Most of the people are 423 farmers, 243 industrial workers, 183 construction workers, 157 entrepreneurs, and the others are traders, private sector employees, civil servants and others. The number of poor families in Kandri is amounted to 28 families- 53 people- and poor families nearly 378 households-1171 persons- (Simgakin of Semarang City, 2013- Simgakin is a system of information and management for the poor). Kandri village community has cultivated various types of freshwater fish to generate supporting income. Currently, there are 20 fishponds in the area of 2 ha of land owned by Semarang city government which is managed by Kelompok Tani Muda Mandiri (in English namely Independent Young Farmers Group). In addition to this additional activity, it is also planted a variety of vegetables and papaya fruit, and some work for breeding beef and dairy farms. Nevertheless, the results of the agriculture and fisheries in these two districts have not been able to be the main income.

Apparently, Semarang local government is more prioritizing the provision of employment in the industrial sectors or factories than that of the primary products – the agricultural one. The farmers are not yet well protected from the fierce competition of global free trade in which making foreign products easily imported to Indonesia. Their products are cheaper and have better quality. Meanwhile, the curriculum of agricultural education alone does not result to competent alumni and is not yet able to accommodate the needs of global agriculture and the latest technology. In fact, farmers are not getting their rights to obtain required knowledge and information, education and training, seed provision, and fertilizer to assure products' quality.

This condition shall not be fully handed over to the government only as a representation of the state, but it requires the intervention of all elements of society. This is very relevant to the opinion of Schumpeter stating that entrepreneurs are the ones playing vital role in growing the economy of a nation. They are innovators in the form of: (1) the creation of new stuff; (B) new ways; (C) new markets; (D) a new source of raw materials; and (e) a new organization system (Suryana, 2000: p.56). Thus, the Law for Limited Liability Company, Investment Law, and the Law on Mineral and Coal, it is mentioned that companies run in the field of natural resources are required to provide Corporate Social Responsibility for surrounding citizens.

A research conducted by *Etty et al (2011)*, shows that the distribution of CSR funds through assistance from technical consultants to implement the concept of One Village One Product, can improve the income of horticulture farmers. Institutions involved in the program are state-owned enterprises, the provincial and local government, and society. Even though this distribution has experienced some constraints such as different cultures of government and private organizations as well as the knowledge of the farmers, the result of the calculation of Benefit Cost Ratio, Return on Investment, and Payback Ratio indicates that the planting of horticultural commodities in dry land is profitable.

Corporate Social Responsibility is an implementation of Law No.23 of 1997 on Environmental Management having three principles namely, the principle of state responsibility, a principle of sustainability, and utility. Referring to *Saidi and Abidin (2004)*, there are at least four models or CSR patterns which are generally applied by the companies in Indonesia:

1. Direct involvement. It means that companies run a CSR program directly with their own organizing social programs or give their contributions to the society without intermediaries. To carry out this task, the companies usually select one of their senior officials such as the corporate secretary or public affairs manager to put CSR as a part of a public relation's official duties.
2. The company's foundation or charitable organization. Company sets up its own foundation under the company or its group. Usually, companies provide the initial funding, routine fund or endowment that can be used regularly.
3. Partnering with other parties. The Company maintains its CSR through cooperation with social organizations or non-governmental organizations, government agencies, universities and the mass media both in managing funds and in carrying out its social activities.
4. Support or join a consortium. Company becomes co-founder and a member or supports for a social institution established for the purpose of a particular social activity.

Currently, Central Java province has the dry land farming which is not yet irrigated and is never facilitated by any agricultural development programs. Then, this dry land is becoming the priority of the government to work on.

Table 2: Dry land in central Java

Width of Dry Land	1,541,853 ha	61.37%
Yard	575,916 ha	22.92%
Moor/Garden	759,028 ha	30.21%
Field	9,587 ha	0.38%
Meadow	2,662 ha	0.11%
Swamp	4,742 ha	0.19%
Fishpond	35,728 ha	1.42%
Dike	2,385 ha	0.09%
Unproductive Dry Land	4,896 ha	0.19%
Community Forest	69,735 ha	2.78%
Government Forest	0	0
Plantation	77,174 ha	3.07%
Others	0	0

Source: Board of Water Resource Management of Central Java Province (2008)

Many strategies have been made by various parties and the government to improve the income of farmers' families in rural areas without changing the existing culture. The strategy that has been developed includes two things, namely on farm and off farm. Model on farm (in agriculture area) should adapt to the change of the environment. One thing that needs to be developed is a model of integrated farming in which combining a variety of ways providing opportunities for farmers in earning additional income from various sources. Sustainable agriculture should respect multicultural environment, maintain biodiversity, respect local knowledge, and use appropriate technology in accordance with the local culture but has a high value added economy.

The other important component is an approach in empowering farmers. According to [Bercovitz and Feldman \(2006\)](#), several countries have adopted the model of Triple Helix to encourage innovation through the concept of institution and policy making. The pattern of Triple Helix interaction is believed to be able to create relationships and interactions between science and technology and to also gather people from various disciplines to participate in the process of information exchange, ideas and concepts. In addition, Triple Helix interaction patterns will facilitate the formation of consensus and commitment that can lead to certain initiatives. Further, Triple Helix model positions three important entities in the commercialization process of innovation such as academicians, governments, and businesses or industries. The relationships between academician, industry, and government can measure to what extent the innovation is created comprehensively ([Loet, 2010](#)). It is also mentioned that intellectual capital can improve innovation capabilities ([Xiaobo, 2013](#)). However, the Triple Helix approach is only appropriate to develop already well-run industry such as certain incubators as mentioned by [Asmoro \(2012\)](#), the approach is not appropriate for farmers' empowerment program.

PT Pertamina Persero has conducted collaboration with Universitas Negeri Semarang (UNNES), Semarang city government, and some community groups (farmers, ranchers and tourism-awareness groups). Through Small and Medium Enterprise Development Programme, UNNES has been trying to optimize the management and to improve the added value of agroforestry products in Cepoko and Kandri. The approach used was the Quadruple Helix. The Quadruple Helix is a development of Triple Helix approach by integrating civil society, innovation and knowledge ([Oscar, 2010](#)). Quadruple Helix innovation theory is a collaboration of four stakeholders, namely: academician, businissman, civil society, and goverment, that play roles to encourage innovation. During this study, PT Pertamina Persero provides fund, while Universitas Negeri Semarang plays a role as consultants. Then, Semarang city government plays role as the land owner, and, last but not least, the community groups plays role as the field managers.

A research by [Mulyana \(2014\)](#) shows that academician and civil society significantly influence activities while government has no impact on activities. Then, academician and businessman are found to significantly influence innovation capability. Meanwhile, creativity has significant impact on innovation capability and competitive advantage.

In fact, the activities of *silvoagrocultura*, *silvopastura* and *silvoagrofisleri*, as part of the activities of agroforestry, are potentials in these two villages. The program has been implemented for over three years and is expected to generate income as the impact due to a change of farmland's function into a reservoir. In particular, this activity has several purposes; (1) optimizing the management of agroforestry sector by applying the technology of cultivation, (2) providing capacity building program and strengthening local institutions in the management of Edutourism and Agrotourism, (3) increasing the value added through technological post-harvest handling, and (4) establishing and developing business partnership from upstream to downstream among communities, universities, private sectors, and government bodies (department of agriculture, department of culture and tourism, department of trade and industry).

Table 3: Roadmap of small medium enterprise development program at Kandri and Cepoko district

Cepoko District (Agrotourism)			
2015	2016	2017	
Optimize the management of agroforestry sector	Improve the added value through the use of technology	Establish partnership of post system	business information
- Fruit Plant Nurseries	- Create appropriate technology for harvest time	- Establish post system	
- Cultivation	- Product Diversification	- Promotion	
- Seed Certification	- Product Packaging	- Fruits Festival	

<ul style="list-style-type: none"> - Making Organic Fertilizer - Making Organic Pesticide <p>Improve capacity and strengthen farmer groups</p> <ul style="list-style-type: none"> - Training for Nurseries and Seed Certification - Training for Maintenance and management of Crop Pests - Training for organization, Financial, and Marketing Management - Establish Joint Business 	<ul style="list-style-type: none"> - Create brand/ trademarks - Supply modern market <p>Improve capacity and strengthen farmer groups</p> <ul style="list-style-type: none"> - Training for Agrotourism Management - Training for Business Management - Training for Processed Product Marketing
Kandri District (Edutourism)	
2015	2016
<p>Optimize the management of silvoagrofishery sector</p> <ul style="list-style-type: none"> - Breeding for carp, catfish, and <i>Patin</i> - Planting organic vegetables <p>Improve capacity and strengthen farmer groups</p> <ul style="list-style-type: none"> - Breeding of Dairy Cattle - Training for sytem of fish farming, organic vegetables, and dairy cattle - Training for maintenance for infrastructure - Training for organization, Finance, Marketing, and Edutourism Management - Training for guide 	<p>Establish business partnership</p> <ul style="list-style-type: none"> - Promotion - Creating tourism packages and outbond - Making souvenirs - Facilitate and develop local art and culture <p>Improve the added value through the use of technology</p> <ul style="list-style-type: none"> - Diversification for Dairy Products - Making biogas
2017	

2. Method

Program of empowerment is designed for three years by involving community groups from horticulture groups, fish farmers, breeders, and Aware for Tourism groups (in Indonesian it is called Sadar Wisata Group). The involvement of society in Small and Medium Enterprises Development Program is illustrated in Figure 1.

Once all the activities of empowerment programs accomplished, evaluation is conducted. In this study, the evaluation employes qualitative and quantitative approaches. In the qualitative approach, the data are analyzed using interactive model (Bogdan, R.C. & Biklen. 1998). While in the quantitative approach, it uses the Human Development Index (HDI) analysis.

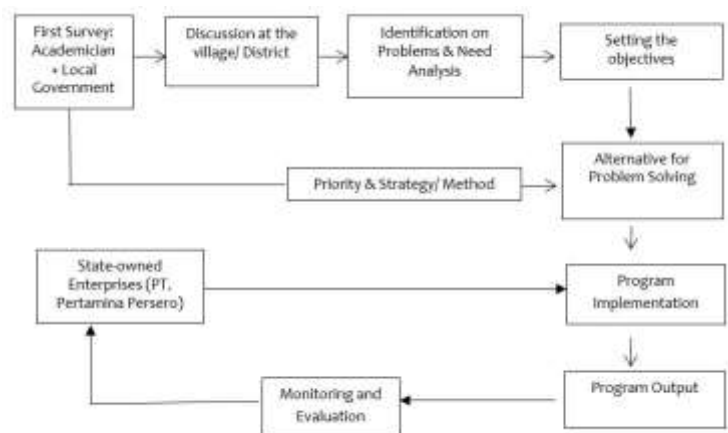


Figure 1: Program's Cycles of Farmers' Empowerment at Dry land

HDI is conducted by calculating the composite index of life expectancy, education index and the index of purchasing power parity. In calculating the HDI for small scale (sub-district / district), a nonparametric approach is employed involving method of Small Area Estimation (SAE) or a simpler method showing the ratio between the sum of the number of census for prosperous

and underprivileged communities with a total of censuses in a region. In counting the HDI, as the impact of the empowerment program of activities for dry land farmers, we use three variables as the composite of HDI calculation. Then, the three variables involving the life expectancy index, education index and the index of real consumption per capita are adjusted. To collect the data, we use some techniques: (1) in-depth interviews; (2) observation; (3) Focus Group Discussion; (4) questionnaire distribution; and (5) documentation.

Table 4 and Table 5 show the calculation of the HDI value of farmers' groups members as the samples in the district of Kandri before and after the program, while table 6 and table 7 illustrate Cepoko district.

Table 4: The calculation of HDI value of farmer's group in Kandri prior to the program

Number of Life Expectancy	66	Index of Life Expectancy	0.68333
Number of Literate	100	Index of Education	0.83711
Number of Time for Education	7.67	Index of Consumption/ Capita	0.95058
Number of Real Consumption /capita	1,118,795	HDI	0.82367

Table 5: The calculation of HDI value of farmer's group in Kandri after the program

Number of Life Expectancy	67	Index of Life Expectancy	0.7
Number of Literate	93	Index of Education	0.79777
Number of Time for Education	8	Index of Consumption / Capita	0.94285.7
Number of Real Consumption /capita	894,285.7	HDI	0.72923

HDI ≥ 0.90 Indeks of Human Development is high; HDI $\geq 0.5-\leq 0.89$ Indeks of Human Development is moderate/sufficient; HDI ≤ 0.49 Indeks of Human Development is low.

Table 4 shows the difference in value of the HDI of 0.09, where the value of the HDI before the project is higher than that of the value of the HDI groups after the program. Its decline in the value of the HDI is still in the same range-in the category of moderate / sufficient. However, this does not mean that the Small Medium Enterprise Development Program is considered to bring negative implications on the progress of regional development and beneficiary groups. The most influential finding is the decline of consumption and purchasing power of respondents or farmer group members in meeting their daily needs. It is indicated that this situation is influenced by national issues happening in the year after the implementation of the program. It is due to the weakening of the rupiah has led to weaken the national economy including the purchasing power of the people. This condition shows that the farmers' group members in Kandri are very vulnerable to the issue of the national economy. Therefore, the expansion of the community economy region is expected to have sustainability by providing programs for strengthening the capacity of farmer groups in order to be resistant to such issues over the macro economy.

Table 6: The calculation of HDI value of farmer's group in Cepoko prior to the program

Number of Life Expectancy	83	Index of Life Expectancy	0.96666
Number of Literate	93.75	Index of Education	0.78750
Number of Time for Education	7.3125	Index of Consumption/ Capita	0.74010
Number of Real Consumption /capita	937,500	HDI	0.83142

Table 7: The calculation of HDI value of farmer's group in Cepoko after the program

Number of Life Expectancy	84	Index of Life Expectancy	0.98333
Number of Literate	93.75	Index of Education	0.93750
Number of Time for Education	7.3125	Index of Consumption/ Capita	0.48750
Number of Real Consumption /capita	947,500	HDI	0.84085

HDI ≥ 0.90 Indeks of Human Development is high; HDI $\geq 0.5-\leq 0.89$ Indeks of Human Development is moderate/sufficient; HDI ≤ 0.49 Indeks of Human Development is low.

Meanwhile, the results of calculating the value of HDI farmer groups in Cepoko show that the Small Medium Enterprise Development Program has a positive impact on improving people's welfare, especially members of farmers as direct beneficiaries of the program. However, the increase in the value of the HDI after the program has not been significant with an increase of 0.01. Such insignificant increase is due to the short periode in conducting the program so that there is only a few economic activities which are running. Another positive impact is the farmer group at Cepoko is found to be more resistant to national economic issues such as the weakening of the rupiah. Nonetheless, the facilitation for activities and sustainability of the program require to be conducted, especially in terms of improving economic activity to make the HDI of farmer groups significantly increase.

Therefore, the Small and Medium Enterprises Development Program has different implication on the two different locations influenced by the ability and endurance of farmer groups in facing issues over the macro economy. So that, in planning the projects, there is a need to take account of external or macro factors into account as it could potentially affect positive impact of the program. Besides, the results of HDI value in both locations are counted based on a micro scale using a quite few samples by involving the members of farmers as the respondents. Hence, the calculation results do not comprehensively reflect the value of the HDI regionally as it does not describe the whole development progress of Semarang city in general.

3. Analysis and discussion

To see the implications of farmer empowerment program takes a long time because it involves the process of re-education, persuasion and facilitation for the target groups. The process of re-education concerns with rational justification for the undertaken actions. Hence, the segmentation of the target groups becomes essential to do. While the process of persuasion is aimed to convey a message through structuring the change of the behavior. Then, the facilitation process basically has three directions: first, being pros for the poor and providing empowerment for them (pro-poor); second, the management of regional development by developing the role of society, academician, private sector and local government; and third, sharpening the modernization and consolidating structural change towards socio-economic and cultural conditions in local communities. Empowerment action is expected to create a sustainable process through: (1) the convergence process; (2) the process of synergy among development actors; and (3) the process of cybernetic.

The process of empowerment should not be completely handed over to the government as a representation of the state, but it requires the intervention of all elements of society. This is very relevant to the opinion of Schumpeter stating that entrepreneurs are the ones who trigger the economic growth of a nation. They are innovators in the form of: (1) the creation of new stuff; (B) new ways; (C) new markets; (D) new source of raw materials; and (e) a new organization system (Suryana, 2000: p.56). Society requires institutional systems and technology to help the needy and powerless ones (Listya Cahya, 2016). Cepoko and Kandri communities only need a technology for post-harvest management so that the products can have higher added value.

Psychologically, the group system at the local level gives strength to its members and increases the participation of the members in achieving common goals. Institution or group is a vehicle for realizing the goal, a platform for having brainstorm and sharing information. Participatory development is potential to develop leadership and to guarantee sustainable prosperity (Brian D. christens, 2012).

Small and Medium Enterprise Development Program through Quadruple Helix approach does not only require coordination between the involved actors, but it needs also a mixed method in its implementation. Top-down method is in the form of local government regulations to redistribute the income from the rich to the poor as well as to provide legal certainty and to create conducive environment during the implementation. Meanwhile, the bottom-up approach is used to gather the aspirations of the community to create program based on the need. This is in line with the results of the

study conducted by Alphonsus O. Isidiho and Moh. Shatar (2016) related to evaluation of rural development programs involving low educated people in developing countries.

Finally, Small Medium Enterprise Development Program may not be sustainable without the involvement of beneficiary communities, academicians and entrepreneurs. Academicians are obliged to transfer technology while entrepreneurs provide funds as a form of social responsibility to the community and it could be in the form of business incubator so that the process of convergence and synergy among development actors and beneficiaries can occur well (Dwi, 2014).

4. Conclusion and recommendation

Based on the results of the evaluation of development activities of dry land farmers, it can be concluded that; first, Small Medium Enterprise Development Program is conducted by involving academician, private sector, government and beneficiary; second, HDI value of Kandri before the implementation of the program is less than that of after the program due to the weakening of the rupiah during the program implementation, and it has led to the lower purchasing power of the society; third, HDI farmer groups in Cepoko after the Small Medium Enterprise Development Program is higher than that of prior to the program.

Having said this, some recommendations can be offered to the government such as to establish the centers of agriculture-based rural economic growth through Small Medium Enterprise Development Program which is integrated from upstream to downstream, to strengthen the local institutions, to create cluster for better assistance and capital facilitation so that the quality, quantity and the continuity of the products are assured and efficient. The combination of integrated farming with Quadruple Helix approach can be implemented.

Small Medium Enterprise Development Program implies differently in both locations. So that, in the upcoming development program, the preparation process of planning of the programs, the external factors or macro factors need to be taken into account because they could potentially affect the positive impact of the program. Besides, in this research, the value of HDI result is still at micro scale involving a few samples of members of farmers. So that, the calculation results do not comprehensively reflect the value of the HDI regionally because it does not describe the whole development progress of Semarang city in general.

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