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Farmer Empowerment Model for Climate Change Anticipation

Efriyani Sumastuti [1]✉, Nuswantoro Setyadi Pradono [2]

[1] Faculty of Economics and business, University of PGRI Semarang
[2] Policy analyst at the Regional Secretariat of Central Java Province

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Abstract

The purpose of this research is to arrange an empowerment model for farmers of prime food crops in order to anticipate climate change in Central Java. The data used are primary ones collected through in-depth interviews with key persons and via Focus Group Discussion (FGD), which later went through Analysis Hierarchy Process (AHP). To formulate an empowerment model for farmers of prime food crops, reconstructions of existing field findings were performed based on FGD results and in-depth interviews with key persons and several related institutions. The results of research showed that in order to anticipate climate change, there are three main priorities that should be taken. They are: (1) to conduct anticipations towards climate change; (2) to deliver aids in production technology in accordance with the ocurrence of climate change and (3) to deliver information regarding planting time and types of crop.

✉ Alamat korespondensi :
FEB UPGRIS
Jalan Sidodadi Timur No.24, Semarang, Jawa Tengah, Indonesia
E-mail: efrisumastuti@gmail.com

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INTRODUCTION

Indonesia is located precisely across equatorial axis in which the complexity of weather parameter changes in indonesia is different from other countries located in subtropics territories with much predictable changes. Second, a combination of land, sea and two oceans surrounding Indonesia had contributed to complicated predictions, both in terms of atmospheric information and wind characteristics. Climatology experts mention that Indonesia had three different variations of climate and they are known as the patterns of monsunal, equatorial and local. Third, this complexity had worsen due to the impact of climate shifts caused by global warming (Strategic Plans Of Indonesian Agency For Meteorological, Climatological And Geophysics, 2010). One of the sectors which is directly affected is farming, since it is very dependent on climate.

Central java is one of food center areas in Indonesia. The prime food crops in central java according to Susilowati (2009), is rice, maize, soya and horticultures (vegetables). The study had been the basis in the determination of commodity types for this research.

Generally, the subjects in agriculture sector (farmers) had not yet optimally utilized information regarding climates. The management is based on habits. This resulted in acquired losses, such as crop failures due to the flood, drought or certain pest attacks. Therefore, the farmers need some empowerment in order to be capable of managing natural resources more intensively.

Along with the ocurrence of changes in distribution pattern of rainfall, seawater temperature and seawater level as the indicators of climate change, half of the community whose social and economics life depends on natural resources had became more and more uncertain. Farming sector would be affected by the decrease of food productivity caused by the increase of cereal sterility, the decrease of irrigable lands and the decrease of nutritional absorbtion efectiveness and the spread of pest and disease.

Indonesian Agency for Meteorology, Climatology and Geophysics (badan Meteorologi, Klimatologi dan Geofisika, or simply BMKG) periodically had delivered weather/climate information to the Department of Agriculture at the local area, but it can be said that the acceptability level is still low. This can be proven by farming activity which is still following habit-driven planting pattern in dry or wet season and had obtained very minimal yields. The purpose of this research is to arrange an empowerment model for farmers of prime food crops in Central Java province in order to anticipate climate change.

METHOD

Weather and Climate

Weather is the condition of atmosphere at a whole in a specific time, including changes, development and the disappearance of a phenomenon. Besides that, weather is also the condition of atmosphere represented by the values of many parameters, such as temperature, pressure, wind, humidity and various rain phenomena at a location or territory during a short period of time (minute, hour, day, month, season, year).

Climate is defined as a synthesis of weather events during a long period of time, which is statistically quite usable to show different statistic values for every condition in any time. Moreover, climate is also a statistical probability for many atmospheric condition, such as temperature, pressure, wind, humidity which happens in an area during a long period of time.

While the definition of climate change is the change in physical condition of earth atmosfer, among others are temperature and rainfall distribution which brought broad impact to many life sectors of mankind. This physical change not only happen for a while but also for a long period of time. Climate change is average change in one or more weather elements on a certain area. The term "global-scale climate change" is climate change with reference to the area of the earth as a whole. IPCC (2001) stated that climate change refers to the average variation of climate condition in an area or at statistically real variability for a long period of time (usually a decade or more). Moreover, it is also clarified that climate change is possibly caused by internal nature process or existing external force, or human acts that constantly change the

composition of atmophere and land use management.

The term "climate change" is oftentimes used interchangeably with term "global warming", whereas global warming phenomena is only a part of climate change, because climate parameters do not only consist of temperature, but also other related ones such as precipitation, cloud condition, wind and even solar radiation. Global warming is average increase of temperature in the atmosphere close to the earth surface and in troposphere, which might contribute to the changes of global climate pattern. Global warming occurs as a result of the increasing number of greenhouse gas emissions (Gas Rumah Kaca or simply GRK) in the atmosphere. The rise in the intensity of greenhouse effect occurs because of gasses in the atmosphere that absorb heat rays, namely, infrared rays emitted by the earth. These rays caused changes in global climate.

Although global warming is only a part in climate change phenomenon, it becomes one important matter to study. This is because temperature changes would bring significant impact to the human activity. The changes of earth temperature could change the environmental condition which on later stage would affect the location where people could live. This means that global warming will be a threat to people's lives as a whole.

Currently, flooding is an issue that is also a major concern in many regions of countries. This issue had worsened due to the changes of global climate. Some climate projection models had predicted that greenhouse effect would affect hydrology cycle. High volume of rainfall would directly affect the widespread of flood inundation areas in lowlands. Conversely, drought would affect drylands and highlands. Drought is another issue feared to be a bigger one for many countries. A study which was conducted in Indonesia to find out the rise of CO2 and its effects on three river-flow areas (Daerah Aliran Sungai or simply DAS) which are densely populated and are strategic food producers, namely DAS Citarum, Brantas and Saddang had predicted the occurrence of larger runoff, bigger scale of land erotion and lower productivity. Climate factor also had determined drought condition on forests. Drought is expected to occur more frequently due to the rise of air temperature and the increase in probability of extreme climate occurrence, thereby increasing the probability of forest fires as well.

The essence of farming sector vulnerability is the risk faced by that sector. The risk in this regard is the disaster caused by changes of climate and weather. Several disaster indicators can be obtained through secondary data, such as meteorology data showing the frequency of rainfall that occurred, whether the wet season is delayed or not. The analysis of the risks that occur will show how sensitive the sector to the changes of weather that occur and the ability of farming sector to adapt.

Empowerment

The meaning of community empowerment actually refers to the fact that empowerment is an effort to actualize potentials possessed by community. In order to develop the farmers of prime food crops, the emphasis is on the importance of an independent local community as a system to organize themselves. Such a community empowerment approach is certainly expected to give a role to an individual, not as an object but as a subject (actor) that determines their groups (Sudantoko, 2010).

Later on, this human-centered community empowerment approach is the basis for the insight into the management of local resources which is a planning mechanism for people-centered development that puts emphasis on social learning technology and program formulation strategy. As for the goals to achieve is to increase the capability of community in actualizing themselves (empowerment). In this regard, Sudantoko (2010) puts forward the characteristics of local resource management approach which is based on community that includes:

1. Decision or initiative to fulfill the needs of local community is made locally, by a community that possesses identity and its role is recognized as the participant in the process of decision making.
2. The main focus on the management of local resources is to strengthen poor community in directing existing assets on local community to fulfill their needs.

3. A great tolerance toward the existence of variation, thereby recognizing the meaning, individual choice and recognizing decentralized process of decision making.
4. The culture of organization is marked by the existence of autonomous and independent organizations which orient one another to provide implementation feedbacks for self-correction in every level of organization.
5. The existence of coalition and communication networks between the actors and autonomous, independent local organizations that includes the beneficiary groups, local government and so on, which becomes the basis for all activity directed to strengthen supervision and ownership of community toward many existing resources and the capability of community to manage local resources.

Adaptation towards environment is formed from repeat actions and is an adaptation to the environment. Sudantoko (2010) and Edy Mulyono (2011) mentioned adaptation as follows: "…….refers to coping mechanism that humans display in obtaining their wants or adjusting their lives to the surroundings milieu to their lives and purposes". These repeat actions would form two possibilities. They are successful adaptation acts as expected, or conversely, acts that failed to meet the expectation. Failure of an action will lead to continued stress, which affects the condition of the individual as well as on responses or individual response to the environment. Conversely, when an action is successful, there will be some individual adaptations to the environment. The success in choosing this action is a strategy of human adaptation which in turn will became a social norm.

The most important thing in an empowerment is active participation in every process of decision making. A choice of action in resource utilization is considered appropriate if the action perceived benefits him. This is based on profit/loss calculation in order to fulfill tiered needs which is performed repeatedly. Those choices of action are very dependent on how a human made a perception towards his environment.

The empowerment and participation are very potential strategies in order to increase economics, social and cultural transformation. This process will eventually be able to create a more community-centered development, according to Uphoff (2003). Empowerment is defined as follows:

Empowerment is particularly challenging because of inherent ambiguity and exclusiveness of what is to be measured. It can be argued with justification that empowerment does not really exist in its own right, that is really a reflection of other things that do exist. While this does not mean that we can not measure empowerment. 'Power' to identify what are kinds of power bases proposed by political scientists and economists over many years. He concluded there are six categories of resources or assets that can be accumulated and utilized to achieve objectives (1) economics; (2) sosial; (3) political; (4) informational; (5) moral; and (6) physical.

Community empowerment is capacity process or the development of human resources. By acquiring capacity, someone will have strength (power) or legally recognized authority, such that he would not be set aside (Susilowati, 2009).

Methodology

The research was conducted in Central Java province. The selection of research location was performed with *purposive cluster sampling* method with a goal to formulate an empowerment model for farmers in regions having clusters of prime food crops. To formulate an empowerment model, FGD (Focus Group Discussion) or in-depth interviews were conducted with stakeholders. The results of FGD and in- depth interview with keypersons and several related institutions were later analyzed with AHP (*Analysis Hierarchy Process*).

RESULTS AND DISCUSSION

Based on FGD results and in-depth interviews with keypersons, the results of AHP analysis regarding the empowerment of farmers are later formulated into an empowerment model to anticipate climate change in Central Java, as shown in Figure 1. The model is a finding and as a suggestion for empowerment process. The relations among the roles of every stakeholder in the effort to increase empowerment of prime food crop farmers to anticipate climate change are as follows:

1. Farmers of Prime Food Crops

Farmers as the actors play a very important role (key holder) in an effort to empower themselves. In order to empower them, motivations and benefits from many opportunities and facilities provided by stakeholders needs to be given because without the participation of farmers - either individually or in groups - will lead to the failure of any effort to increase empowerment.

2. Government

The role of government to grow and increase the empowerment of farmers is very important with policy in favor of the management of prime food crops. Government had facilitated farmers by binding partnerships with stakeholders associated with agriculture crops. Besides that, government also had conducted trainings through Department of Agriculture and Horticulture and provided funds to manage farming.

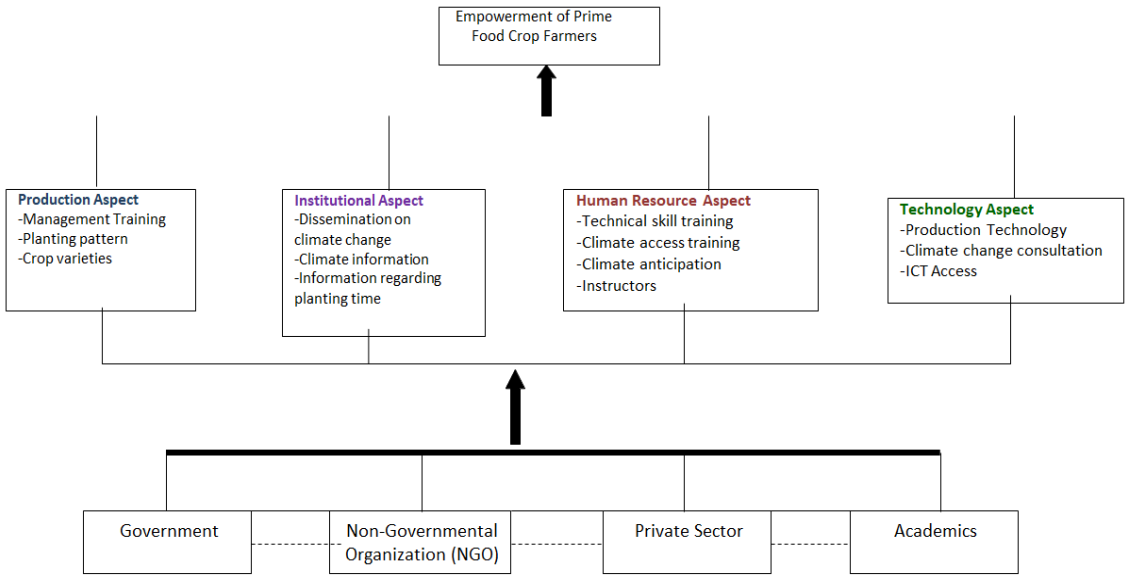

Figure 1. An empowerment model for farmers to anticipate climate change in Central Java
Source : Processed primary data (2014)

3. Academics (College)

College plays the role as business development consultant in many aspects, such as: management, production, market and marketing. Academics collaborate with government through Community Empowerment Board (Badan Pemberdayaan Masyarakat or simply, Bapermas) or other parties to conduct trainings associated with business development. Academics can work together with NGO and Government to provide mentoring. They can also conduct studies and production technology development to anticipate climate change.

4. NGO

The role of Non-Governmental Organization or NGO (Lembaga Swadaya Masyarakat or simply, LSM) is performed through the enhancement of human resource with human resource development programs and to facilitate ICT access to anticipate climate change. Moreover, NGO can conduct supervision towards the implementation of government policies in an effort of development.

5. Private Sector

The role of private sector such as business people and State-Owned Enterprises (Badan Usaha Milik Negara or simply, BUMN) in increasing the empowerment of farmers to anticipate climate change, especially to provide assistance in business consultation and CSR (Corporate Social Responsibility) Program, particularly ones related with climate change.

Empowerment model for farmers based on production aspect

Farmer empowerment to anticipate climate change based on production aspect can be conducted through production management training and the determination of planting pattern and crop varieties suitable with climate conditions that occur. Based on Figure 1, if seen from

production aspect only, then the empowerment model can been seen in Figure 2.

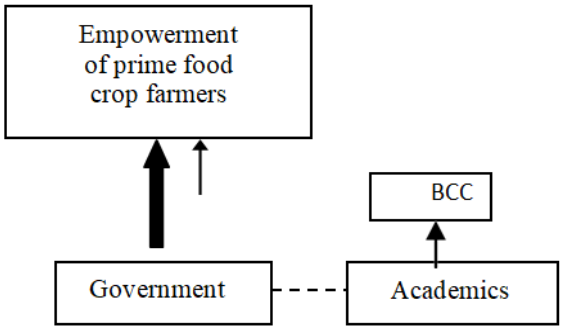

Figure 2. Farmer empowerment based on production aspect

From production side, trainings can be conducted by government in collaboration with academics. To reactivate Business Consultation Clinic (Klinik Konsultasi Bisnis or simply, KKB) which is facilitated by academics in empowering the farmers. Moreover, in order to anticipate climate change, government – in this case, related department – provides information regarding planting patterns and crop varieties suitable with climate condition and conducts production management trainings.

Empowerment model for farmers based on institutional aspect

Farmer empowerment based on institutional aspect, in particular to anticipate climate change is performed via dissemination programs and information delivery related to climate change and its connection with the management of food crop production. Institutions related to the matters above are in Figure 3.

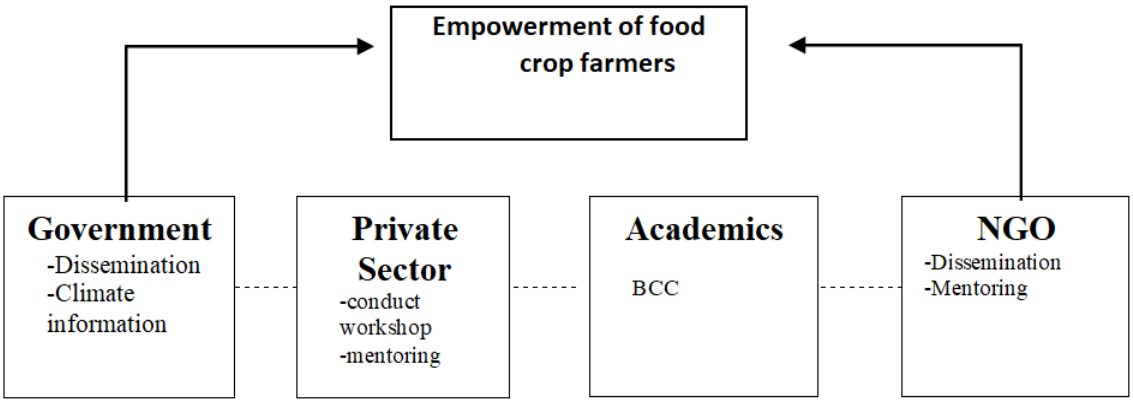

Figure 3. Farmer empowerment based on institutional aspect

Empowerment model for farmers based on Human Resources

Farmer empowerment model to anticipate climate change based on human resource aspect can be seen in Figure 4. From that figure, it can be elaborated that from human resource side, in order to anticipate climate change, education and training are needed. The process of education and training can be divided into two. They are:

1. Formal education and training

This type of education is more binding, both of time and materials provided. Generally for formal education, the curriculum had been determined by provider, in this case, it can be government, college (state-owned and private) and private sector.

2. Non-formal education and training

Non-formal education and training can be conducted by government, college (state-owned and private), private sector, NGO or community of farmers (farmer group) in the form of learning by doing. The competent parties can work together to decide the type of training that is required. Several types of required training, among others, are regarding:

a. Technical skills
b. Climate information access
c. Climate anticipation

These trainings aim to decrease losses due to climate change in the management of food crop production.

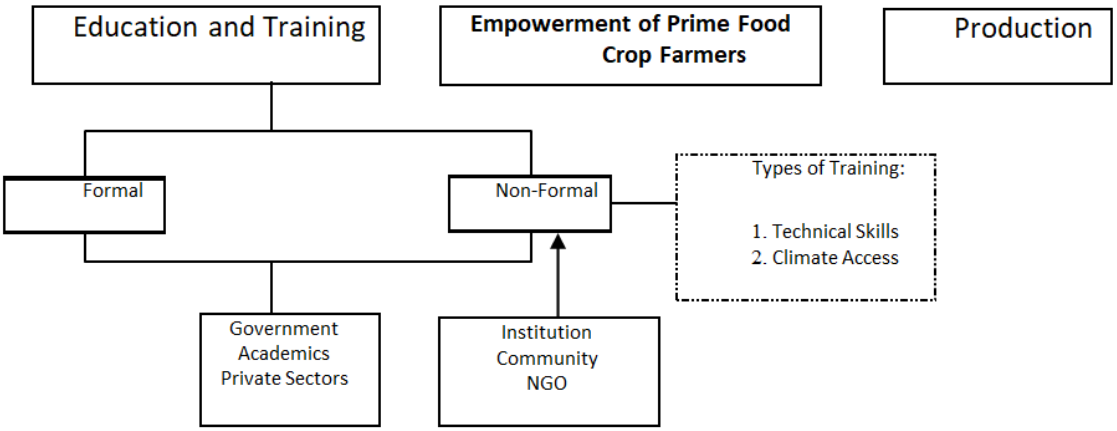

Figure 4. Farmer empowerment based on human resource aspect

Farmer empowerment model based on technology aspect

Farmer empowerment model based on technology access can be seen in Figure 5.

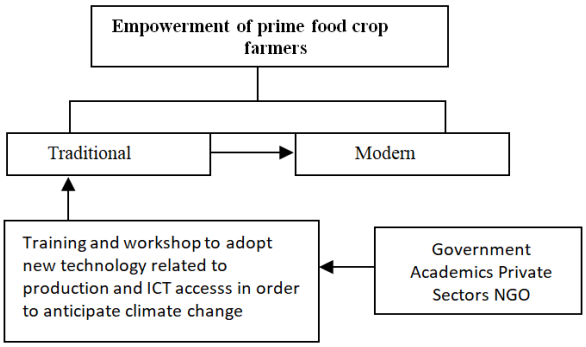

Figure 5. Farmer Empowerment Based On Technology Aspect

From technology aspect being used, this can be divided into two:

1. Traditional technology

Generally, in product management, farmers still use traditional technology. Therefore, empowerment process in technology access still need some trainings to be conducted on how to adopt the existing new technology. This technology is certainly related to production process and anticipation to climate change.

2. Modern technology

To move from traditional technology to modern one, the supports from related institutions are needed. Generally, infrastructures and the readiness of human resources are required in order to access that modern technology.

CONCLUSIONS

Farmer empowerment to anticipate climate change is supposedly conducted with three main priorities. They are:

a. To conduct anticipations towards climate change
b. To provide aids in production technology in accordance with the occurrence of climate change
c. To deliver information regarding planting time and types of crop

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