

Potential Sustainability of “Kampung Iklim” Program in Surakarta Municipal

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Abstract. Revolution 4.0 is one global transformation impact on increasing greenhouse gas (GHG) emissions, climate change problems. Climate Change is one of the global issues of concern and is included in the objectives of the SDGs (Action on Climate Change). Data from the Strategic Environmental Assessment (KLHS) of Surakarta, Climate Change as one of the strategic issue factors in sustainable development in Surakarta Municipal. This research aims to identify variables indicators that influence the potential for sustainability of the “Kampung Iklim” Program in Surakarta Municipal. This paper is a literature study, observation and interview key person in the field. Approaches with Social, Ecology and Economic aspect to measure sustainability “Kampung Iklim” Program in Surakarta Municipal.

Keywords: Revolution 4.0 ; Climate Change; Sustainability; Kampung Iklim Program; Indicator.

1 Introduction

Surakarta Municipal, or better known as Solo or Sala, is one of the cities located in the Central Java Province. The area of Surakarta Municipal reaches 44.06 km² with an altitude of ± 92 m above sea level. Surakarta Municipal consists of 5 sub-districts and 51 sub-districts. The city of Surakarta in the past was the center of activity for the region known as the Surakarta Residency. The region has now been divided into several cities/districts by consistently making Surakarta Municipal the center of its activities both for business interests, service provision, education, and health.

Industrial revolution era 4.0 more and more sophisticated technological innovations from physical, digital, biological. Environment is one of the global issues from the impact of revolution transformation era 4.0. Revolution era 4.0 must be able to overcome global challenges in the field of environment, one of which is to limit impact climate change from greenhouse gas (GHG) emissions and support sustainable development.

Data from the Strategic Environmental Assessment (KLHS) Revision of the Spatial Planning (RTRW 2017) of Surakarta Municipal, disaster risk and climate change issues, namely the occurrence of changes in microclimate, and GHG emissions is one of the strategic issue factors in sustainable development in Surakarta Municipal [1]. The 2012 PRAKLIM - GIZ Study Report has 4 phenomena of climate change in Surakarta that occur increase rainfall and temperature, health problem (increasing population of agepty aedes mosquitoes), phenomenons of increased hurricanes and tornadoes [2].

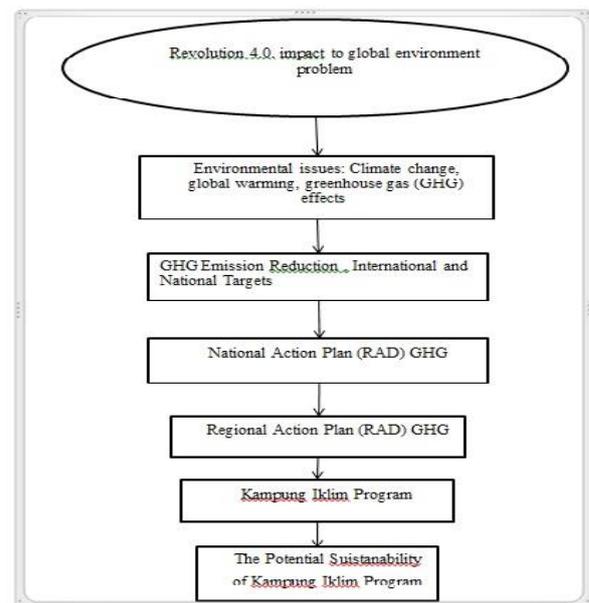


Fig. 1. Framework Research

2 Research objectives and Method

This research is a literature study and observations in the field include a review of secondary data obtained from various literature, documents, books, journals and scientific works that have to do with the issues discussed, then combine with the results of primary data from observation results by observing the conditions in

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field and interview to key person in DLH Surakarta municipal, Chair of local working group. Location of this research is several Kampung Iklim in Surakarta municipal such as Sambirejo, Kadipiro, Mojosongo. This research aims to identify indicators that influence the potential for sustainability of “Kampung Iklim” Program in Surakarta Municipal.

3 Literature Review

3.1 Climate Change

Climate Change is one of the global issues of concern and is included in the objectives of the SDGs (Action on Climate Change). Based on [3] the opinion of Francis (2014) climate change is a change in the statistical nature of the climate system in the form of changes in Earth's weather including changes in temperature, wind. Climate change directly has a negative impact on humans and the surrounding environment, so climate change is the focus of all parties to overcome it. The United Nations Convention on Environment and Development (UNCED Earth Summit, 1992) states that global environmental damage is getting worse, ozone depletion results in increasing penetration of ultraviolet light to the earth to harm humans, and more and more flora and fauna that is extinct due to global warming and climate change. Greenhouse gas (GHG) is one type of emission that impacts directly on the environment. Increasing the concentration of greenhouse gases in the atmosphere triggers the effect of greenhouse gases, namely an increase in global earth temperature and encouraging the phenomenon of climate change (climate change). To deal with the problem of climate change, an international agreement was made in the field of environment. This international agreement is the Kyoto Protocol Agreement. The Kyoto Protocol is a reflection of the desire of the world community to reduce greenhouse gases that occur in the atmosphere which every day is increasing. The aim of the Kyoto Protocol is to ensure that the participants of this agreement regulate their greenhouse gas (GHG) emissions so that they can be reduced by at least 5% in the period 2008-2012 [4].

According to [5] Climate change is very direct influence on the agricultural sector, as evidenced at the present time the emergence of extreme weather, the length of wet and dry months that are not predicted, until drought hit many places. So that the adaptation of climate change must be done by farmers and the community to meet food needs. Organic farming does not only function as an effort to provide food, but also an agricultural approach that can run sustainably that is able to support environmental, economic and sociocultural aspects.

3.2 Sustainability City

Based on Government Regulation number 26/2008 about National Spatial Planning, sustainable development has three dimensions. First, the sustainability of economic growth that must be carried out effectively with the

principles of community, government and business. Second, the sustainability of socio-cultural which are the values are formed according to the role of climate and political stability. Third, sustainability of environment (ecology) where the existence of harmony between human and ecosystem (natural environment and unnatural environment).

The principles of ecologically, socially and economically sustainable development by ensuring environmental health, making effective and efficient use of water resources, energy, reducing waste production and implementing a low-emission integrated transportation system.

3.3 “Kampung Iklim” Program

“Kampung Iklim” Program is a certification programme initiated by the government to increase the participation of local communities in implementing actions in the field of climate change mitigation and adaptation. Moreover, it's designed to raise local awareness of climate change issues and encourage local implementation of mitigation and adaptation measures. These will lead communities to be less vulnerable and be more resilient to climate change disaster [6]. Building community-based climate resilient villages is the goal of “Kampung Iklim” Program, and based on an argument by [7] that a community with adaptive governance characteristics will become resilient, the research main question of this paper seeks to answer the question: what is the main characteristic of adaptive governance in building resilience in PROKLIM villages. This study type model was applied to each indicator of three adaptive governance variables. The three variables are polycentric institutions and networking, participation, and learning and innovation.

Based on Government Regulation Number PI / PP1 / SET / KUM.1 / 2/2017 concerning “Kampung Iklim” Program Implementation Guidelines that Adaptation to climate change is an effort made to improve the ability to adapt to the impacts of climate change, including climate diversity and extreme climate events so that the potential for damage due to climate change is reduced, the opportunities posed by climate change can be exploited, and the consequences arising from climate change can be overcome. Climate change mitigation is a series of activities carried out in an effort to reduce the level of greenhouse gas emissions as a form of climate change mitigation efforts. “Kampung Iklim” Program will strengthen various stakeholder partnerships in dealing with climate change and facilitate the dissemination and exchange of information on good practices of climate change adaptation and mitigation. “Kampung Iklim” Program is an instrument to encourage climate change adaptation and mitigation actions at the site level, which are focused on strengthening local activities [8].

3.4 Indicator of Potential Sustainability

The process involves DLH Surakarta municipal as an innovator, working group management of “Kampung

Iklim” Program as an agent of change and residents of Sambirejo as program beneficiaries. Interpersonal and group communication channels dominate in the dissemination and reception of information about the “Kampung Iklim” program at any stage, while Internet media used at the stage of assessment and evaluation program. Attribute of innovation become the most influential element in the decisions of innovation. The implementation of the program in Sambirejo has been considered successful by the Government, but in fact, most of the residents of Sambirejo yet have a full understanding of the Kampung Iklim program [9].

Based on [10] three characteristics of adaptive governance play an important role in building resilience. These three characteristics are polycentric institutions and networking, participation, and learning and innovation. This finding will support and guide the policy of making community resilience in Indonesia more effective. By using several indicators for each characteristic, this study found that participation was the most significant characteristic in building community resilience in PROKLIM Village. One indicator of the characteristics of participation, the presence of influential leaders were found to be most important in this case because an influential leader could build awareness of the vulnerability of the village to several environmental problems and the threat of climate change among villagers, encouraging villagers to actively participate and increase their adaptive capacity.

The awareness to re-rise became a capital to start "Green Economy Movement, Improve the Quality of the Environment". Community empowerment is reflected in the efforts of the Serut hamlet community in developing their village, as follows: (1) Development of organic farming, (2) Management of livestock farming with communal and fishery cages, (3) Community based waste management, (4) Green and water resources management. Based on this reason, Serut Hamlet has awarded as climate village by the Ministry of Environment in 2012. Factors that influence the process of community empowerment in Serut hamlet towards climate village are; (1) Natural conditions caused by the 2006 earthquake which resulted in similarity of fate, (2) Culture of society, norm, and community self-help, (3) Local leader factor, (4) Government factor [11].

In the implementation of PROKLIM, DLH Kota Surakarta and “Kampung Iklim” actors performed the stages of community empowerment process, namely the stage of awareness, the appointment of problems and problem-solving, the stages of the implementation of the plan and publication of information, and community empowerment. Actors of “Kampung Iklim” used several empowerment approaches in an effort to empower the community, which called the 5P approach. But the approaches are only possible, advocacy, reinforcement, and maintenance (5P). In pursuing PROKLIM, actors use existing social capital, such as networks, social norms, and measurements arising from the existence of networks [12].

The implementation of the Climate Village program in Plalangan Village, Gunung Pati is considered to be running well, the level of public understanding of the

climate village program is good with very good criteria of 1%, good criteria with a percentage of 91%, sufficient criteria with a percentage of 8% and criteria not good with percentage 0. Further obstacles in the implementation of climate village programs are a) lack of funds provided by the government, b) lack of extension staff, c) lack of public awareness in maintaining proclaim activities[13].

The effectiveness of 'Kampung Iklim' Program is influenced by 1) leadership, 2) community knowledge and understanding of the policies and programs, 3) awareness and community participation, and 4) resources and skills [14].

3 Result

The result from analyzing literature can resume that variables and indicators to measure potential sustainability. Variables depend from social, ecology, and economic aspect.

Table 1. Variables Sustainability

Variables	Indicator
Social Aspect	
Communication	Interpersonal and group communication
Innovation	Innovation of Adaptive activities
Institutional	Support by local intuitional
Capacity of local government officials	appropriate budget targets to activities or infrastructures that support the building of resilience
Participation	Participation of local citizen and leaders take the initiative
Awareness	Awareness of Kampung Iklim Program
Networking	Between institutional, community and citizen
Local Actor	Performed the stages of community empowerment process
Government	Networking to build adaptive program
Culture of Society and Norm	Local culture
Local leader	Community empowerment
Human Resources	knowledge of the policies and programs
Ecology Aspect	
Resources and skills	To implementation Program
Mitigation activities	Condition and sustainability of Object in Locatio
Adaptation Activities	Condition and sustainability of Object in Location

Variables	Indicator
Economic Aspect	
Economic	To increase income , reduced household expenditure

Result from analyzing of observation and interview that 30 variables to measure potential sustainability that is Ecological aspects include: rainwater harvesting, water infiltration, spring protection, water saving, integrated agriculture, control of disease vectors, sanitation, Clean Healthy Life Behavior, solid waste management, agricultural cultivation, liquid waste management, increased vegetation cover, food security, adaptive design, energy conservation, environmental benefits. Social aspects include recognized groups, gender roles, funding sources, institutions, environmental management projects, policy support, Proklim expert local human resources, capacity building, community training, Proklim working groups, Proklim assistance, Proklim development. Economic aspects include economic resilience, economic benefits. Result of observation in Kampung Iklim, a description of the design of a climate village in Surakarta.



Fig. 2. Vertical Garden and Vegetable Plants on the Roadside of the Village (Location: Mojosoongo)



Fig. 3. Solid Waste Management



Fig. 4. Bank Sampah Product (zero waste concept)

4 Conclusion

Social, ecology and environment aspect is variables to measure potential sustainability of “Kampung Iklim” Program. The variables will be breakdown into variable indicators. Variables indicator will be used as a basis for questionnaires and field observation to measure sustainability. The sustainability analysis base on the questionnaire will be distributed to residents in Kampung Iklim. The sustainability of the climate village program can control the environmental impact of revolution 4.0.

References

1. BAPPEDA Kota Surakarta, *KLHS Revision of the RTRW of Surakarta Municipal*, Surakarta (2017)
2. Bappenas, *The Guidelines for Implementing Greenhouse Gas Emission Reduction Actions*, Jakarta (2011)
3. Francis, *Climate Change and Implication for Senior Secondary School Financial Accounting Curriculum Development in Nigeria*, J. Educ. Pract., 153–157 (2014)
4. Supriadi, *The Environmental Law in Indonesia - An Introduction*, Jakarta: Sinar Grafika (2010)
5. A. Muller, *Benefits of Organic Agriculture as a Climate Change Adaptation and Strategy for Developing Countries*, Environment for Development (2009)
6. Pelling, *Adaptation to Climate Change: from Resilience to Transformation*, New York US.: New York: Routledge. (2011)
7. R.C. Djalante, *Adaptive Governance and Managing Resilience to Natural Hazards.*, Int. J. Disaster Risk Sci. **2**(4), 1–14 (2011)
8. R.I. KemenLHK, *Director General Regulation on Climate Change Control No. P.1 / PPI / SET / KUM.I / 2/2017* (2017)
9. U. Rahayu, *Study of Communication Patterns in the Process of Making Climate Village Program Innovation Decisions in Sambirejo Village, Surakarta City*, UNS - Surakarta (2016)

10. R. Syarini, *Adaptive Governance Characteristics Of Yogyakarta Special Region Proklam (Climate Village Program) Villages*, Gajah Mada University-Yogyakarta (2017)
11. P.A. Merdika, *Community Empowerment in Serut Hamlet, Bantul Regency In Efforts Towards a Climate Village*, UGM (2017)
12. N.Y. Ghina, Siti, *Climate Village: Community-Based Environmental Management*, J. Sociol. DILEMA **32**(2) (2017)
13. A.I. Puspito, *Implementation of the Climate Village Program in Plalangan Village, Gunungpati District, Semarang City*, Geography UNNES-Semarang (2016)
14. R. Rike, *Program Evaluation of Climate Villages in Reducing the Risk of Climate Change Impacts in Nglegi Village, Patuk District, Gunungkidul Regency*, PWK-UGM (2018)