

Conference Paper

Framework Considerations for Rural Resilience Toward Land Degradation

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Abstract

Land degradation is a global problem which involves climate, soil, vegetation, economic, and population conditions. Land degradation occurs in rural agricultural land as a result of agricultural activities. Land degradation can ultimately eliminate the sustainability of environmental, social and economic in rural areas. Land degradation problems decline environmental, social and economic conditions that decrease rural resilience. Basically the components of community resilience according to Kusumastuti [14] can be used to assess the resilience of rural communities because they involve not only environmental, social and economic aspects but also community capacity, institutions, infrastructure and hazards. Various studies were still involve environmental, social and economic.

Keywords: rural resilience; vulnerability; preparedness; land degradation.

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1. Introduction

Land has a close relationship with rural, because land is a livelihood for rural communities. Rural community use land to fulfill their needs and most of them have a livelihood as farmers. Land is one of the factors of production that plays an important role in rural agricultural activities. The conditions of soil and water make farmers able to plant various types of agricultural commodities on their land.

Determination of agricultural commodities is closely related to socio-economic conditions of the community. Determination of the commodity is not only based on soil fertility but also influenced by the socio-economic conditions of the farm families. The decision making process on the utilization of rural resources in farm families is considered as a complex and essential issues to be focus on. The decision of the farm families to plant an agricultural commodity is considered by three aspects, such as market demands, product prices and the duration of productivity. Within a farming system concept, all decisions in family refer to the decision-oriented approach where targets and objectives are the results needed to be achieved [1]. So that farm family usually choose agricultural

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commodities that are demanded by the market, high product prices and relatively short duration of productivity.

The Decision making in proper land use particularly in rural areas is closely relevant to the economic value of crops grown. Farmers do not hesitate to change certain agricultural crops when they feel they can provide high income to their families. Where targets and objectives of the farm families only on economic aspect, sometimes they forget about environmental aspect. Farmers are competing to plant superior agricultural crops in ways that are not environmentally friendly, thus reducing the quality of land. If land degradation occurs for a long time, land degradation will occur. Land degradation creates big problems that makes environmental and socio-economic condition worse. For rural communities agricultural land is a source of livelihood. Land degradation can ultimately eliminate the sustainability of rural environmental, social and economic. Land degradation problems decline environmental, social and economic conditions that decrease rural resilience.

2. Land Degradation in Rural Areas

Rural areas generally have a good environment with abundant resources. But in reality the resources in rural areas are used unwise so that environmental damage occurs. Land degradation occurs in rural agricultural land. In general, most of the land degradation that occurs especially on agricultural land is the result of agricultural activities. Agricultural activities that cause land degradation such as over fertilizing, erosion, monoculture farming and so on. Degradation of agricultural land causes loss of nutrients and organic matter which has an impact on the decline in soil productivity. Excessive loss of one or more nutrients causes the soil to no longer be able to provide sufficient and balanced nutrients to support plant growth. In the end, the degradation of agricultural land will affect the productivity of agricultural crops.

Community indiscretion in cultivating land triggers changes in land use patterns which ultimately have an impact on changes in socio-economic and environmental conditions of rural communities. The community tends to be indifferent to land use so that often exploitation of the land is done excessively. As a result, land degradation in the rural area cannot be avoided anymore. Land degradation as the main reason for vulnerability of the community is a portrait of the limited ability of the community to maintain crucial resources if the resource is considered as a representation of the community's desire, ability and assessment of the resource.

3. Rural Resilience

Resilience is defined as the ability of the system to maintain its identity in the face of internal changes and external shocks [2]. Resilience literally has meaning as a spring or an elastic so it is often referred to as resilience. Resilience can be defined as the ability or capacity to respond to both changes and disturbances without the need to change the initial state [3]. Resilience depends on the ability to adapt to new things, where new things are unpredictable and unprecedented [4].

Rural development is essentially all forms of rural human activity in the development of self, family, community and environment in rural areas of physical, economic, social, cultural, political, orderliness, defense and security, religion and government carried out in a planned and bring a positive impact on rural progress. Thus, village development is in fact a conscious effort of the community and government both by using resources sourced from the village, government assistance as well as the assistance of domestic and international organizations/institutions to create changes for the better [13]. Rural development has an important and strategic role in regional development and national development because rural development directly touches the interests of the community.

IPCC defines that resilience is the ability of a social or ecological system to absorb interference while maintaining the same basic structure and function, self-regulating power and the power to adapt to pressure and change [5]. According to the Inter-Agency Working Group on Resilience, resilience is defined as the ability of states, communities and households to anticipate, adapt and/or recover from the influence of potentially dangerous events (natural disasters, economic instability, conflict) by means of protect livelihoods, accelerate and maintain recovery, and support economic and social development [6]. Resilience is the capacity of the community or system to deal with stresses and shocks by anticipating, preparing, responding and recovering [7]. Resilience is a situation where a thing that is able to continue to survive despite facing pressure and change.

The concept of resilience can be applied in rural development [8]. Resilience has emerged as an interesting conceptual approach to be associated with rural development in complex, vulnerable and adaptive terms [9]. Today the rural area faces rapid changes and uncertainty in agriculture, forestry and landscapes that can affect them in the future. Rural resilience determines the extent a rural area is able to withstand threats that harming their lives. Rural resilience is the ability of the community to anticipate, adapt or recover from the pressures and shocks that occur in the countryside. Rural resilience

is defined as the capacity of rural areas to adapt changes in external circumstances such that a satisfying standard of living is maintained, while facing existing ecological, economic and social vulnerabilities. Resilient villages are believed to have a large capacity to prevent and face unexpected threats [10].

Resilience of places or communities is a concept that is increasingly being discussed, especially those relating to resistance to shocks, economic decline, climate change and environmental hazard [11]. The perspective of rural security refers to the ability of rural areas to overcome existing environmental, and socio-economic vulnerabilities. This perspective is based and in accordance with the idea that environmental, social, economic aspects are interrelated and interactions between aspects are increasing [12]. Resilience is not based on a single factor, nor is it based on economic problems and social problems separately [13]. The local economy, environment and society are interrelated and resilience depends on all of them at the same time. Rural communities to survive in economic, social and environmental terms, they need to develop strong multifunctional characteristics.

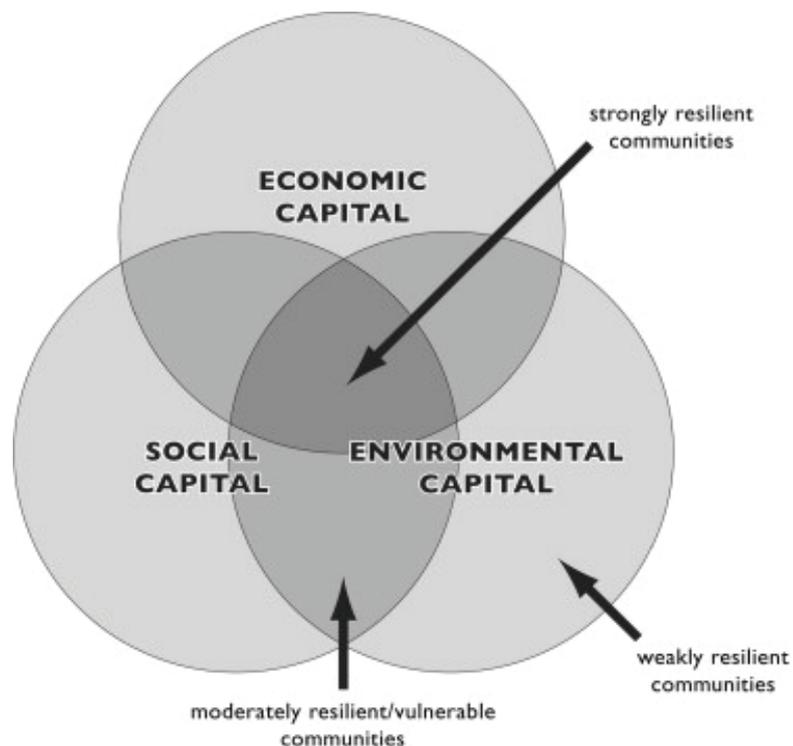


Figure 1: Strongly resilient communities framework [13].

Several studies on rural resilience have been carried out. Heijman [8] proposed that rural resilience builds on the interface of other types of resilience, in particular economic resilience, ecological resilience, and cultural resilience. The rural resilience perspective refers to a rural area's ability to cope with its inherent economic, ecological and cultural

vulnerability. Blake [9] built a framework of rural resilience that covers cultural, environmental, institutional, economic and social dimensions. It based from prior research, namely the Community Capitals Framework.

In this paper we proposed a framework of rural resilience according to Kusumastuti [14] framework of resilience. Resilience of an area is determined by comparing preparedness with vulnerability.

$$RI = \frac{PI}{VI}$$

Where

RI = resilience score,

PI = preparedness score of the area

VI = vulnerability score of the area

Resilience of the area is determined by comparing the preparedness versus the vulnerability (exposure toward disaster). The goal for the community is to maximize the preparedness potential and minimize their vulnerability. Higher preparedness will result in higher resilience, while higher vulnerability will result in lower resilience. Social resilience is a function of demographic characteristics and access to resources, while community resilience is related to the attributes of the area that promote population wellness, quality of life, and emotional health, and economic resilience is related to the economic vitality of the community. Furthermore, institutional resilience is related to the efforts of local government to raise the awareness and preparedness of the rural toward disaster. Infrastructure resilience is related to the physical aspects of the area that reduce land degradation. Lastly, since hazard normally affects the resilience of the area, it is included in model. Hazard is a part the vulnerability that is related to the exposure to natural disasters represented by hazard frequency and hazard intensity [14].

Basically the components of community resilience according to Kusumastuti [14] can be used to assess the resilience of rural communities because they involve environmental, social and economic aspects. Rural resilience are closely related to their environmental, social and economic conditions. According to Chong by utilizing available resources, ultimately, resilient rural community will achieve four key deliverables including: (1) Ability to secure basic needs; (2) Ability to adapt to change; (3) Ability to mitigate and minimise vulnerability; and (4) Ability to move out from poverty.

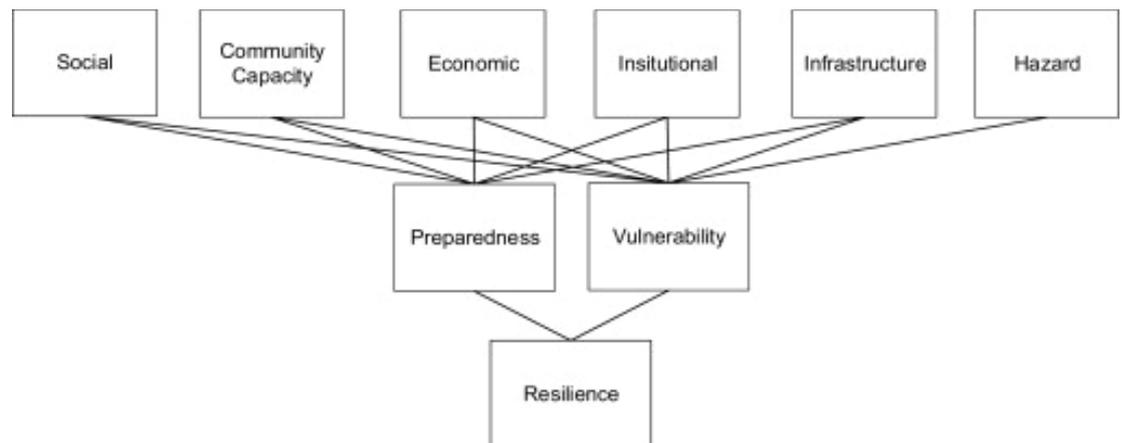


Figure 2: The resilience framework [14].

3.1. Preparedness

Preparedness is the activities and steps taken before the occurrence of natural hazards to predict and remind people of the possibility of the occurrence of a hazard, evacuate people and property if they are threatened and to ensure an effective response. According to Cutter [15] preparedness is an actions that allow the government, organizations, societies, communities and individuals to be able to respond to a disaster situation appropriately. Preparedness is any activity before the occurrence of a disaster that aims to develop operational capacity and facilitate an effective response when a disaster occurs.

Preparedness refers to the steps taken to prepare and reduce the impact of disasters [16]. Preparedness efforts increase the effectiveness of emergency response by developing strategic preparedness plans at the operational and tactical levels, early warning systems and community training to reduce disaster risks. The Loss of disasters can be reduced not only with post-disaster relief and recovery but also pre-disaster mitigation and preparedness. Preparedness aims to minimize the side effects of hazards through effective, timely, adequate and efficient preventive measures. Preparedness efforts also aim to ensure that the resources needed to respond to disaster events can be used effectively in times of disaster and know how to use them. Chong [12] argues that lack of awareness of preparedness activities will affect the chronic vulnerability of society.

With reference to [12, 14, 17, 18], this paper proposed the list of detail elements for dimensions of preparedness which might potentially be used in assessing community current state (refer to Table 1).

In this paper, preparedness refers to activities and steps taken by the community before the occurrence of natural hazard which is land degradation. Preparedness is a

TABLE 1: Dimensions and indicators of preparedness.

<i>Dimensions</i>	<i>Indicators</i>
Social	Ability and expertise other than occupied work
	Land conservation activities from farmers
Community Capacity	Existing community groups
	Participation in community groups
	Benefits of community groups
Economic	Other alternative livelihoods
	Savings ownership
Institutional	Sustainable agriculture socialization
	Land conservation activities from Government / NGOs
Infrastructure	Availability of check dam
	Availability of diversion ditches

component of rural resilience that is used to minimize vulnerability. High community preparedness will produce high resilience.

3.2. Vulnerability

Scientists use the word vulnerability as a root in geographic and natural disaster research, but currently vulnerability has been widely used in other studies such as environment, public health, development and poverty, food and hunger, sustainable science, land change and climate impacts and adaptation [17]. Vulnerability refers to the potential of a system to be undermined by external pressure. Vulnerability is a vulnerable state to the danger caused by conditions exposed to the pressures associated with environmental and social changes as a result of the lack of capacity for adaptation [18]. Vulnerability is a condition of a community or society that leads or causes an inability to deal with a hazard. The level of vulnerability becomes important to know as one of the factors that affect the occurrence of disaster, because the disaster will occur if danger occurs in a vulnerable condition.

The concept of vulnerability can be an analytical tool to describe the degree of ease of exposure to damage, powerlessness of the physical and social systems [19]. The vulnerability assessment is not only based on climate change considerations, but also based on other pressures that may occur [20]. The context of vulnerability can be seen at different scales and aspects of society such as households, neighborhoods, villages, cities, countries, and economic or social sectors. Vulnerability is the result of a process whereby humans are actively involved and this condition can be prevented. In an easier

way, vulnerability can be identified as a physical, social, economic condition in an area that may be affected by environmental change.

With reference to [6, 12, 14, 17], this paper proposed the list of detail elements for dimensions of vulnerability which might potentially be used in assessing community current state (refer to Table 2).

TABLE 2: Dimensions and indicators of vulnerability.

<i>Dimensions</i>	<i>Indicators</i>
Social	Dependency Ratio
	Family education level
Community Capacity	Social relations with neighbors
	Social conflict
Economic	Livelihood of the head of the family
	Decreasing the amount of agricultural production
	Changes in the amount of income
Institutional	Government assistance
Infrastructure	Ownership of agricultural land
Hazard	Crop failure
	Critical Land
	Natural disasters in the last 5 years

Vulnerability in a region can be seen from social conditions, community capacity, economy, institutions, infrastructure and dangers that exist in the region. Vulnerability is a component of resilience where vulnerability represents a threat posed by society. The environmental susceptibility of a region is strongly related to local socio-economic factors because human activity can greatly influence the evolution of the environment. The importance of identified vulnerabilities is to know the actions to be taken to reduce the risks that communities will receive as a result of environmental hazards.

4. Conclusion

The degradation of agricultural land will affect the productivity of agricultural crops. An effort is needed to overcome land degradation for the environment and agricultural productivity to be maintained. Resilience of a region is determined by comparing preparedness with vulnerability. The goal is to maximize the potential for preparedness and minimize vulnerability so that the resilience of a region can be realized. This paper explains the proposed framework for measuring rural resilience toward land degradation with reference to Kusumastuti [14]. The framework highlights the need for a community to increase their own resilience (social, community capacity, economic, institutional,

infrastructure and hazard). Ultimately rural resilience can be achieved through; (1) ability to secure basic needs, (2) ability to adapt to change, (3) ability to prevent and reduce vulnerability and (4) ability to eradicate from poverty.

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