Drylands Agriculture and Prevention Strategy of Environmental Agroecosystem Damage in Kabupaten Musi Rawas, South Sumatra

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Abstract

Until now, the use of drylands as agricultural mode is severely lack in Indonesia. Agriculture, Paddy farming in this sense, is done more in wetlands. In fact, the drylands area occupies the largest area of Indonesia. Besides that, the future of drylands has a strategic position in the agricultural development in Indonesia. Therefore, the use of drylands is an important tool in the equality of development. Interestingly, drylands focus only to producers of agricultural commodity plantations, housing, medicine, and foreign exchange. When drylands of Musi Rawas, South Sumatra is used for agricultural purposes, it requires integrated management across sectors. In order to preserve the environment, it is necessary to follow the rules of proper management of the environment. Drylands management is one way to optimize the use of the land and the preservation of land and the environment. Improper land management can reduce the productivity of land and agricultural product will also reduce the quality of the surrounding environment. The purpose of writing this paper is to describe the impact of agricultural activities on drylands agro-ecosystem and strategies in addressing the environmental damage it causes.

Keywords : Agriculture, drylands agro ecosystem, pollution, environment

1. INTRODUCTION

The emergence of ambiguous issues, on the one hand there is the demand to provide resources in meeting food consumption due to the emergence of the other side of the advances in science and technology and population growth. Therefore, to realize the creation of a balance is necessary prudent action that did not result in changes to the environment. Agroecosystem formed as a result of interaction between social systems with natural systems, in the form of human activity that takes place to meet the needs of daily life (livelihood). Priority activities carried out by the farmers are cultivating rice (paddy).

Dry land is part of the terrestrial ecosystem relatively greater extent compared with wetlands (Odum, 1971). Furthermore, according to Hidayat et al (2000) Dry land is a stretch of land that was never flooded or inundated by water at some time during the year. Overall dry land has an area of approximately 70%. At this time the use of land for agricultural purposes either dry crops and perennial crops such as oil are highly developed.

Relief soil will determine whether land management easier and dry. According Subagio et al (2000) relief of land is determined by the slope and elevation differences. Judging from the shape, fertility and other physical properties, management of dryland relatively heavier compared to wetlands (rice paddies). Until now the attention of various parties to the sustainable management of dryland relatively low compared with lowland wetland management (Irawan and Pranadji, 2002).

Utilization of dry land in hilly and mountainous regions for seasonal agriculture produces food in common and do people who live in rural areas, one in Musi Rawas, South Sumatra Province. But sometimes, the use of dry land in the mountains and hills on a continuous basis without regard to principles of conservation will cause erosion and fertility decline in weight.

In recent years environmental degradation has become a national and international issues, including in Indonesia. One of the underlying case is global warming, clearing of forests for agriculture is a contributor to global warming. Changes in forest into dry land agro-ecosystem for agricultural purposes and settled temporarily in order to make ends meet has been going on for a long time. This has resulted in the degradation of soil fertility decline. Utilization of dry land in the hills or slopes continuously either for agricultural purposes or agricultural season crops can lead to land erosion and fertility decline in weight. To maintain the sustainability of the land required proper management efforts. Therefore, in this study there are some problems to be studied. First, is the opening for dryland farming in Musi Rawas, South Sumatra has an impact on soil fertility? Secondly, what about the existing environment agroecosystem with the opening of dryland agriculture in the region? Third, is opening in dryland farming is done with the proper management of the land so that sustainability can be maintained?
Furthermore, the purpose of this paper is to describe the impact of agricultural activities on dry land agro-ecosystem, including pollution and environmental damage they cause, and how management and mitigation solutions.

2. LITERATURE REVIEW

Since the end of the 19th century the development of dryland agriculture in particular on the island of Java has been very fast and so far has spread beyond the island of Java. Between the years 1875-1925 (50 years) increases were more than 350% (Lombart, 2000). This happens due to the availability of low-lying wetlands for most farmers who use it as farmland food decreases. Some shrinkage of wetlands in the lowlands due to conversion of land to non-agricultural land that is not under control. Agroecosystem mostly used by the state or the civilized agrarian society. Agriculture or agro word shows the activity or intervention communities against natural or agricultural ecosystems. The term can be given a meaning as an agricultural community activities that take advantage of natural or land for food, energy and other materials that can be used for survival (Pranaji, 2006). In this benefit the community can take directly from nature, or the first processing or modification. So an agroecosystem already contains public intervention or alter the natural balance of the ecosystem to produce something useful.
According to Hidayat (2000) that the dry land agro divided into several categories based on climate, altitude above sea level and the type of soil that is based Climate divided into two, namely (1) Dry land wet climate (LKIB) ie regions with rainfall above 2500 mm / year, (2) dry land dry climate (LKIK) ie regions with rainfall below 2000 mm / year. According to Hidayat (2000) that the dry land agro divided into several categories based on climate, altitude above sea level and the type of soil that is based Climate divided into two, namely (1) Dry land wet climate (LKIB) ie regions with rainfall above 2500 mm / year, (2) dry land dry climate (LKIK) ie regions with rainfall below 2000 mm / year.

Meanwhile, when divided by altitude where dry land divided into: (1) Upland plateau (LKDT) which is the area located at an altitude above 700 meters above sea level and (2) lowland dry land (LKDR) which is the area located at an altitude of 0 - 700 meters above sea level. Based on the type of soil on dry land can be divided into:

1. Oxisol, a land that has been progressing very advanced, cross the land, textured clay to heavy clay, porosity is high, power hold little water and clay minerals dominated by kaolinite, iron oxide and aluminum. Land is relatively resistant to erosion.
2. Inceptisol, land is still fairly young and soil properties vary, depending on the parent material (fine texture of argillaceous silt, very acidic to neutral). Included into the main types of dry land agriculture.
3. Ultisol, Soil has a base saturation less than 35% at a depth of 125 cm. This land has undergone weathering occurs tranlokasi further and clay in the parent material which generally consists of aluminum-silica-rich material with a wet climate.
4. Andisol, Land andisol andik has attributes with the parent material such as volcanic ash-rich volcanic glasses and minerals easily weathered. Properties - properties such as light weight content, rich in organic matter, rich in volcanic glass containing amorphous minerals (alofan), has no nature behind the drought, power withstand very high water and resistant to erosion. Soil texture varies from coarse argillaceous berliat up. The reaction is generally slightly acidic soil.

Farm management in particular dryland sustainable and sustained require a professional and follow the rules of the environment. According Goenadi (2002)

sustainable agricultural land management has five pillars, namely productivity, security, protection, viability and acceptability.

Disruption in the environment due to human greed, lack of concern for ecology and due to the use of agricultural technologies that do not refer to the development of environmentally sound (Ambo Ala, 1997). In addition, not terakomodirnya use / application of fertilizer is unable to prevent environmental damage (Nuhfil, et al., 2003). Furthermore Reintjes, et al. (1999), says that when the fertilizer used in the region is low, the output will be far behind compared with the growth of population. This phenomenon is common among farmers who manage marginal lands.

Management of dryland agrokosistem seen as part of the ecosystem management of natural resources by the farmers who occupy the areas where they settled. According Soerianegara (1977) dryland agro-ecosystem management is part of the interaction or cooperation with natural resource agroecosystems.

On sloping land with a slope of more than 15% when the soil is not managed well when planted, it is very susceptible to erosion in the rain. This happens because the land is not able to absorb the rain water into the soil, resulting in surface flow (run off) the washed granules into the soil so that the soil is not fertile anymore. According Sutono et al (2007), due to erosion during the rainy season not only washed away the soil grains but also washed manure and compost are also awarded to the ground so that the soil washed into thin, so erosion should be prevented as early as possible. The impact of this erosion is in the bottom of the siltation in the watershed (DAS) which resulted in the disruption of local water ecosystem balance.

3. METHOD

The method of research using quantitative methods that use mathematical calculations. Further quantitative analysis with qualitative analysis described systematically and identified in accordance with the conditions on the farm agroecosystem in Musi Rawas, South Sumatra with a case study on dryland agriculture. In addition to sharpening the qualitative analysis carried out also by the method of observation and interviews, especially interviews. Based on that, the qualitative analysis is then placed in a descriptive tabulation.

4. RESULTS

Sustainable agricultural development in dry land agro-ecosystem management can be seen as an effort to repair and regenerate the natural resources that can be recovered (renewable resources) in the region. In the utilization of arid land resources for sustainable agriculture and environmental approaches require follow environmental rules. There are several methods to control the negative impact of the exploitation of the use of dry land. Based on the data though, there are some strategies adopted by farmers in dryland areas in Musi Rawas, South Sumatra.

4. 1. Conservation of Dryland Agriculture in Musi Rawas, South Sumatra

One of the efforts to address land degradation caused by exploration conducted by farmers in dryland areas Musi Rawas South Sumatra is to implement the alley cropping systems in the development of dryland farming systems, because these

systems provide many advantages such as may suppress erosion. Theoretically, the model is in line with the opinion Sudharto et al., (1996) that increases the productivity of the soil due to the addition of organic matter through the results of hedge clipping, can increase plant growth and production, and to create microclimate conditions (temperature) in the hallway plant . Provision of forage materials, by farmers in dryland areas Musi Rawas, South Sumatra, as mulch derived from legume crop plants are trimmed at the age of 1.5 to 2 months can increase levels of soil organic matter and water availability, improve soil physical properties and increase production. According Adiningsih and Sudjadi (1989), alley farming systems can prevent erosion double that with mulch clipping yield and reduction of surface flow.

Application of tunnel farming systems by farmers in dryland areas Musi Rawas South Sumatra shows that with the march of erosion buffer plants grass king (king grass) planted parallel to the contour lines can effectively reduce the rate of erosion. Furthermore, from the results of king grass clipping are held every month can produce 0.5 tons of forage that can be given to cattle for 20 days. From the plot area of 1 hectare will produce 1 tonne of forage that can be used to feed cattle. In the next assessment year (second year) terrace already formed as a result of planting vegetative grass plant terrace king. With the formation of the terraces on sloping land is established representative farm land for different types of plants both food crops and tree crops suitable to local conditions and suppress the occurrence of erosion at a time when it rains. With the formation of terraces gradually to become permanent, in addition to preserving the land also cause land productivity will be better.

4. 2. Strategy setting Farmers Dryland Cropping Patterns Musi Rawas in South Sumatra

Dry land purely rely on the availability of water from rainfall in the agricultural production process, where the cropping system settings arranged in the form of inter-cropping using plants with different harvest and the growth is not much need for water and is an alternative to solve the problem of limited water. Dry land is generally prone to erosion both by water and by wind. One alternative technologies to address the erosion of using cropping systems hallway. Other functions of the alley cropping is to create a microclimate in dry land dry climate and the plants used are adapted to crops commonly grown farmers and thus has a market share. The results Vishnu et al (2005) states by combining several crop cassava, corn, peanuts, soybeans and green beans are arranged in a crop intercropping may provide advantages and can provide fairly good stability in the face of limited rainfall.

4. 3. Strategy Embung Dryland farmers in Musi Rawas, South Sumatra

Ponds or water tank is a reservoir of micro-sized farms (small farm reservoir) was built to accommodate the excess rain water and use it at a time when the rainy season if needed crops during the dry season. Appropriate use of such techniques for rainfed ecosystem that has the intensity and distribution of rainfall is uncertain (Syamsiah and Fagi, 2004).

Making ponds and its application in dryland farmers have a lot to do, especially in eastern Indonesia bagiagian which has a dry climate with limited water. In dry climates the use of ponds has become a habit for most farmers. Dryland farmers in Musi Rawas in South Sumatra have ponds at the moment is 1458 pieces with a total

area of 755.58 ha of inundation and 3083 ha of irrigation, average land holding per farmer ponds in dryland farmers Musi Rawas South Sumatra is 0 , 51 ha.

In the dry season showed that with the application and use of ponds as a source of water mixed with the fertilizer (ngecor) then it becomes more efficient use of water and labor costs can be reduced due to watering and fertilizing done simultaneously.

4. 4. Use of Organic Fertilizer to Farmers Dryland Musi Rawas in South Sumatra

Processing of agricultural land for continuously will cause the land to be thin so that for the next farming need a lot of inputs to restore soil nutrient that has been absorbed by plants. The use of inorganic fertilizers are unbalanced continuously to the production process can damage the land and in the long run become ineffective land for agriculture. One alternative to save the sustainable use of land is to reduce the input that comes from chemicals and switch to organic fertilizer derived from organic material or waste crop residues. In general, the current problems faced by dryland farmers Musi Rawas, South Sumatra, Indonesia in particular and generally is difficulty getting an inorganic fertilizer needs tends to increase. This difficulty is partly due to the availability of inadequate or improper distribution system and other factors. As an illustration, in 2008 the national production of about 6 million tons while the needs of up to 9 million tons. These constraints affect kapada decreased land productivity and production of various agricultural commodities nationwide.
One of the efforts undertaken by upland farmers in Musi Rawas, South Sumatra to overcome shortages of fertilizer and reduce dependence on inorganic fertilizers is to optimize the use of natural resources available locally. Utilization of agricultural waste which is still a concern as the basic material of organic fertilizer is expected to reduce dependence on inorganic fertilizers. On the utilization of agricultural waste to create efficient use of the limited land availability and to maintain environmental. Agricultural waste or residual part of agricultural production that can not be used directly. This waste has undergone a process of decomposition when it contains many nutrients needed for plant growth. When the plants die, the decomposition process occurs later due to the activities of microorganisms with the end result in the form of humus (Sutanto, 2002).

Nutrient content of each different crop residues. The dryland farmers in South Sumatra Musi Rawas using organic fertilizer derived from neem seed residue. Diola neem seed dregs of the ginger plant with some inorganic fertilizer treatments. The use of organic fertilizer (compost) derived from neem seed residue by dry land farmers in Musi Rawas South Sumatra, suggesting that the growth of rice plants better and higher crop production and use of organic fertilizers. Thus, there are several advantages to the use of organic fertilizers is the efficiency of the cost because the price of fertilizer is cheaper, higher production and maintain soil fertility and sustainability.

5. CONCLUSION

Based on this study, that the impact of agricultural activities on dry land egroekosistem the Musi Rawas, South Sumatra, it can be minimized. One of the efforts to address land degradation due to exploration is to convert the technology package for the development of dryland farming systems. Cropping arrangement is

an attempt to suppress the occurrence of erosion, improve soil productivity with the addition of organic matter through the results of crop plants, can increase plant growth and production. By building ponds or water tank or reservoir of micro-sized farms can hold excess rain water during the rainy season and use it if necessary crop during the dry season. Utilization of the ecological chain can create an inexpensive and natural fertilizer, while maintaining soil fertility and sustainability. By doing dry land management alternatives are expected agroekosiste in drylands is sustainable with minimal environmental impact.

6. RECOGNITION

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