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International Symposium on Earth Science and Technology 2015

8/11/2017

Scope and Background



International Symposium on Earth Science and Technology 2015 is organized by The Cooperative International-Network for Earth Science and Technology (CINEST). This symposium highlights the recent achievements in the fields of Mineral Resources, Energy and Environment based on the Earth Science and Engineering. Interdisciplinary studies and discussions on the future directions of the fields are focused, and especially young researchers contributing to earth resources development and global environment are strongly encouraged.

The CINEST would like to offer our immeasurable gratitude to MITSUI MATSUSHIMA CO., LTD. for its financial support to this symposium.

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Saturday, 5th of December, Field Trip "Manda Pit of Miike Coal Mine, a World Industrial Heritage"

(Registration closed)

8:20 Meet at the meeting place,
JR Hakata Station (Chikushi ext.)

8:30 Depart from JR Hakata Station by bus
(One brief stop on the way)

10:30-11:50 Omuta Coal Industry and Science Museum
(Omuta-city, Fukuoka Prefecture)

12:00-13:00 Manda Pit of Miike Coal Mine,
a World Industrial Heritage
(Arao-city, Fukuoka Prefecture)

13:20-14:30 Lunch at Hotel Blanca

17:00 Arrived at JR Hakata station
(One brief stop on the way back)



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Analysis of Social, Economy, Culture and Local Wisdom to Develop Conservation Model of Maize Farming in Gorontalo City, Indonesia

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ABSTRACT

Analysis of social, economy, culture and local wisdom in maize farming is important to collect all information needed for development of conservation model for maize farming in Gorontalo City, Indonesia. Primary data of condition of social, economy, culture, and local wisdom will be used to compile the model of conservation method in maize farming so that the production of maize is optimum and it will be conducted with respect to the environment. This research will followed by development of conservation model for maize farming based on social, economy, culture and local wisdom condition and also dissemination of the conservation model to farmers and society.

This study aims to determine the social, economic, cultural and local wisdom of communities in the cultivation of maize in the Gorontalo City Indonesia. The respondent of this research is maize farmers in Gorontalo City which was distributed in 5 sub districts. The result of this study shows that farmers age is dominated by age 57-65 years old (31,77%), farmers education mainly are elementary school (55,29%), the annual corn farmers' income are IDR 20.137.795,36, 56% of farmers applied local wisdom for maize planting, most of maize farmers in Gorontalo City have custom and tradition to consider astrology for agriculture especially maize farming (to see stars Todata and Totokiya).

INTRODUCTION

Gorontalo Province relies on the concept of Agropolitan to support people's income, which mostly are farmers and fishermen. A commodity which is nominated for agropolitan concept is corn (maize). Corn field spread throughout the district of the Gorontalo Province, namely Gorontalo City, Gorontalo Regency, Bone Bolango Regency, Pohuwato Regency, and North Gorontalo Regency. This study chose Gorontalo City as research area, because Gorontalo City has special characteristics as Capital of Gorontalo Province, urban areas, center of trading and education, but still has a large farming area.

Gorontalo City has an area of agricultural land, 6,160 Ha. The potency for maize farming is 425 Ha, whereas land which has been used is 232 Ha and land which has not been used is 193 Ha. Maize farming land in Gorontalo City is distributed in 5 sub district: Sub District Kota Barat, Sub District Dungingi, Sub District Kota Timur, Sub District Dumbo Raya, and Sub District Sipatana (Central Agency on Statistics Kota Gorontalo, 2013).

Urban development and the increasing development of infrastructure in Gorontalo City caused the decrease of agricultural land. This will impact on the socio-economic culture conditions and local wisdom which This is due to

agricultural land has a very important role in supporting the sustainability of public life in Gorontalo City which are mostly farmers. This condition imply agricultural land is still needed both for farmers for income and for non-farmers for food sources.

People in the maize farmlands have the close interaction between neighbors and their neighborhood, so there are a specific socio-economic-cultural conditions and specific local wisdoms. This is due to corn field is a determinant of their lives, so it must be treated with the best treatment. Social characteristics studied in this research include the age specific rate, number of family members, education level, and the main job.

Economic conditions of the communities studied in this research include income earned from agriculture and land tenure. This involves factors that affect the income and the economy condition of maize farmers. Culture characteristics of maize farmers which were examined in this study include religious values, customs, manners, ideology, art and beliefs associated with farm life. Cultural factors inherent in the life of the maize farmers are reflected as local wisdom for farmland maintenance.

Characteristics of social, economic-culture and local wisdom in maize farming is always evolving and changing dynamically. This is in line with the various changes that occur in the community, maize farmers and corn field. Based on the background, this study assesses the condition of social, economy, culture, and society of local wisdom in maize cultivation in Gorontalo City, Gorontalo Province.

This study aims to assess the condition of social, economy, culture, and society of local wisdom in maize cultivation in Gorontalo City, Gorontalo Province. This research is important to be implemented and it is interesting to determine factors of culture and local wisdom applied by maize farmers

conducted with respect to the environment so that agricultural land can be utilized in a sustainable manner and obtain optimal results and finally can improve the welfare of society.

STUDY AREA

Gorontalo City, Indonesia is located between $00^{\circ} 28' 17'' - 00^{\circ} 35' 56''$ North Latitude and between $122^{\circ} 59' 44'' - 123^{\circ} 05' 59''$ East Longitude. Gorontalo City is bordered to the east with Bone Bolango Regency, bordered to the west with Gorontalo Regency, bordered to the north with Bone Bolango and Gorontalo regency, and bordered to the south with Tomini Bay. Gorontalo City area is 0.65 percent of the total land area of the Gorontalo Province. Gorontalo city is traversed by three major rivers namely Bone River, Bolango River, and Tamalate River. Map of study area is showed in Figure 1.

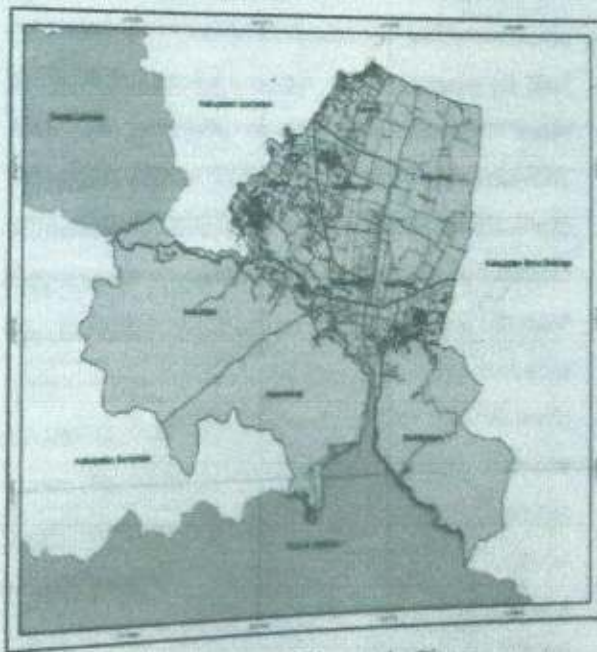


Figure 1. Map of Gorontalo City

(Source : Rupabumi Indonesia Map, Bakosurtanal, 2001)

Gorontalo city same as other tropical regions experiences two seasons, the dry season and the rainy season. Suhu udara di Gorontalo is between $22,8^{\circ}\text{C} - 33,5^{\circ}\text{C}$. Air humidity vary from 56,2%- 93,7%. Lowest humidity is occurred middle of the day, while

the humidity is highest in the morning. In 2013, the highest rainfall is recorded 307,9 mm in May 2013 while the lowest rainfall is recorded 37,2 mm in September 2013. Number of rainy days is highest on July 2013 (24 days) and lowest in September 2013 (9 days) (Central Agency on Statistics Kota Gorontalo, 2014).

LOCAL WISDOM IN GORONTALO

Based on the research results, there are two patterns of farming in Gorontalo, namely: special farm (monoculture farm) and farms with intercropping (mixed farm). 80 percent farmers cultivate maize with specific farming patterns (monoculture farm) and 20 percent use intercropping (mixed farm). Maize farming contributes a high income for farmers. This shows the high dependence of farmers on maize commodity, as source household incomes. The results also showed that there is a trend of farmers to open new land for planting maize. Local wisdom in managing maize farmland, including astrology to see stars *Tadatu and Totokiya*. According to the belief of maize farmers in Gorontalo, when the star had appeared it indicates pests and diseases will come. Meanwhile, when the star was already on the head of the farmers, it's a bad sign will come soon. Tradition *mopo'a huta* (feed the soil) still conducted by Gorontalo people to maintain plants. Trees used as a place of ritual, community planting and maintaining perennial crops as one of the conservation technique. Another tradition which is persisted in conservation efforts is tradition *heelumia, hualunga, dan huayala*.

METHODOLOGY

The type of data in this study consists of primary data and secondary data. Primary data is data obtained directly from interviews with respondents, while secondary data in the form of statistical data and maps obtained from relevant government agencies in

Gorontalo City. Data collection techniques include field observations, interviews directly to maize farmers, literature study, and secondary data collection in relevant government offices.

Field observations carried out in the early stages of research, which aims to get a general overview and comprehensive information regarding the conditions of the study area. Based on field observations, it determines the sample point, number of samples, study design, and research schedule.

The questionnaire given to respondents containing a list of questions about personal data respondents, education, age, income, expenses, land ownership, customs, traditions and culture in land management. Results of observation and data collection through questionnaire respondents were processed and analyzed to determine the characteristics of the socio-economic-cultural and local wisdom of maize farming communities in Gorontalo City.

RESULT AND DISCUSSION

Age Composition

Overview of age composition maize farmers in Gorontalo City is presented in Figure 2. The age group of maize farmers in Gorontalo city is dominated by age group of 49-56 years with a percentage of 30.59% and age group of 57-65 years with a percentage of 31.77%. The lowest percentage was 16-24 years age group with a percentage of 2.35%. These conditions describe that occupation as a maize farmer is mostly done by older farmers with age > 49 years. The condition also showed only a few young people in Gorontalo city which want to be farmers maize. They prefer other jobs for example in trade sector, workshops, working in the office, as well as other types of businesses.

Percentage (%)

Age Group	Percentage (%)
16-24	2.35
25-32	15.18
33-40	18.75
41-48	25.42
49-56	30.59
57-65	31.77

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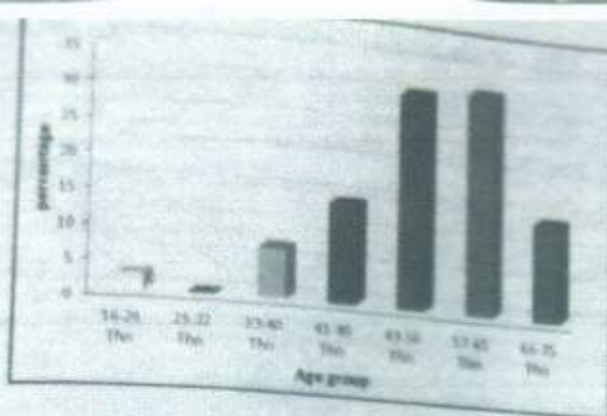


Figure 2. Diagram of age composition of maize farmers

Education

The research result shows that the education level of the maize farmers in Gorontalo City is very low. This can be seen in Figure 3. This diagram shows that 55,29% of maize farmers has an elementary school level education, 15,29% of maize farmers has junior high school level education, 18,82% of maize farmers has senior high school level education, and only 4,70% of maize farmers has university level education.

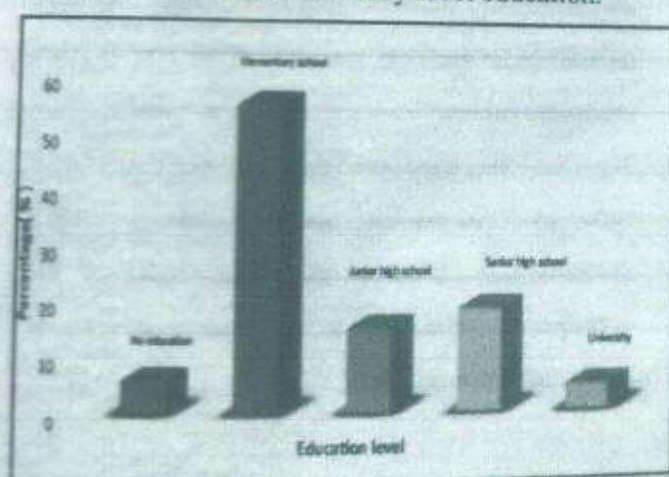


Figure 3. Diagram of education level of maize farmers

This condition illustrates maize farmers in Gorontalo City is dominated by a farmers which only educated to elementary school level. The low level of education of maize farmers affect the mindset, cultivation methods, the mastery of technology, and marketing method of corn yields in the city of Gorontalo. The level of education also influences the perception of maize

farmers to conservation methods, the effects of erosion on the environment and sustainability of land.

Occupation

The research results obtained from interviews with respondents describe that, the principal job of the maize farmers is dominated by the agricultural sector and the self-employed (entrepreneur). The percentage of maize farmers which have the main work in the agricultural sector 64.70%, self-employed 27.05%, civil servants 5.88%, miners and laborers with a percentage of 1.17% respectively.

This shows that in general, the main job of maize farmers in Gorontalo City is the agricultural sector. It also shows that the maize cultivation also become a side job for many people in Gorontalo City which had main job as a civil servant, self-employed, miners and laborers.

Land Status

The land ownership status of maize farmland in Gorontalo City is dominated by profit sharing 61%, own property 38%, and leasing land 1%. Figure 4 illustrates land ownership status of maize farmland in Gorontalo City.

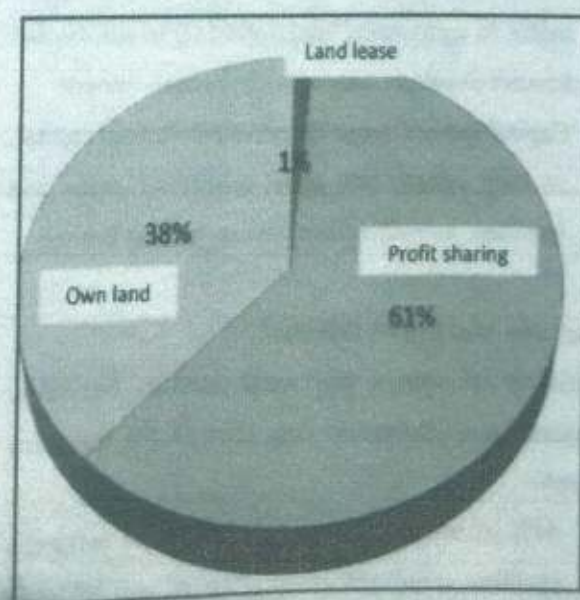


Figure 4. Diagram of land ownership status

This condition indicates that the majority of maize farmers in Gorontalo City do not have agricultural land. They cultivate maize on land owned by others and share the profits. This will affect the amount of income earned by maize farmers. The more narrow land resulted in a low quantity of crop yields. Profit sharing system and land leasing also will reduce the income of maize farmers. This will impact on the unfulfilled needs of families in the form of clothing, food, shelter, education and other needs.

Income

Average income per year of maize farmers in Gorontalo City from maize agriculture is IDR. 20,137,795.36. Average income per year of maize farmers from agricultural sector non maize commodity is IDR. 19,741,004.19. Average income per year of maize farmers from plantation is IDR 3,930,000.

The amount of maize farmers' income in Gorontalo City is influenced by several factors includes:

- a. Weather factors that cannot be predicted, the long dry season which causes the plants are not getting enough water, and crop failures.
- b. Factors of land ownership, most farmers grow maize in agricultural land owned by others. So the harvest should be shared with the land owners.
- c. Capital factors, some farmers have limited capital, so they cannot buy good quality of seeds and fertilizer, as well as land management is limited.

Culture and Local Wisdom

Analysis of culture and local wisdom for maize cultivation in Gorontalo City showed the following results:

- a. 44% of respondents said there was no particular tradition in the cultivation of maize, and 56% said they saw astrology when planting maize (to see stars *Tudatu* and *Tonakisa*).

machetes and 34% of respondents said using tractors, hoes, machetes.

That condition illustrates that most of maize farmers still believe in astrology, to determine a good day in agriculture. However, the results also showed that not all maize farmers apply a tradition in the cultivation of maize. It is caused by several factors:

- a. Weather factors are believed by some farmers as the determining factor of success in the cultivation of maize. This is due to, when the day is said to be good based on astrology, but extremely hot weather caused the soil to become dry so it cannot be planted with maize. It happens over and over, making the tradition of seeing astrology or see good days, in agriculture began not been used by the farmer.
- b. Technological development. Most respondents argued, according to the conditions at this time which already modern, they are already utilizing technologies such as tractors, fertilizers, hybrid seeds and others.
- c. The study was conducted in urban areas, where the flow of information and technology readily available, so farmers had been applying the appropriate technology to increase production of agricultural commodity

CONCLUSION

After the data from respondent and field observation were analyzed, this research makes the following conclusions:

1. Social Conditions: the age group of maize farmers in Gorontalo City is dominated by age group 40-50 years and 57-65 years, formal education most of the maize farmers are elementary school level.
2. Economic Condition: average main income of maize farmers in Gorontalo City is IDR 20,137,795.36. Most of the land ownership zone

of maize farmland is profit sharing. The agricultural sector is the main occupation of the maize farmers, but maize farming has also become a side job for many residents of Gorontalo City.

3. Culture and local wisdom condition: most of maize farmers in Gorontalo City have custom and tradition to consider astrology for agriculture especially maize farming (to see stars *Tadata* and *Totokiya*).

ACKNOWLEDGEMENTS

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