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Land Suitability and Purposed Land Use of Selaru Island, West-Southeast Moluccas Regency

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ABSTRACT

Land Suitability and Purposed Land Use of Selaru Island, West-Southeast Moluccas Regency (MP Sirappa, ED Waas and AN Susanto): Research was conducted in Selaru Island, West Southeast Moluccas Regency which has areal 32,217 ha. The purpose of the research was to study land suitability class and directive of land use for developing food crop and estate plant. The results indicated that Selaru Island was suitable land (S) for upland rice, corn, peanuts, mungbean, sweet potato, calladium, and coconut which had areal of 28,312 ha, 19,330 ha, 19,330 ha, 19,330 ha, 19,330 ha, 28,312 ha, and 12,886 ha, respectively. Land which was not suitable creteria (N) for upland rice, corn, peanuts, mungbean, sweet potato, calladium, coconut, and cacao were 3,905 ha, 12,887 ha, 12,887 ha, 12,887 ha, 12,887 ha, 3,905 ha, 19,331 ha, and 32,217 ha, respectively. Llimiting factors of land use for dryland food crop and estate plant in survey location were high temperature, root media (shallow soil solum), retention of nutrient (rather alkaline - until alkaline), medium erosion level and terrain (wavies, rock at soil surface and rock outcrop). Purposed land use for food crop dyland and estate plant based on land suitability class were (1) public coconut estate with main commodity coconut in the areal of 1,947 ha, (2) food crop dryland-1 with main commodities corn, mungbean, purplish edible tuber, and calladium with a wide was 5,299 ha, (3) food crop dryland-2 with main commodities upland rice, purplish edible tuber, and calladium in the areal of was 8,982 ha, and (4) food crop dryland-3 with main commodities peanuts and mungbean in the areal of 14,031 ha

Keywords: Land use, food crop and estate plant, land suitability, limiting factor, Selaru Island

INTRODUCTION

Agricultural development is not only directed to fulfilling food needs but also as a medium of exchange, so the emphasis is not only the production aspect, but more directed towards quality, efficiency, highly competitive, and sustainable. Agricultural development should be placed as the main base in the response to the crisis, in which agricultural development policies should place the public as the main actors in development (people centered development) (Suartha 2002).

Thus, agricultural development is expected to continue to strengthen food self-sufficiency through the development of sustainable agricultural systems by utilizing science and technology. In a more narrow environmental, agricultural development is expected to increase. Agricultural community access to agricultural production factors, especially the source of funds, technology, seeds, fertilizers, and distribution systems, so it has the direct impact on improving the welfare of farmers.

Agricultural development was performed using the time paradigm which was born from the realization, that the management of natural resources due to uncontrolled of economical policy and technological incentives that were not environmentally friendly caused environmental damage. The use and utilization of land resources in accordance to the optimum carrying capacity in the agricultural development can only be done if the information about the suitability of the land is available. Suryana *et al*. (2005) stated that one of the basic information needed for agricultural development is the spatial data (maps) of land resource potential.

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Spatial data resource potential of these lands provide important information about the distribution, extent, level of land suitability, a limiting factor, and alternative technologies that can be applied. However, in the reality the available data/information of land resources are not fully adequate to the scale. Until recently, land resource information is available at the Research and Development Center for Soil and Agroclimate for the whole of Indonesia only maps on the scale exploration (1 : 1,000,000), while the data/map on the review scale (1 : 250,000) only about 57% of the total area of Indonesia, and the map on a scale semi-detailed to detailed (1 : 50,000 or larger) is only about 13%.

Data and information of land resources and climate are an important component in supporting regional development, particularly in the planning area through the selection of potential areas for agricultural development. According to Wahyunto *et al.* (1994), to determine potential areas to optimal agricultural development, balanced and sustainable land resource data was required to be obtained through the evaluation of land suitability.

An evaluation of suitable landscape for food crop cultivation based on the value of landscape type was needed to decision making, coordination, and control for researchers, practitions, and farmers to minimize cost (Azis *et al*. 2006).

To be able to use land resources efficiently directed, the availability of data and complete information about the climate, soil and other physical environmental characteristics, and the growing requirements of cultivated plants are required. Climate data, soil and other environmental physical properties that affect plant growth and of the management aspects needed to be identified through survey and mapping of land resources. Land resource data are needed especially for the purposes of development planning and agricultural development. The data generated from the activity survey and mapping of land resources is still difficult to be used by the user (users) for a plan without the interpretation for a particular purpose (http:/bbsdlp.litbang. deptan.go.id/). Land evaluation is an approach or a way to assess the potential of land resources. Land evaluation results that will provide information and/or direction of land use and value of production expectations are likely to be obtained.

Dent and Young (1981) stated that the land evaluation was a prediction process of land potential for various alternative uses, and it was one important component in the process of land-use planning (FAO 1976). According to FAO (1976), suitability of land or land suitability classification is a way of a land suitability for a particular use. While, Hakim *et al*. (1986) stated that the land suitability classification is the process of assessment and classification of land units according to the suitability for a particular use. One of the systems used in the study of land suitability is suistability framework for land evaluation of the FAO. Land suitability assessment divided into 4 levels of detail, namely the order, class, subclass, and unit (Rossiter 1994; Djaenudin *et al.* 1993), but in this study it was only up to the subclass level.

The potential of an area for an agricultural development is basically determined by the matching between the physical nature of the environment and the land use requirements or the requirements of growing plants (Departemen of Agriculture 1997). Each agricultural commodity will be able to grow and has a high yield requires certain conditions to grow. According to Djaenudin *et al.* (2003), seeking of land commodity in accordance to the growth requirements will be able to produce optimally with top quality and requires relatively low inputs. Therefore, the potential and land suitability as well as inhibiting factors for the development of a commodity were needed to be known in order to determine the most appropriate commodity (Rossister and van Wambeke 1997).

Thie study was aimed to determine land suitability class of Selaru Island, West Southeast Maluku Regency and its purposed for the development of land use for food crops and plantations.

MATERIALS AND METHODS

Land Evaluation System

Various land evaluation systems were done by approaching to different system of multiple parameter, parameter sum system, and system matching system among land quality and land characteristic to the requirement growing of plant (Ritung *et al*. 2007).

One of land evaluation system that is utilized at Big of Research Institute and Development of Land Agriculture, Bogor is *Automated Land Evaluation System* or ALES (Rossiter and van Wambeke 1997), which is a software which can be filled by soil properties limitation that needed by plant and gets to be modified corresponds to scholarship progress about farm evaluation. ALES matching among land quality and soil characteristic with criteria land suitability class based on requirement of growing plant.

Study Site

Evaluation of land suitability Selaru Island, West Southeast Maluku Regency was conducted in 2006 in the areal about 32,217 ha. The materials used were the Geological Map Sheet year of 1981 Tanimbar Islands, Indonesia Systematic Geological Map Sheet (Quardrangle): Tanimbar island of 2807, 2808, 2809, 2907, 2909 with a scale 1 : 50,000, Joint Operations Graphic with a scale 1 : 250.000, topography map in year of 1946 with a scale 1 : 63.360, Forest Area Map and Mollucas waters with a scale 1:250.000, map sheet ZAE Tanimbar islands with a scale 1:250.000. While the research tools used included Trogh pH, pH Stik, alpha-alpha dipyridyl, hydrogen peroxide, a drill ground, the Munsell color charts, and other equipments.

Land Evaluation Approach

The approach used in the land evaluation was starting from the initial consultation to the land suitability classification which were the two-stage approach, the first stage was the physical land evaluation, and the second stage was economical land evaluation (FAO 1976) . The approach was usually used in an inventory of land resources, both for macro planning purposes, and to study the potential for production testing. The first phase of the suitability classification based on land suitability for the types of uses that have been selected since the beginning of the survey activities, such as for the field (arable land) or rice fields and orchards, where the results were presented in the form of reports and maps. The results of the activities in this first phase were then made as subject to the second stage to analyze the economical and social aspects, but in this study only the first step was done.

Land suitability rating was done by matching between the quality/characteristics of the land with the requirements of growing plants. Land suitability assessment framework refers to the Framework of Land Evaluation (FAO 1976), whereas the assessment procedure followed the method of Format Atlas (CSR/ FAO 1983). Guidelines for land suitability rating based on land suitability criteria for agricultural commodities (Djaenudin *et al*. 1994; Ministry of Agriculture 1997). Qualities/characteristics of land which were classified consist of water availability, rooting medium, retention of nutrients, toxicity, sodositas, terrain/danger of erosion, flood danger and/or puddles

Land suitability rating was differentiated according to levels, namely: the order, consisting of the order according to (S) and not suitable (N); Class, consisting of highly suitable class (S1), suitable enough (S2), marginally suitable (S3), current not suitable (N1), and permanent not suitable (N2); and sub-classes are distinguished on the basis of a limiting factor in each class, namely r = roots media; f = retention of nutrients; t = temperature; e = erosion; m = mechanization ; n = nutrients available; and w = water availability.

Land quality was identified by complex land properties at each plot. Each land quality had performance which was affected by the suitability because of particular use, and usually it was consist of one or more characteristics of the land. The land quality could be estimated or measured by directly in the field, however it was generally determined by understanding the characteristics of land (FAO, 1976). In the land evaluation, land quality was often not used but the direct use of land characteristics, because both are regarded as valuable in the evaluation. Evaluation method that uses land quality, among others was mentioned in the CSR/ FAO (1983), FAO (1983), Sys *et al.* (1993).

Each land quality can affect one or more types of land use. Similarly, one particular type of land use will be influenced by a variety of land quality. As an example, erosion was influenced by the nature of soil conditions, terrain (slope) and climate (rainfall). The availability of water for plant needs, among others influenced by climatic factors, topography, drainage, texture, structure, and consistency of soil, root zone, and coarse material (stones, gravel) in the cross-section of land.

In rating of land suitability classes there were several ways that can be used, for examples, it was comparing (matching) between the qualities and the characteristics of land as a parameter for land suitability criteria that was developed one of them to evaluate the requirements for crops growth or commodities.

RESULTS AND DISCUSSION

Land Resources, Water and Climate

Soils in the study area were varied enough to form a flat area, wavy to surging, solum which rather deep to deep, while in hilly areas generally had shallow soil solum.

Based on morphological characteristics which were observed in the field and the data supported, the results of chemical analysis, the lands in the study area were classified according to Soil Taxonomy (Soil Survey Staff 1998) at the following orders: Entisols, Mollisols, and Alfisols. Minasny (2007) reported that there were several sources of information that can be used to predict soil properties such as laboratory, field description, and soil morphology. More details on the division of the subgroups level is presented in Table 1.

Legend of the soil map scale 1 : 63,360 depth review Selaru Island, West Southeast Moluccas Regency, Moluccas Province was divided into 9 soil map units which consisting of 4 units of soil maps developed from a marine sediment material sand plains, along the coastal plains estuarin and estuaries, estuarin plains along the coast, tidal rivers and estuaries along the coast. On the other hand, the other five soil map units where formed from material napal, limestone/coral and shell limestone which was a plains and tectonic hills. Legend of the soil map scale 1 : 63,360 depth review are presented in Table 2.

Hydrological conditions in the study area were highly dependent on rainfall. The rivers water were very limited and generally dry in summer. The river was generally narrow and short size and empty directly into the sea. The use of river water for agriculture did not exist, so in general agricultural systems were relied solely on rain water. According to Rawls and Pachepsky (2002), slope gradient, position of the slope, and horizon classes as collected from soil survey data can used to predict water retention.

Based on data from Saumlaki Meteorological stations, rainfall on average per year was between 1000 to 2000 mm with an average temperature was 27.4^{o}C (minimum temperature was 23.8^{o}C and maximum temperature was 31.1^{o}C) (Table 3). According to Oldeman *et al.* (1981), the location of the survey was in the C3 zone climate with wet months of 5-6 months and dry months of 4-5 months.

Land Suitability

Optimization of land use potential is very important to support national food security and agribusiness development, and for that information about the potential and the availability of land resources was needed. Mulyani and Las (2008) suggested that the land resource data can be utilized to construct a thematic map, such as maps of land suitability for various commodities, land-use map directions, and the agriculture spatial map direction.

Table 1. Soil classification (Soil Survey Staff 1998) to the level of subgroups.

Ordo	Group	Subgrup
Entisols	Ustorthents	Lithic Ustorthents
	Udipsamments	Typic Udipsamments
		Aquic Udipsamments
	Udifluvents	Typic Udifluvents
	Hidraquents	Typic Hidraquents
Mollisols	Haplustolls	Typic Haplustolls
		Lithic Haplustolls
	Haprendolls	Lithic Haprendolls
Alfisols	Hapludalfs	Mollic Hapludalfs

Determination of an appropriate cultivation of food crops grown on a particular area can be done manually, ie comparing data in the field with land-use criteria for certain food crops, but the obtained information required time, effort, and little cost. It also could be done using satellite imagery (Ritung and Hidayat 2006). Thus, the productivity of food crops was dependent on the quality of land used (Azis *et al.* 2006).

According to Ritung and Hidayat (2006), by comparing the land potential data and land resources mapping, so land use data from satellite image analysis provided a more accurate spatially to the expansion of agriculture, both for seasonal crops as well as for annual crops.

Each soil map unit (SMU) was generated from the survey activities and/or mapping of land resources, land characteristics could be specified and described that included the physical state of the environment and the land. The data was used for the purposes of land interpretation and evaluation for a particular commodity. Each characteristic of land was used directly in the evaluation of one single character, and there was more than one because they had interaction each other. Therefore the interpretation needs to consider or compare the land to its use in terms of land quality. For example, the availability of water as the land quality was determined from the dry months and rainfall which was the annual average, but the water which was absorbed by the plant would depend on other land quality, such as state or rooting media, including soil texture and depth of rooting zone of growing plants (http://www.bbsdlp.litbang.deptan. go.id/).

Assessment of land suitability classes for food crops and plantations were classified according to level, *i.e.* order, class, and sub-class. The results of land suitability assessment of food and plantation crops are presented in Table 4.

Based on Table 4, SMU 1, SMU 5, and SMU 6 had a land suitability class was not suitable (N2) for the six types of food crops (upland rice, corn, mungbean, peanut, sweet potato, and calladium) with an areal approximately 3,905 ha, whereas SMU 2, SMU 4, and SMU 9 had suitable land suitability class (S2 and S3) for the six kinds of food crops with an areal approximately 19,330 ha. SMU 3, SMU 7, and SMU 8 was partially classified according to suitable (S3) for upland rice and calladium, and some was classified as not suitable (N1 and N2) for corn, peanuts, mungbeans, and sweet potatoes with a total areal of 8,982 ha. For crops evaluated, the SMU was not appropriate (N2) to plant cocoa (32,217 ha). As

Table 2. Number of soil map unit (SMU), soil classification, proportion, lanform and its wide area in Selaru Island, West Southeast Moluccas Regency.

SMU No.	Soil Classification*	Proportion**	Landform	Elevation (m asl)	Relief	Slope (%)	Parent material	Wide area	
								ha	%
1	*Consosiation :* Typic Udipsamments	P	Shore sand plain	0-3	Flat	0 – 2	Marine sediment	1,947	6.04
2	*Assosiation :* Mollic Hapludalfs Typic Haplustolls	D F	Plain–tectonic hilly (force terrace)	50-80	wavy – hilly	3 – 25	Napal, limestone/ coral	5,299	16.45
3	*Assosiation:* Typic Haplustolls Typic Udipsamments	D F	Tectonic plain (force terrace)	20-30	Rather flat–wavy	3 – 8	Limestone/ coral	3,342	10.37
4	*Complex:* Typic Haplustolls Lithic Haplustolls Lithic Usthortents	F F F	Plain-tectonic hilly (force terrace)	3-15	Flat – wavy	0 – 8	Limestone/ coral	7,196	22.34
5	*Assosiation:* Typic Hidraquents Aquic Udipsamments	D F	Estuarine plain along of the coastal and the river estuaries	3-6	Flat	0 – 2	Marine sediment and coral	1,817	5.64
6	*Assosiation:* Aquic Udipsamments Typic Hidraquents	D F	Estuarine plain along the coastal	0-1	Flat	0 – 2	Marine sediment	141	0.44
7	*Assosiation:* Typic Udifluvents Typic Udipsamments	D F		1-2	Flat – rather flat	0 – 3	Marine sediment	1,917	5.95
8	*Assosiation:* Typic Udifluvents Typic Hidraquents	D F	Estuarine plain along of the river and the coastal	1-4	Flat	0 – 2	Marine sediment	3,723	11.56
9	*Complex:* Lithic Usthortents Lithic Haplustolls Lithic Haprendolls	F F F	Tectonic hilly	5-10	Wavy - hilly	3 – 25	Limestone/ coral	6,835	21.21

Note: * Soil Taxonomy (1998), ** P = Predominant (> 75%), D = Dominant (50-75%), F = Fair (25-50%).

for coconut, SMU 3, SMU 4, SMU 5, SMU 6, and SMU 9 were classified as not suitable (N2) with a total areal 19,331 ha, and others SMU were classified as suitable (S3) for the coconut with an areal approximately 12,886 ha. In general the main limiting factor in land suitability rating can be improved by the addition of input, so the land suitability classes can be improved one class.

From the results of land suitability classes rating, it was shown that a SMU could be classified according to whether or not suitable for more than one commodity or commodity group with the same levelof land suitability or different, depending on growing conditions of each commodity (Table 4). To select a commodity which was most appropriate for development can be selected based on the priority scale, level of socio-cultural conformity and the local community.

Appropriate land use for land was the essence of land evaluation, and often it affected all other measures in the study. For example, initial investigations may indicate that parts of a region that was too dry to grow desired crops, therefore, irrigation

Table 3. Climate data in the last 10 years (1996-2005) in Selaru Island, West Southeast Moluccas Regency.

Month	Temperature (ºC)			Number of rainfalls (mm month^{-1})	Number of rain days (day)	Dampness of air relative (%)	Wind velocity (Knott)	
	Max	Min	Average				Average	Max
January	32.0	24.6	28.1	252	20	84	7	28
February	31.9	24.2	27.7	337	17	86	5	20
March	31.2	23.6	27.3	259	14	83	6	40
April	31.4	24.4	28.1	82	12	80	5	20
May	30.2	23.6	27.1	384	15	81	6	25
June	29.7	23.7	26.7	230	12	79	7	18
July	29.3	23.3	26.4	46	17	77	8	20
August	29.4	22.9	26.0	14	9	79	7	18
September	30.4	23.2	26.7	0	0	78	8	18
October	32.1	23.8	28.0	0	0	77	4	15
November	33.3	24.7	28.9	8	4	75	5	18
December	32.4	24.1	28.2	188	16	83	5	31

Source: Saumlaki Meteorological Stations *in* BPS Kab Maluku Tenggara Barat (1996;1997; 1998; 1999; 2000; 2001; 2002; 2003; 2004; 2005).

Table 4. Wide area and land suitability class for food crops and plantations on each soil map unit (SMU) in Selaru Island, West Southeast Moluccas Regency.

SMU No.	Wide (ha)	Land Suitability Class							
		Upland rice	Corn	Mungbean	Peanuts	Sweet potato	Calladium	Coconut	Cacao
1	1,947	N2	N2	N2	N2	N2	N2	S3wrfn	N2
2	5,299	S3rf	S2tfe	S2tfe	S2trfe	S3f	S2fe	S3w	N2
3	3,342	S3tf	N1f	N1f	N1f	N2	S3f	N2	N2
4	7,196	S3rf	S3r	S3m	S2rfme	S3rf	S3r	N2	N2
5	1,817	N2	N2	N2	N2	N2	N2	N2	N2
6	141	N2	N2	N2	N2	N2	N2	N2	N2
7	1,917	S3f	N1f	N1f	N1f	N2	S3f	S3wrf	N2
8	3,723	S3f	N1f	N1f	N1f	N2	S3f	S3wrf	N2
9	6,835	S3r	S2t	S2rfm	S3rf	S3r	S3r	N2	N2

Remarks : S2= rather suitability; S3 = marginally suitable; N1 = the existing not suitable; N2 = not suitable permanent; r = root media; f = nutrient retention; t = temperature; e = dange of erotion; m = mechanization; n = available nutrient; w = water availability.

may be necessary (http://www.fao.org/docrep/U1980e/U1980e02.htm/). If the fitness class had been defined in terms of value for each factor, hence rating hereinafter was relatively easy.

Classes of land suitability for some types of food crops and plantations are shown in Table 5. The area was suitable fordry land plant, namely rice, corn, peanuts, mungbeans, sweet potatoes, calladium, and coconut, in each had a wide area of 28,312 ha, 19,330 ha, 19,330 ha, 19,330 ha, 19,330 ha, 28,312 ha and 12,886 ha, respectively, and the area which were not suitable for upland rice, corn, peanuts, mungbeans, sweet potato, calladium, coconuts, and cocoa in each a wide area of 3,905 ha, 12,887 ha, 12,887 ha, 12,887 ha, 12,887 ha, 3,905 ha, 19,331 ha, and 32,217 ha, respectively.

According to Aziz *et al*. (2006), land evaluation can also be done through the application of artificial neural network with the LVQ method, to determine the appropriate types of food crops grown on a specific land, value based on land characteristics was included, which was previously done learning. This was because the computers were given stock of knowledge and reasoning ability as an expert in that field. LVQ (Learning Vector Quantization) was a method for learning in a supervised competitive layer (Kusumadewi 2003). Further explained that the characteristics of land that was used consists of 22 units, *i.e*. the mean temperature, rainfall, humidity, drainage, texture, rough material, depth of soil, peat thickness, peat with outcrop/enrichment of minerals, peat maturity, KPK clay, base saturation, pH H_2O, C-organic, salinity, alkalinity, sulfidic depth, slope, erosion hazard, inundation, the rocks on the surface, and rock outcrops.

Purposed Land Use

Land evaluation process and its purposed land use were done in a few phase, which were: (1) preparation of land characteristic, (2) preparation of requirement of grow plants/land use (LURs), (3) process of land evaluation suitability, and (4) land suitability were chosen/ determinations of purposed land use for plant (Ritung *et al* . 2007).

Based on land suitability class, the scale of priorities, social and cultural communities, then the referral can be made in land use. Referrals land use for food crops and plantations on the Selaru Island, West Southeast Moluccas Regency are presented in Table 6 and Figure 1, with the following description: (1) public coconut estate with a wide of 1,947 ha (6.04%) with main commodity was coconut, (2), food crops dryland-1 with a wide of 5,299 ha (16.45%) with the main commodities were corn, mungbean, purplish edible ruber, and calladium (SMU 2), (3) food crops dryland-2 with a wide of 8,982 ha (27.88%) with the main commodities were upland rice, purplish edible ruber, and calladium (SMU 3, 7, and 8), (4) food crops dryland-3 with a wide of 14,031 ha (43.55%) with the main commodities were peanuts and mungbean (SMU 4 and 9), (5) forest demarcation coastal/rivers, mangroves and brackish water fisheries with a wide of 1,958 ha with the main commodities were mangrove and mangrove crab.

The main limiting factors in the development of land use for agricultural crops and plantations were rooting medium and nutrient retention, especially poor soil drainage and shallow soil solum, and alkaline soil pH. Sirappa *et al*. (2006) reported that in order to overcome the problem of land management, application of nutrients were needed to be very careful, and organic matters were needed.

According to Chacholiades (1978), development of appropriate agricultural commodities in an agroecological zone should be characterized by: (1) it could be developed on a large scale, (2) it had a charm and a great driving force that can encourage the growth of other sectors, and next, (3) it had a comparative advantage and competitive. Conway (1987) described that each agroecological zone had certain characteristics, including productivity, stability, sustainability and equitability.

Susanto and Sirappa (2007) argued that agricultural development in small islands, as in Selaru should be based on the characteristics of land resources and social, cultural and economical community to be sustainable agricultural development. Subardja (2006) suggested that land quality had a close relationship with plant productivity and was influenced by parent materials and soil developments, especially nutrient retentions. Nutrient availability was more influenced by nutrient management.

Tabel 5. Wide of area on each land suitablity class for each type of food crop dryland and estate plant.

Land suitablity class	Type of crops and their wide area (ha)							
	Upland Rice	Corn	Peanuts	Mungbean	Sweet Potato	Calladium	Coconut	Cacao
S1	-	-	-	-	-	-	-	-
S2	-	12,134	12,134	12,134		5,299		-
S3	28,312	7,196	7,196	7,196	19,330	23,013	12,886	-
N1	-	8,982	8,982	8,982	-	-	-	-
N2	3,905	3,905	3,905	3,905	12,887	3,905	19,331	32,217
Total	32,217	32,217	32,217	32,217	32,217	32,217	32,217	32,217

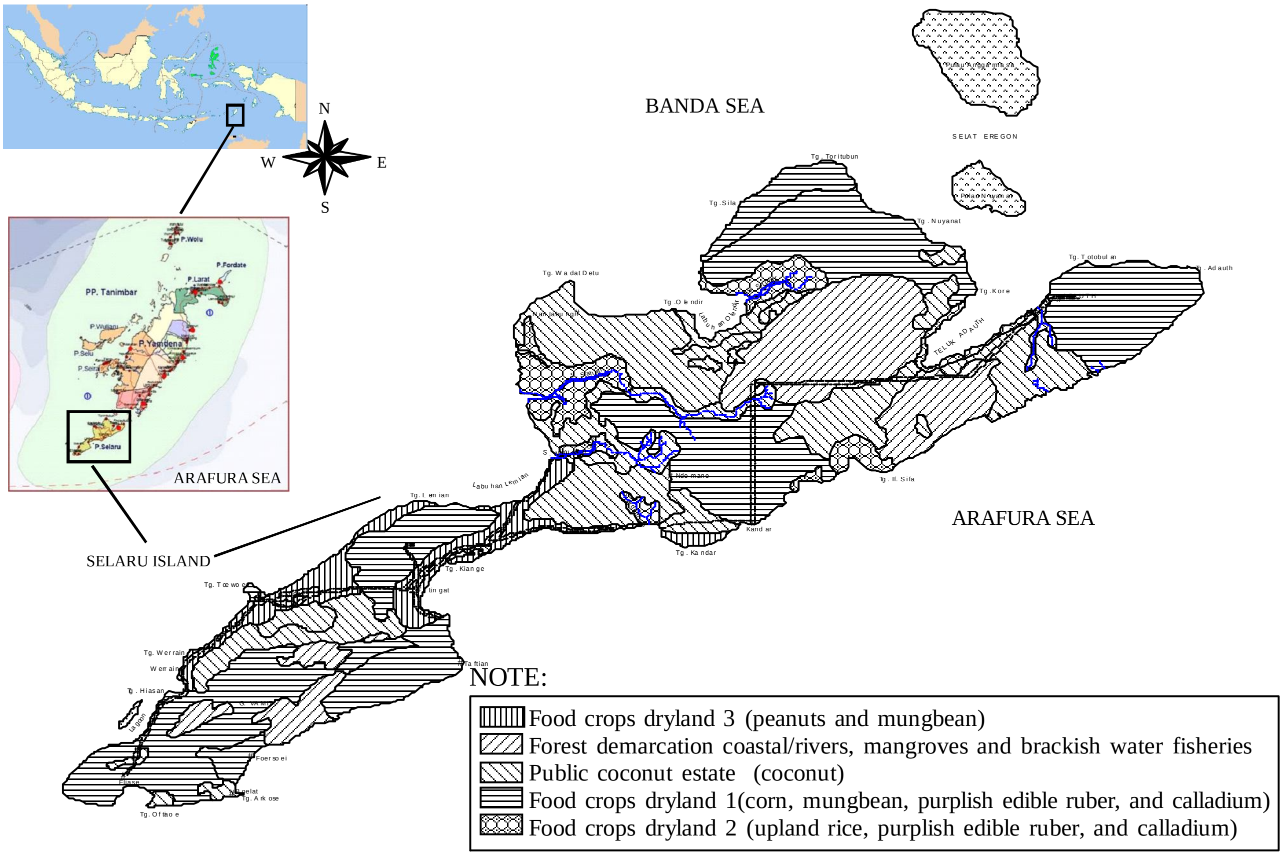

Figure 1. Purposed land use suitbale for food crop and estate plan at Selaru Island, West Southest Moluccas.

CONCLUSIONS

The selection of food crop and estate plan which were cultivated in Selaru Island, West Southeast Moluccas Regency must consider the suitability of the land. Selaru Island, West Southeast Moluccas Regency had suitable land (S) for upland rice, corn, peanuts, mungbean, sweet potato, calladium, and coconut in each a wide of 28,312 ha, 19,330 ha, 19,330 ha, 19,330 ha, 19,330 ha, 28,312 ha and 12,886 ha, respectively, while those classified as not suitable (N) for upland rice, corn, peanuts, mungbean, sweet potato, calladium, coconut, and cocoa in each a wide of 3,905 ha, 12,887 ha, 12,887 ha, 12,887 ha, 12,887 ha, 3,905 ha, 19,331 ha and 32,217 ha, respectively.

The main limiting factors of land use for food crops and estate plantations in that location included temperature (annual average temperature was high), medium roots (shallow soil solum), nutrient retention (soil pH was rather alkaline until alkaline), danger of erosion level was medium, and terrain (wavy, rocks on the soil surface and rock outcrop).

Based on the results of assessment of land suitability classes, then the purposed of land use for food crops and estate plant on the Selaru island were: (1) public coconut estate with the main commodity of coconut with a wide of 1,947 ha, (2) food crops dryland-1 with the main commodities of corn, mungbean, purplish edible tuber and calladium with a wide of 5,299 ha, (3) food crops dryland-2 with the main commodities of upland rice, purplish edible tuber and calladium with a wide of 8,982 ha, and (4) food crops dryland-3 with the main commodities peanuts and mungbean with a wide of 14,031 ha.

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BPS Kab Maluku Tenggara Barat. 1996. Maluku Tenggara Barat dalam Angka. Biro Pusat Statistik Kabupaten MTB (in Indonesian).

Table 6. Purposed of land use for agriculture in survey area in Selaru Island, West Southeast Moluccas Regency.

Purposed land use	Main commodity	Limiting factor	SMU No.	Wide area	
				Ha	%
Public coconut estate	Coconut	Temperature (average of height annual temperature); root media (soil drainage quickly/very quickly); nutrient retention (low cation exchange capacity, soil pH alkaline); nutrient availability (very low K availability	1	1,947	6.04
Food crops dryland-1	Corn, mungbean, purplish edible ruber, calladium	Temperature (average of height annual temperature); nutrient retention (soil pH rather alkaline until alkaline); danger erosion level (low until moderate)	2	5,299	16.45
Food crops dryland-2	Upland rice, purplish edible ruber, calladium	Temperature (average of height annual temperature); root media (moderate soil drainage); nutrient retention (soil pH alkaline)	3; 7; 8	8,982	27.88
Food crops dryland-3	Peanuts, mungbean	Root media (a half of soil solum shallow, texture rather heavily); nutrient retention (soil pH rather alkaline); terrain (wavy relief, rock at soil surface and rock outcrop); danger erotion level (low)	4; 9	14,031	43.55
Forest demarcation coastal/rivers, mangroves and brackish water fisheries	Mangrove, mangrove crab	Root media (drainage very pursued)	5; 6	1,958	6.08
		Total		32,217	100.00

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