

## A Challenge in Providing Housing Land and Sustainable Agricultural Land; An Effort to Meet The Backlog of Housing and Food Security in West Sumatra

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**Abstract**— Population growth in urban areas tends to be faster than in rural areas; it is due to various factors. Population growth has increased housing demand. The need for housing should be filled with the provision of land and houses. The most common problems in urban housing provision are less urban land available for housing and higher the price. It is happening in cities of West Sumatra, changed of agricultural land (rice field) into housing although the Government of the Republic of Indonesia has issued Act No.26 / 2007 on Spatial Planning, which sets the land allotment for spatial in Indonesia. Supporting this, in the year 2009, the Indonesian government issued, Indonesian Act No. 41/ 2009 on Sustainable Land Farming Protection, concerning on sustainable land for food agriculture, that agricultural land must be maintained in order to produce agricultural products. This paper describes to what extent of the conversion of agriculture land into housing in the last five years in several regions in West Sumatra, Indonesia. Illustrate the process of transferring land functions (from rice field to housing), which is permitted by government regulations. This study shows that there has been a relatively significant change in the function of a rice field in urban areas. The lack of government records on land use change needs to be an important note. A legal product is governing the conversion of agricultural land, Law enforcement of spatial use rules, detailed spatial plan, reliable maps as a reference (Spatial Planning) in determining the land use of the proposed location for the house to be built, should be of particular concern by the government. It is necessary to coordinate and integrate housing and agricultural planning so that housing construction can meet the needs of the house, on the other hand, the need for rice product can be produced without having to reduce agricultural land.

**Keywords**— land used; housing land; sustainable agriculture land.

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### I. INTRODUCTION

Population growth is causing many consequences; increasing demand for food, clothing, housing, and other necessities. Increased demand for food can be supplied with increased production of rice, and potatoes. Various methods have been cultivated in increasing the production of food (rice), it can be done by Agricultural Intensification, Extensification, Diversification, Mechanization, and Rehabilitation. Intensification is the optimum land management in order to obtain maximum production from existing land, and extensification is increased the amount of land planted (expanding agricultural land).

On the other hand, in the fulfillment of housing needs, various methods also have been implemented to provide

housing for the community. Several ways have been done; the addition of the expansion of residential land (townhouse building) and increasing the capacity of the number of houses on a land (multi-story buildings)

Both demands (for housing and food) show that land is the thing that must be supplied to meet the demand. The land is a place to build housing, agriculture, facilities and infrastructure, and a place for activity and others. It cannot be denied that the provision of buildings as a residence requires the land where the house is built. Demand for the land of urban housing is increasingly high, due to the rapid increase of urban population. The increasing demand for residential houses will be in line with the increased need for land to build housing in the area. The massive and rapid development of urban residential buildings has intensified aggregates domestic environmental pressures [1], [2].

Although urban sustainability has now risen to prominence in urban studies, a generally acceptable and operational definition is yet to be developed. As cities are spatially heterogeneous, complex adaptive systems, however, urban sustainability is more usefully viewed as a dynamic process instead of a fixed goal [3]–[6].

The challenge of sustainable development is the availability of threatened land to meet increasing human demand. Land resources are an important part of the central issue in regional development planning. Hence, in 2007 The Government of the Republic of Indonesia issued the Act No.26 / 2007 on Spatial Planning, which aims to be able to conduct the arrangement of spatial, in a system that includes the process of spatial planning, spatial utilization, and control [7]. Following and supporting the above regulation, with consideration of increasing population growth and economic and industrial development, resulting in degradation, transfer of functions, and fragmentation of agricultural land have threatened national carrying capacity in maintaining food self-sufficiency, sustainability and sovereignty, the Government of the Republic of Indonesia passed the Act no. 41/ 2009 on Sustainable Land Farming Protection. This regulation is expected to prevent the rate of conversion of paddy fields, especially rice fields with technical irrigation, to support national food security [8]. Reference [9] shown that farmland conversion in the non-urban planning area was more intensive than that in the urban planning area.

On the other hand, based on data from the Ministry of Public Works and Housing of Indonesia, the home backlog reaches 7.6 million units by 2014 based on the concept of occupancy. While the concept of ownership, home backlog reaches 13.5 million homes. The government pursues a housing backlog by issuing a policy of Government Regulation no. 88/ 2014 on the Development of Housing and Settlement Areas [10]. Furthermore, in supporting the provision of houses, in April 2015, the President of the Republic of Indonesia inaugurated the One Million Housing Development program. It is hoped that the number of backlogs based on the concept of occupancy can fall to 5 million units by 2019.

Moreover, to fulfill this, the need for land for housing is critical. Empirically it has been proven that the economic value of land that is used for the use of food agriculture, is lower valued than use as non-agricultural, such as for housing, trade, or other functions and purposes [11]. Experience so far that urban agriculture; food-agriculture land conversion and its impact on food availability have served as a vital input in the livelihood strategies of urban household in many countries [12], [13].

The question is whether these two demands for housing and agricultural land in the implementation can be mutually met or vice versa. This research will describe the data and facts in the field, the existence of land competition in the fulfillment of the need for housing and agricultural land.

## II. MATERIAL AND METHOD

This research followed four steps: (a) Desk study for land used is focus on two regencies; Tanah Datar and Limapuluh Kota, and two municipals: Padang and Pariaman of West Sumatra province of Indonesia. Desk studies are carried out

by conducting a review of policy documents, related to the support, enforcement, and implementation of regulations on sustainable agricultural land at the provincial and district levels.

(b) Digitizing the land use with aerial photography (satellite imagery map). Thus, the overlay of mapping from land use is directed at evaluating the implementation of the Spatial and Regional Plan, whether the land that has been set up as agricultural land is turned into housing. Map of land use plans in 2012 and maps. Satellite imagery in 2015 was used as a comparison.

(c) Interview to government agency to get information, perception, and level of understanding from stakeholders (Public Works, Regional Planning Board, Food Agriculture, Statistics, Spatial Planning Coordinating Board in regency and municipal), are done by using several questions composed in a questioner, and then scoring for later analysis using Analytical Hierarchy Process method, and

(d) Analyzing the definition and challenge of providing land for housing and rice fields.

The review of the legislation was carried out using qualitative and interpretative descriptive analysis. Comparative analysis is carried out to find out whether the land that has been designated as agricultural land by Indonesian law remains as agricultural land or has changed its use to housing. In the next step is quantitative descriptive analysis to show where agricultural land use has changed to settlements or housing.

## III. RESULTS AND DISCUSSION

### A. Land Used Regulation

The Government of the Republic of Indonesia issued Act No.26/2007 on Spatial Planning, which aims to create a safe, comfortable, productive and sustainable national territory with; (a) the realization of harmony between the natural environment and the artificial environment; (b) realization of integration in the use of natural resources and artificial resources with respect to human resources; and (c) the realization of the protection of spatial function and the prevention of negative impacts on the environment due to spatial utilization. The Act of the Republic of Indonesia No. 26/2007 on Spatial Planning states that each Province shall have a Regulation on the Spatial Planning of the Provincial Region at the latest within two years from the enactment of the Act, and to the Regency or Municipal shall have Regulations on Spatial Plans of Municipal or Regency no later than 3 (three) years since the Act is ratified [7].

Every land allocation in Regency and Municipality is determined through Local Regulation on Spatial Planning. This Spatial Planning Regulation is a rule that must be determined by every Province, Regency, or Municipality in Indonesia. The completion of the Regional Spatial Planning for Municipals and Regencies selected for this study is delayed by approximately two years from the time mandated by the Act. Table 1, shows the Regional Spatial Planning Regulations for the Regencies and Municipals selected for this study.

Based on the National Spatial Planning Plan document, the city of Padang as the National Activity Centre and Pariaman is as the Regional Activity Centre [14]. The city of

Padang as the capital of West Sumatra Province is planned to become a metropolitan city by 2025. Moreover, the city of Padang along with the city of Pariaman is also planned to be an agglomeration area.

Based on Indonesian Law no. 41 of 2009, concerning the Protection of Sustainable Land Agriculture, states that each region (including the city of Padang and the city of Pariaman) must establish a sustainable agricultural land [8]. Moreover, according to the Regional Regulation of West Sumatra Province no. 13 of 2012, regarding the Provincial Spatial Planning, Tanah Datar and Limapuluh Kota Regencies must declare *agropolitan* areas with agricultural land for dry food and horticulture.

Melinda et al. [15], showed that in the city of Padang and the city of Pariaman there was a decrease in the number of paddy fields, meanwhile, in Tanah Datar and Limapuluh Kota Regencies, there was an increase in paddy fields in the period 2009 to 2014, due to a new rice expansion program.

TABLE I  
REGULATION OF SPATIAL AND REGIONAL PLAN OF MUNICIPALS /  
REGENCIES, YEAR AND PERIOD

REGENCY / MUNICIPAL	REGULATION NUMBER AND YEAR	PERIOD
LIMA PULUH KOTA	7 / 2012	2012 - 2032
TANAH DATAR	2 / 2012	2011 - 2031
PADANG	4 / 2012	2010 - 2030
PARIAMAN	21 / 2012	2010 - 2030

Indonesian Act No. 41/ 2009 concerning on sustainable land for food agriculture have been in place for seven years. The regulation aims to maintain food security for individual households. Every Municipals and Regency must establish a zone of food crop agriculture to guarantee sustainable agricultural land and be written in both the Regional Spatial Planning and Regional Development Planning [8].

Regional Spatial Planning and Regional Development Plan must be followed by all parties, in the form of allocation of spatial designation in a planning area. The spatial form can be location allocation, area, and other attributes (such as type and intensity of activities) that are planned until they are reached at the end of the planning period. Also, spatial can also be a procedure (without pointing to location allocation, area, and other attributes) that must be obeyed by stakeholders of spatial users in the plan area. However, the spatial arrangement can also consist of a combination of the two forms, i.e., spatial allocation and procedures [17].

#### B. Changes of land use from agricultural land to housing

Based on the mapping analysis using the Regional Spatial Planning map, from land use published in 2012 and the Citra satellite in 2016, in the City of Padang, Kota Pariaman, Tanah Datar and Limapuluh Kota Regencies, several parts of the area were designated as agricultural areas, has been used as a residential area. Figure 1 shows an example of a map using the Citra satellite, which was superimposed on a Regional Spatial Plan in one sub-district in Limapuluh Kota District. It shows aerial photographs and delineation of land use in 2015, where green is still existing agricultural land, yellow is a residential area, and red is agricultural land

(according to the 2012 Spatial Plan) which has now changed into a residential area.

Table 2 shows the total number of settlements in the allocation of agricultural land. This finding tells about the change of agricultural land into housing or land that is not utilized, which might have an impact on the amount of agricultural production, and certainly will have a negative impact on the success of sustainable agriculture development programs [15].

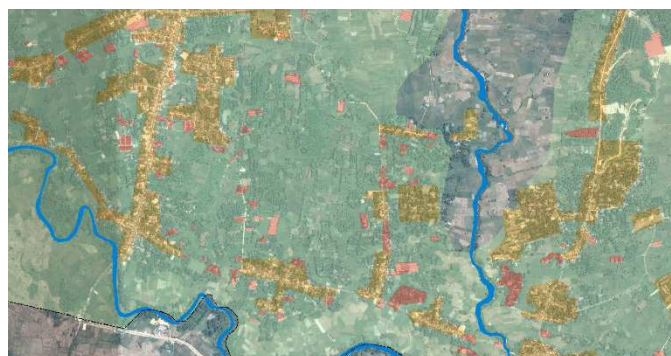


Fig 1. Delineation of settlement area (red zone) was changed from agricultural land within five years in Limapuluh Kota Regency.

TABLE II  
TOTAL AGRICULTURAL LAND WHICH HAS BEEN SHIFTED TO HOUSING AND  
SETTLEMENT AREA USING SPATIAL PLANNING AND CITRA SATELLITE  
MAPPING OVERLAY

MUNICIPALITY / REGENCY	TOTAL AGRICUL TURAL LAND IN 2012 (HA)*	TOTAL AGRICULT URAL LAND IN 2015 (HA)**	HOUSING AREA IN AGRICULTURAL LAND (HA)**	% OF HOUSING AREA IN AGRICULTURAL LAND
LIMAPULUH KOTA	43356	43035	321	0.74
TANAH DATAR	60473	60052	421	0.70
PADANG	3016	2856	159	5.27
PARIAMAN	2057	2014	43	2.08

\* Regional Spatial Planning,

\*\* digitizing using Citra satellite map,

Table II shows that for all regions, there has been a change in agricultural land into residential land. The city of Padang as a big city has the highest percentage of land change compared to other regions. The magnitude of the change in land pressure is believed to be due to a large number of people who need housing (linear correlation). On the contrary, although the percentage of land conversion area is small in Tanah Datar and Limapuluh Kota Regencies, regarding quantity/area, the two regencies have also experienced massive conversions (average above 60Ha per year). Even though the two regencies are directed by the Provincial Government to develop *agropolitan* areas, which guarantees sustainable agricultural land. However, this condition must be investigated to learn how and why it happened, and develop strategies on how to maintain sustainable agricultural development in all regions.

#### C. The process of building permits

This section explains how individuals or communities in obtaining building permit, on their land (despite existing

agricultural land), and undertake the process. The process developed by the municipal and regency governments is relatively similar — any individual or family who will apply for a home building permit, preceded by the approval of neighbor and village officials, than complete other requirements, such as map location plan and drawing of the house plan.

Other requirements will be added if the plan of the building area of the house to be built passes a certain limit of area. For example, for house-building plans under the area limit of 100m<sup>2</sup>, the arrangement of permits are only in the Sub-district (A Regency or Municipal consists of several Sub-districts). As for the plan of the building area of a house that exceeds 100m<sup>2</sup>, or a two-story building, the requirements are added by completing the drawings approved by the architect or engineer. These requirements are submitted to the Sub-District and proceed to the One Stop Integrated Service Agency. The issuing permit for the building area plan is more than 100m<sup>2</sup>; the sub-district is only to be reported while issuing the permit is One Stop Integrated Service Agency. The Agency, before issuing permission, will request to Regency or Municipal Spatial Planning Coordinating Board, to provide advice and feedback on applicants.

Regency or Municipal Spatial Planning Coordinating Board is a coordinating body consisting of two working groups; working group on Spatial Planning, and the working group on Spatial Utilization Control. The Spatial Planning Working Group is tasked with; provide input to the Regency or Municipal the Spatial Planning Coordinating Board on spatial planning policies; inventory and review the problems (conflicts) that arise in the planning and provide an alternative solution. The Spatial Utilization Control Working Group is substantially tasked with; coordinate monitoring (monitoring, evaluation, and reporting) on spatial planning; and coordinate the control and permit of Spatial Utilization [16].

Members of the Municipal or Regency Spatial Planning Coordinating Board consisting of Public Works, Housing and Settlement Offices, Agriculture, and other stakeholders who understand the policy of spatial use and planning are required to undertake a review of requests submitted by individuals or communities. The Board will conduct a coordination meeting discussing the request. If the location of the building permit application is on land for housing and housing, then the recommendation for the permit will be approved, and vice versa.

The following is a flowchart mechanism for obtaining building permits (Figure 2). The observation of the four districts, it was found that only in Pariaman Municipal, for a building area limit less than 50m<sup>2</sup> whose permit is in Sub-district, while other districts for an area up to 100m<sup>2</sup> (Table 3).

The correlation between the permit limit of the building area issued at the Sub-district level with the area of agricultural land that has been transformed into housing area (Table 2). Then it may be stated that the greater of the permit limit of the building area that can be issued by the Sub-district, that the more agricultural land will be transformed into housing and settlement land.

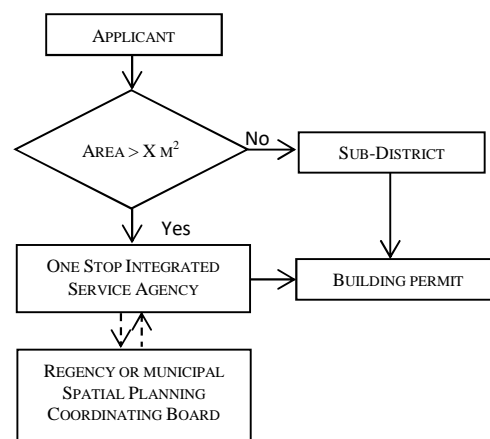


Fig. 2. Flowchart for obtaining building permits.

TABLE III  
REGULATION OF SPATIAL AND REGIONAL PLAN OF MUNICIPALS /  
REGENCIES, YEAR AND PERIOD

REGENCY / MUNICIPAL	AREA LIMIT (X) PROCESSED BY SUB-DISTRICT (M <sup>2</sup> )
LIMAPULUH KOTA	100
TANAH DATAR	100
PADANG	100
PARIAMAN	50

#### D. Interview to Government Agency

Depth interviews were conducted to get information upon implementation land regulation, on which part of the gap occurred. Key informants involved were from government officers at Padang and Pariaman Municipalities, and Tanah Datar and Limapuluh Kota Regencies. Key informants who were asked were Sub-district staffs, members of the Municipal the Spatial Planning Coordinating Board composed of Local Government Organizations; Regulators and Stakeholders dealing with Regional Planning Boards, Public Works, and Housing, Food Agriculture Department, Statistics Centre Board, and others.

The first stage of the interview is to ask the Sub-district how the mechanism for applying for permits and how the Sub-district verifies the land proposed by the applicants to get a house building permit. From the observation, it is found that at least there are some limitations in Sub-districts, these are; do not have a technical team and a reliable map as a reference (Spatial Planning) in determining the land use of the proposed location for the house to be built. Sub-districts also do not have the Sustainability Agriculture Farmland Protection map.

The next stage was gathering of information, perception, and level of understanding from One Stop Integrated Service Agency. Results from interviews conducted on One Stop Integrated Service Agency found some important notes that the agency only as an institution that take care and record the administration of permissions. Technical analysis is requested to members of the Municipal or Regency Spatial Planning Coordinating Board to conduct and make recommendations upon request. This indicates that the technical team or members of the Municipal or Regency Spatial Planning Coordinating Board are the key people to control spatial utilization.

The third stage is to interview members of the Municipal or Regency Spatial Planning Coordinating Board. Some following questions are compiled and then asked members of the Municipal or Regency Spatial Planning Coordinating Board. Then respondents are asked to rank their answers, based on their importance, and then scoring for later analysis. The ranking issues from the most important to the unimportant about the land changes that occur can be seen in Table 4.

From the three stages of the interview to the stakeholders in the government, as planners, the implementing and monitoring part of the spatial use policy, several important issues become the cause of the problem until the conversion of land, which changes the function of part of the land area from its initial function (as planned) to other functions that have negative impacts (problems) on the environment and the potential of the land itself.

TABLE IV  
PROBLEMS RANKING

Problem identified	Score			Ave. score	%
	p1	p2	p3		
A legal product governing the conversion of agricultural land, not yet ratified	16	14	16	15.33	11,30
Law enforcement of spatial has not been enforced	15	16	14	15.00	11,00
Detailed spatial plan for sustainable agricultural land, not yet completed	14	15	15	14.67	10,80
Reliable maps, not yet complete	12	13	12	12.33	9,10
Documents and studies on awareness of land use, which are relatively non-existent.	7	10	13	10.00	7,40
Relative lack of commitment to perform tasks and functions	11	9	9	9.67	7,10
Document on sustainable land for sustainable agriculture that has not yet been established	13	11	3	9.00	6,60
Incomplete agricultural development planning	10	12	4	8.67	6,40
Relatively un-optimal function and the role of the coordinating board of spatial planning	9	7	10	8.67	6,40
Competence (capacity and capability) human resources in performing their duties and functions, is still relatively low	8	8	8	8.00	5,90
Utilization of facilities and infrastructure as a tool of analysis is still minimal	6	6	7	6.33	4,70
The placement of human resources that is inconsistent with its competence	5	2	11	6.00	4,40
Relatively adequate allocation of funds to maintain the sustainability of agricultural land	4	5	6	5.00	3,70
Administrative management that has not been well established	3	4	5	4.00	2,90
Weak administrative order (note, correspondence, organized documents)	2	1	2	1.67	1,20
Monitoring and evaluation of administrative quality, which is still relatively rare	1	3	1	1.67	1,20
				136	100

The four important issues of the sixteen mentioned are A legal product governing the conversion of agricultural land, not yet ratified; Law enforcement of spatial has not been enforced; Detailed spatial plan for sustainable agricultural land, not yet completed; Reliable maps, not yet complete. Some of the above are believed to be the cause of the ongoing conversion of land, into the land that has been built into housing and settlements in the province of West Sumatra.

#### IV. CONCLUSIONS

This study reveals that at the district and city level, land use for specific matters, such as land use for agricultural land and housing development, is less concerned with spatial planning in sustainable food agriculture. For governments as policymakers, the existence of land is fundamental to achieve and maintain food and housing security. The national government must make a legal aspect, that agricultural land must be maintained; in turn, it must be identified by the regional level — regulations that have been legalized, currently not followed by technical regulations in the region.

Land allotment for housing and settlements needs to be planned for provision by each level of government. Measurable land allocations for agriculture, conversion rules and maps have become very important to legalize by the government at the Regency and Municipal levels. Efforts to classify and protect sustainable food agriculture should start from the lowest administrative area, where the land is located. Regional Development Planning, must be consistent with the area allocated by the legal Spatial Planning, so that the development of food agriculture starting with determining land for sustainable agriculture, must be shown in Spatial Planning and Spatial Detail Documents. It is imperative that, in the Medium-Term Regional Development Planning, it must establish and protect agricultural zoning.

Future research that can and can be done to continue this research, among others, is whether the land planned for housing and settlement is optimally used for housing and so also for agricultural land. So that the occurrence of land conversion can be minimized.

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