Rice field conversion and urban agglomeration in Indonesia: between power and options

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Abstract. Indonesia’s urban areas are expanding. Moreover, in the making, much-involved rice field conversion. While the government is committed to achieving self-sufficiency, the conversion poses a definite threat. This paper questions the continued rice field conversion in urban fringes despite government interventions and aims to explain its underlying drivers using the political ecology approach. The study conducted in 3 rice producing regencies. Rice field conversion data obtained by analyzing land use dynamics data from the Indonesian Central Bureau of Statistic. The understanding of political settings and power distribution are achieved through a literature study. The result showed an evident conversion to urban uses in Bantul and Karawang Regency, but not visible in Deli Serdang. The political setting, law enforcement, high-cost farming, taxation, and sale system are held responsible for the low profitability of rice farming that leads to rice field conversion. The continued conversion despite government intervention indicated that the government is not the strongest actor in the scene.

1. Introduction

Land use change is considered an inevitable phenomenon in the process of development. Developed countries also experienced land use changes in their development, so also major cities in developing countries [1][2]. While forests are converted to agricultural land in the forest frontiers, agricultural lands in urban fringes are eaten away by the development of urban areas. Road development that usually follows agricultural land establishment increases its accessibility, thus making it more suitable to be transformed into urban uses [3].

However inevitable, rice field conversion in urban fringes and other areas need to be controlled. If not controlled, it could disturb the implementation of spatial planning and could lead to several other issues, such as unemployment and increasing poverty [4]. There is a possibility of substituting the loss of rice field in urban fringe areas by establishing new rice field plot in other more remote area or even converting natural land uses. However, besides the lower soil quality, the establishment of the rice field plot itself means more investment. Not to mention the absence of supporting infrastructures, such as the irrigation system and roads. Therefore, farmers often need a wider field to achieve the same yield and income in the new rice field in comparison to the former [5]. The loss of agricultural lands reduces food
and other agricultural production that could potentially lead to [6] increasing import that could be more burdensome to the state’s budget [3]. About physical properties, the conversion of agricultural land to urban uses potentially decreases water infiltration, increases flash flood risk, and it will affect or change the microclimate of the surroundings [7].

The government of Indonesia has been dedicating high concern to the development of agriculture. It committed to fulfilling the staple food demand solely from domestic production. Various investments in agricultural infrastructure such as irrigation and road, together with agricultural aids and institutional arrangements were devoted to developing the agricultural sector, especially rice farming. This massive effort successfully brought Indonesia from the biggest rice importer to rice self-sufficient in 1984. President Suharto received the FAO Award for Country Achievement for the success [8]. Unfortunately, Indonesia could not maintain the success. It has again become a rice importer with 3 million tons of rice import in 1995. However, the self-sufficiency commitment persists. Aids and support for food crop agriculture remain high.

On the other hand, agricultural land conversion to other uses starts to occur. Despite the various aids and support, rice farming still has the least land rent in comparison to plantation crops. In rural areas, farmers shifted to more profitable cash crops, while in urban fringes, rice fields are converted into urban uses [9]. This paper questions why do rice field conversion in urban fringes continues to happen despite government interventions and aims to explain the underlying drivers of land use change in urban fringes of Indonesia using political ecology approach. In political ecology point of view, land use change is seen as a consequence of the combination of power control and the political setting and arrangement it resulted in [9][3][10].

2. Case Study Areas, Materials, and Method

The case studies are conducted in 3 rice producing areas in Indonesia that are located near to a bigger urban area. The areas are Karawang Regency of West Java as the urban fringe of Greater Jakarta, Bantul Regency as the urban fringe of Yogyakarta City, and Deli Serdang Regency as the urban fringe of the Medan City of North Sumatera. From each of the Regencies, Districts that are located surrounding the border of the bigger urban area are chosen to represent areas affected by the development of the particular urban area, thus making the districts as the urban area’s urban fringe.

Data used in this study are secondary data derived from Regency and District in Figures published annually by the Indonesian Central Bureau of Statistic. The Regency in Figures contains land use share data for each of the Districts in the respective Regency. For Karawang, Karawang in Figures for the years 2009, 2010, and 2011 is used to compile the land use dynamics, while for Bantul, Bantul in Figures for the years 2003 – 2012 is used. The Districts chosen for Karawang are Teluk Jambe Timur, Teluk Jambe Barat, Rawamerta, Karawang Timur, Karawang Barat, and Rengasdengklok, while for Bantul, Banguntapan, Sewon, and Kasihan are chosen. Unfortunately, the land use share data is not available in Deli Serdang in Figures. It is available in Deli Serdang’s Districts in Figures. However, Districts in Figures are only available from 2014. With this data shortage, harvest area data available for the whole Deli Serdang are used to express the reduction of rice field. Reduction of harvest areas did not always mean a reduction of rice field. However, when the harvest area was always decreasing every year, this can be an indication of decreasing rice field. To verify that the reduction of the rice fields is dedicated to the expansion of urban uses, two expert interviews were conducted with an expert in Agricultural Geography and an expert in Economic Geography from the State University of Medan. The districts observed are Percut Sei Tuan, Sunggal, Tanjung Morawa, and Labuhan Deli.

3. Results and Discussion

3.1. Results

The land use dynamic of Banguntapan, Sewon and Kasihan Districts of Bantul is presented in Figure 1. In the figure, it is clearly visible that rice field in Banguntapan and Sewon is decreasing along with the increasing built-up area, while in Kasihan, the expansion of built-up area is also eating away dry fields, beside of rice fields.
If we look at Figure 2 in a brief look, there is an impression of an increasing harvest area. However, when looked carefully, there are three periods of decreasing harvest area. After it decreased sharply from 2002 to 2005, harvest area rises a little in 2006. It decreases again in 2007 and again in 2008 before it rises in 2009 and 2010. Harvest area still increased a little in 2011. However, it falls yet again in 2012 and 2013. The record of ups and downs of the harvest area does not seem to be caused by climate variability or any natural disaster such as drought or flood. Such events tend to show a sharp harvest area reduction, but the value will go back to ‘normal’ in the next year record. Thus we conclude that this is an indication of decreasing areas of rice field. The record of the increasing harvest area is most likely due to an increasing area of rice field. The Government of Indonesia and also the Provincial Government of North Sumatera have a program to establish new rice field plot in order to support rice self-sufficiency program. The result of the expert interview validates our estimation. Both of the experts we interviewed confirmed that many of the rice fields in Deli Serdang, especially in Districts located surrounding the border area of Medan City like Percut Sei Tuan, Sunggal, Tanjung Morawa, and Labuhan Deli, are converted into urban uses, especially settlements and shophouses.

Figure 3 illustrates the land use dynamics in Karawang, West Java. Rengasdengklok and Karawang Timur showed a slight decrease of rice field with a slight increase of built-up area and another type of land use. Built-up area in Telukjambe Timur is replacing dryland agriculture while the record of the rice field area remains constant in the three year period. Telukjambe Barat and Rawamerta showed a relatively constant value for all of the type of land uses, while the rice field in Karawang Barat first increased the decreasing again.

The record shows that the expansion of Greater Jakarta has not yet reached Karawang, since Jakarta as a Megapolitan is already surrounded by four satellite cities which form the Greater Jakarta area, which comprises of Jakarta, Bogor, Depok, Tangerang, and Bekasi. The loss of rice field in exchange for the
increasing built-up area in the records above is arguably due to the urbanization process in Karawang itself.

3.2. Discussion
Food security has become a global concern. Many countries started to invest more in food production [12]. In the midst of rice self-sufficiency target, the government of Indonesia is struggling to control rice field conversion to other uses. The conversion of rice field does not only mean a loss of rice production and a waste of investment in agricultural infrastructure, but it also means a loss of livelihood for the farmer. This could lead to increasing unemployment since the agricultural sector, especially rice farming, is a labor-intensive sector. Increasing unemployment could lead to increasing poverty and criminality. Indonesia’s sustainable development is threatened. Besides, decreasing production could lead to increasing dependency on imported rice, which will put more burdens on the state budget. High dependency on import to fulfill the demand for food, especially staple food, could pose a threat to a country’s stability. Import is a trade transaction. An exporting country has the right not to sell a commodity, and the importing country could not force the exporting country to sell to them. If Indonesia fails to maintain rice production, it could face social unrest in the future when food became globally scarce.

The development of food crop agriculture in Indonesia, especially rice, is relatively rapid in the early Suharto Era (1966-1998). The commitment of being rice self-sufficient remains until today. With the militaristic style of leadership, Suharto applied, rice field conversion to other uses at his time was considered a serious assault, although there was no formal regulation prohibiting an individual [13]. The early formal regulation concerning the conversion of rice field was in the form of instruction to related officials and was issued in 1974. Table 1 lists formal regulations regulating the conversion of rice field.

| Regulation               | Content                                                                 |
|--------------------------|-------------------------------------------------------------------------|
| Internal Affairs Minister Regulation (PERMENDAGRI) No. 5 1974 | Instruction to related offices to avoid the conversion of fertile food crop land in granting permission for the establishment of industrial and business area |
| Presidential Decision (KEPPRES) No. 53 1989                | Instruction not to develop an industrial area on the irrigated rice field or fertile food crop land |
| Presidential Decision (KEPPRES) No. 33 1990                | Instruction not to permit the conversion of irrigated rice field to the industrial area |
| Act (UU) No. 24 1992                                          | Instruction to perform a comprehensive study in the preparation of Regional Spatial Planning (RTRW), especially concerning the conversion of food crop land to mining area, settlement, industrial area, and others. |

From the table above, one thing is clearly missing. Landowner as the decision maker of the future use of the parcel of land has never been an object in the regulations and circulars. On the other hand, Act No. 12 1992 gives the freedom for the farmers and landowners to choose what kind of crop they would like to grow. Although it is mentioned there that the landowners must comply with the government programs, it is also mentioned in verse after that the government must guarantee a proper income for the landowner in the case that the landowner must follow the government program. This is perhaps the reason of the absence of any regulations explicitly addressed to the landowners. It is not until 2011 that the regulation specifically addressed to the landowners is issued. It is the Act No. 41 2011. The regulation concerning the guarantee of a proper income is regulated by the Presidential Regulation (PP) no. 12 2012.

Unfortunately, however, this regulation has a chance of not being able to do much to control rice field conversion. Although no regulation targeted personal converters in the past, the people perceived that rice field conversion to other uses as a serious assault. However, they hardly see any punishment.
enforced. This reduced the perception of the strictness of the forbiddance. If the new regulation could not show sufficient ‘power show-off,’ the perception that rice field converters could easily run away without any consequences would remain.

Low income and high workload from rice farming are said to be the main reasons for conversion [14]. The agricultural tool aid can solve the high workload from the government. However, what is causing the low income?

Indonesia’s agricultural development adopted the green revolution concept by applying prime seed, fertilizer, and pesticide to improve yield. Besides the impact on the soil and environment, it also creates high-cost farming. Although there are subsidy programs, the farmers are, in many cases, too poor to buy the subsided input [15][16].

In Indonesia, the land is taxed. The tax is calculated based on its area size and the tax object selling value (NJOP). Land with good access usually has a higher NJOP in comparison to those located in remote area. Thus, the land tax for rice field and shop-houses or industrial area is the same if the NJOP is the same. This resulted in a very high tax when compared to the profit generated from the rice field. This adds up to the already high production cost.

Production sale is another issue. The government has invested huge amount of state budget in rice farming, but the sale is not guaranteed. It is left to market mechanisms. Farmers are only supported to become a producer and not an entrepreneur. During harvest, the price plunge due to high supply. The Basic Purchase Price (HPP) is difficult to be implemented down to the farmers’ level since the farmers are selling their rice to a middleman. The middleman will then sell it to a bigger rice mill. The farmers have almost no power to determine the price. Instrument to control the implementation of HPP for Harvest Dry Rice (GKP) and Mill Dry Rice (GKG) is not sufficient. This arrangement benefited the mills and intermediaries more than the rice farmers. To dedicate more benefit to the farmers, they must have more control over the sale of rice.

In order to improve the control of the sale of rice, the farmers through the farmers’ group and the farmer’s group union (Gapoktan) must have their drying facility, warehouse, and mill. This way the farmers will have direct access to the market. They can sell the rice directly in their cooperative shops or they can create or can be assisted to create a link to a bigger market. Besides technical knowledge and skills, the farmers must improve their entrepreneurial skill. If a type of crop or commodity is profitable, provides a good and sufficient income, farmers and landowners will be willingly growing rice on their land.

4. Conclusion
Land use change from rice field to the built-up area is evident in the urban fringe of Yogyakarta City, Banguntapan, Sewon, and Kasihan Districts of Bantul Regency and the urban fringe of Medan City, Deli Serdang Regency. The expansion of Greater Jakarta has not yet reached Karawang Regency, as the conversion of the rice field to urban uses is not visible.

The loss of rice field due to conversion to other uses could lead to increasing unemployment, increasing poverty and increasing criminality. Although it is widely known to be prohibited, there were no regulations before 2011 that specifically forbid landowners to convert their rice field to other uses. Supported by the Act 12 Year 1992, the landowners have a legal force to do what they wanted on their land.

In 2011, the Act 41 Year 2011 finally targeted landowners specifically. However poor law enforcement hinders its implementation. Land price in urban fringe tends to rise continuously, increasing attractiveness to sell. When rice field only remains a little, it could be attacked by all the pests previously foraging in a vast rice field.

Low income from the high production cost and high tax, plus decreasing price during harvest has hit the well-being of the farmers. If farmers through the Gapoktan could have their own drying facility, warehouse, and mill, they will have direct access to the market and more power to control the sale of rice and the price. Thus they could benefit more. The most effective way to hinder rice field conversion is to make it profitable.
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