

The relations between agricultural land conversion and urban farm workers livelihoods

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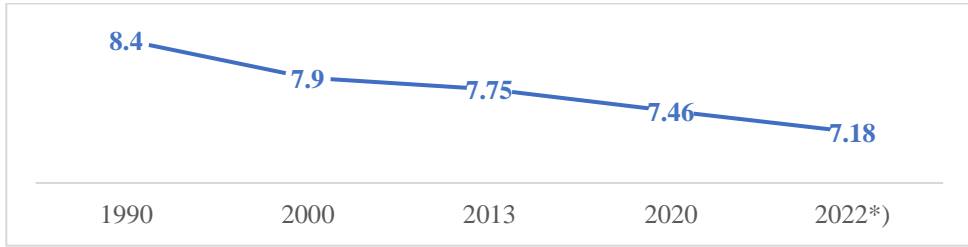
Abstract. The conversion of agricultural land for food in urban areas is a real threat to the region food security and availability. On the one hand, the livelihoods of farm workers are increasingly threatened, and it is easy to switch their livelihoods to other sectors. This study aims to examine the relationship between land conversion and farm laborers' household livelihood strategies to survive in urban areas. This study uses a mix methods approach to analyse relation between the macro data about land conversion rate data with the micro farm labor household livelihood strategy in West Java urban region. The results showed that the main livelihood for urban farm laborers could no longer be categorized, because of the fast and easy dynamics of transitioning from agricultural to non-agricultural livelihoods. This study also shows that the government's efforts are still not effective in suppressing the conversion of agricultural land to non-agricultural uses. The creation of new jobs based on urban agriculture is one solution that needs to be pursued to maintain food availability and the survival of urban farm workers.

1 Introduction

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life [1]. One of the challenges is the loss of agricultural land, which is the major factor causing food insecurity by reducing food production [2] and opportunity for farmers or farm workers [3]. These challenges also have an impact on the livelihoods of farmers and/or farm workers. Because A livelihood comprises the capabilities, assets and activities required for a means of living [4].

On supply side the most important reason for conversion (sale) of farm land, is the low income from agriculture and the net return is lower and not remunerative [5]. Besides that it can also increase the unemployment rate of women older than 35 years and men older than 40 year [6]. On the one hand, land for farmers is a source of food and a means of survival and their livelihood [7]. On the other hand, livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, now and in the future, while not undermining the natural resource base [8].

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Note *) the Potential Area of Rice Harvested Areas to Shrink by 0.14 million per year

Fig. 1. Land conversion rate in Indonesia 1990-2022 (in million hectares)
Source: [10]

Figure 1 shows that the rate of conversion of paddy fields in Indonesia reaches 0.14 million hectares annually. This is because the need for land for various sectors is increasing along with the increasing population and rapid economic development, especially around urban areas and around industrial centers. The need for land for infrastructure development (roads, airports, ports, industry, offices) and residential areas, extends to intensive paddy fields which have become centers of rice production [9]. This also happened in West Java Province, where prime agricultural land has been subdivided and converted into industrial estates and other urban land uses [2].

The city of Bandung as the provincial capital of West Java also faces a major challenge, namely the uncontrolled population growth rate. As a result, the need for land for housing has soared. In addition, rapid developments also occurred in industrial, trade, and service activities. In the past 14 years, the area of rice fields in the city of Bandung has shrunk by 1.379 hectares. In other words, 98,5 hectares of rice fields are lost every year [10]. Based on that, the conversion of agricultural land for food in urban areas is a real threat to the region food security and availability.

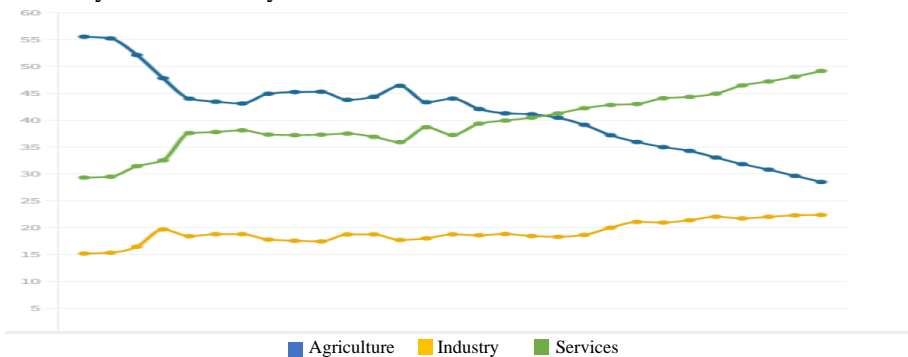


Fig. 2. Proportion of Workers in Agriculture, Industry and Services 1991 – 2019
Source: [10]

The other hand shows that the livelihoods of farm workers are increasing threatened, and it is easy to switch their livelihoods to other sectors. The proportion of agricultural workers in Indonesia continued to decline over the period 1991 to 2019 (Figure 2). The decline in the number of agricultural workers in Indonesia mainly started in 2000 and has continued to the present situation. This shows that the narrower the agricultural land that will be cultivated, the greater the opportunity for farmers to work outside the agricultural sector [11].

The availability of agricultural land is the main requirement in the realization of self-reliance, security, and food sovereignty [12]. This is based on the fact that in Indonesia agricultural activities still rely on land. Along with the increase in population and the increase in living standards, the availability of land for agriculture is decreasing [13]. This is inseparable from the effect of land conversion to non-agricultural uses. These two issues are

the background of this article, that the rate of land conversion of paddy fields is high while the livelihoods of farm workers in urban areas are increasingly threatened. Based on that, this study aims to examine the relationship between land conversion and farm laborers' household livelihood strategies to survive in urban areas.

2 Methods

2.1 Site selection and period

This research was conducted in 19 sub-districts of the city of Bandung, which is the capital of the province of West Javandesia. The selection of the research location was taken purposively because it was included in the national sustainable food agricultural land program. This research was carried out during the period from January 2021 to January 2022.

2.2 Research approach

This study uses a mix methods approach to analyze relation between the macro data about land conversion rate with the micro farm labor household livelihood strategy in Bandung City West Java Indonesia. This is intended to provide an illustration that the high conversion of rice fields has an impact on the sustainability of food agriculture in urban areas and also the impact on the livelihoods of agricultural workers.

This study uses a survey approach to 209 farms that spread across 19 sub-districts. The research respondents are male and female household heads who since 1990 have worked on land owned by other people and land owned by companies or land owned by the government which has been planted with rice as their livelihood. The survey was conducted in a participatory manner, involving Field Agricultural Extension Officers (PPL), local administrators, facilitators, village heads and community leaders.

2.3 Data analysis

This study was designed in a mixed method with a predominance of quantitative and additional qualitative. In addition to using the survey method of farm workers, it also uses field observations, participatory observations, and in-depth interviews. Refers to several approaches and criteria regarding the suitability of productive agricultural land in the city of Bandung which is integrated with spatial data. Broadly speaking, the stages of the research include preparation, spatial analysis, survey of farm workers, and drawing conclusions.

3 Result and Discussion

3.1 Macro data about land conversion rate

The total area of paddy fields in Bandung City is very limited. Not only that, the location of rice fields in the city of Bandung is also spread over 19 sub-districts with a narrow scale. Therefore, sampling locations were taken by census at 209 rice fields in 19. These 209 rice fields do not only belong to the Bandung City Government, but also belong to the community, institutions, corporations, police and military.

The results of the survey and field observations are set out in the following table (Table 1). The data presents land use and types of commodities cultivated. Through surveys and field observations, rice fields in the city of Bandung can be mapped in detail to the intensity

or cropping index (IP), water availability in one year, types of plant pests and diseases, cropping patterns, post-harvest treatment or handling and so on. Thus, the aspects that are mapped are not only physical and technical aspects of paddy fields, but also socio-cultural, economic, and institutional and environmental aspects.

The results of terrestrial and aerial surveys also reveal the actual area of rice fields in the city of Bandung. Based on the results of the analysis, it is known that the raw land for rice fields in Bandung City in 2021 is 731.97 hectares (Table 1). If according to previous records, the area of raw rice fields in Bandung City in 2018 was 810.42 hectares, it is known that the raw rice fields during the 2018-2021 period decreased by 78.45 hectares. If it is a percentage, then almost 10 percent of paddy fields in the city of Bandung are converted over three years. If it is assumed that the process and the amount of land conversion are constant, then in just 30 years the paddy fields in Bandung City will be completely converted.

Table 1. Raw Land for Rice Fields in Bandung City 2021

No.	Districts	area (hectare)
1	Andir	0.68
2	Antapani	16.29
3	Arcamanik	27.69
4	Babakan Ciparay	1.69
5	Bandung Kidul	40.39
6	Bandung Kulon	10.62
7	Batununggal	1.57
8	Bojongloa Kidul	14.17
9	Buahbatu	64.85
10	Cibeunying Kaler	0.67
11	Cibiru	49.93
12	Cinambo	79.07
13	Gedebage	174.46
14	Kiaracondong	15.08
15	Mandalajati	3.35
16	Panyileukan	48.62
17	Rancasari	92.33
18	Regol	9.29
19	Ujingberung	81.22
Total		731.97

That condition clearly cannot be tolerated, because productive land in urban areas is still and will be needed. Cities cannot be totally dependent on imports, as they can be dangerous in the event of a major shock that cuts off outside supplies. Cities must be self-sufficient in food production [14]. Although agriculture can be designed in artificial media, land as a green open space and multifunctional production space is still and will be needed. Big cities in the world, can be ascertained to have productive land until now [15]. In fact, New York, Tokyo, Berlin, London and others still have green open land and productive land.

The results of a more in-depth analysis of the condition of paddy fields in the city of Bandung show that most of them only get their water from non-irrigated networks. In fact, paddy fields that receive irrigation from the irrigation network, on average, can only be planted twice a season. Meanwhile, paddy fields that rely on rainwater for irrigation can only be planted once a year. Some of the paddy fields that were originally irrigated from the irrigation network are now starting to become difficult to cultivate three times a season, because the irrigation network has changed many functions and is full of plastic waste.

The results of the analysis revealed that of the total raw area of rice fields in 2021 (731.19 hectares), only 59.12 hectares of irrigation systems use irrigation networks, both technical and semi-technical. While most of them already depend on rainwater (rainfed). That is, if the existing paddy fields are not increased in productivity and production functions, it can be ascertained that they will soon be converted. Therefore, the homework for the Bandung City Government to protect sustainable food agricultural land is to improve the irrigation system for the continuity of the production process.

The condition of irrigation in raw rice fields in the city of Bandung in the end has an impact on cropping intensity. If the water supply to the irrigation network runs normally, only 59.12 hectares of rice fields can be cultivated three times a year. However, farmers admit that the water supply is only sufficient to cultivate rice crops twice a season, while in paddy fields that only rely on rainwater supply, the intensity of planting can only be done once a year. If the rain still falls, the paddy fields are cultivated to plant secondary crops, such as corn, beans and sweet potatoes.

Based on the distribution, only the rice fields in the sub-districts of Bandung Kidul, Buah Batu, Cibiru, Cinambo, Gedebage, Rancasari and Ujungberung have adequate water supply and have a higher cropping intensity than other areas. However, the farmers admit that in some areas of the lake plains, it has begun to be difficult to get water supplies during the dry season. The problem is that many irrigation networks and tertiary irrigation canals have been disrupted and covered by buildings and garbage. The implication is that in some locations, paddy fields can only be cultivated twice a year.

The decrease in cropping intensity on raw paddy fields has a real impact on the decline in productivity, resulting in the loss of farmers' income, both loss of grain as a source of food and a source of income. To a certain extent, the decrease in cropping intensity and productivity has an impact on decreasing the attractiveness of farmers to cultivate the paddy fields.

The results also show that the majority of raw rice fields in Bandung City (472.33 hectares) can only be cultivated once a year, while the rest (259.64 hectares) can be cultivated two or more in a year. Physically, sustainable food agricultural land is more suitable to be applied to land where the intensity of planting is two or more in a year. However, the percentage is smaller and narrower than that of raw rice fields where the intensity of planting is only once a year. Creation and innovation are needed to increase the intensity, productivity and multifunctionality of all raw rice fields in the city of Bandung.

3.2 Farm labor household livelihood strategy

The survey results reveal that the 267 hectares of rice fields have been converted to other uses, either for settlements (housing), infrastructure (such as rainwater storage rooms or ponds) and so on. In general, the conversion of land use occurs to residential purposes, especially on community-owned rice fields. Many of the triggering factors, apart from the pressure of demand, are also influenced by the weakening of the attractiveness of rice farming results, the increased risk of farming and the weakening of the environmental carrying capacity, such as the death of irrigation networks and the increase in plant pests and diseases.

The results of mapping farmer profiles reveal that most of the rice farmers in Bandung are more than 50 years old. In fact, more than half of them are over 60 years old, so they are categorized as old (aging). Most of the farmers are cultivators, although there are also owners and tenants. The average scale of farming ranges from 0.02 ha to 1.0 ha, with the dominant farming orientation being commercial, although some are semi-commercial (50:50) and subsistence (100 percent of their farm products are consumed). The average productivity of farming is about 4.5 tons per hectare in paddy fields that are sloped in northern Bandung and about 5 tons per hectare in flat rice fields in the central part of Bandung.

In general, farming is carried out by farmers, family workers and farm laborers who are given daily wages. The wages of farm laborers in Bandung are relatively uniform, the daily wages range for male farm workers is 70,000 - 75,000 IDR, while for women it is around 60,000 - 65,000 IDR. The average working time is 5 hours, with a time span from 7.00-12.00, for both male and female workers. Most of the work is done by men, while the female farm workers are only in planting and weeding activities. Meanwhile, harvesting and drying activities are carried out together. Even though they are located in urban areas, it is still easy for farmers to find labor or farm laborers. However, most of the age of farm laborers are also quite old.

General description of rice farming characteristic and wages carried out by farm labor families also describes the state of farm labor household livelihood strategy from 209 farmers as respondent, it can be explained that there are several strategies carried out by farmers in urban areas (Figure 3).

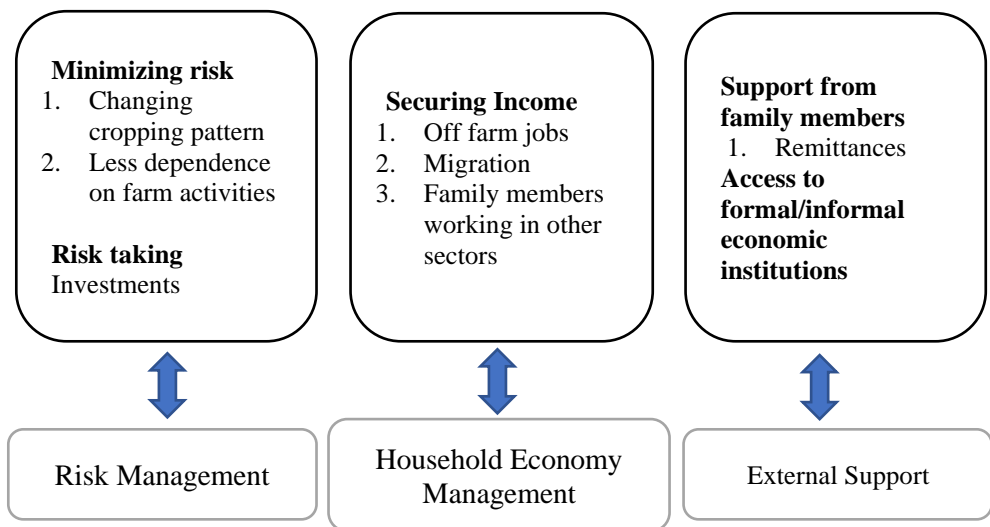


Fig. 3. Farm labor household livelihood strategy

The livelihood strategy of farm workers in managing the risks of their rice farming cannot be separated from the factors of water availability and scattered locations. The smallholders mostly live on the outskirts of the city and have to travel a considerable distance to the paddy fields they cultivate. Of course, it plays a role in managing his farm. The first way is to change the cropping pattern according to ability, which is only once a year, and the rest is planted with secondary crops that are not too difficult to maintain. It is also closely related to the dependence of farmers on farming activities, so they can do other jobs outside of agriculture that are considered more productive and earn more income, such as being a motorcycle taxi driver, construction worker or other seasonal work. While risk management is related to investing in wells for agricultural purposes, smallholders only rely on assistance from landowners, so the risk of water availability is borne by agricultural land owners.

The managing household economy strategy of smallholder households is related to the age of the farmer and the number of family members. The average age of the sharecroppers is old, encouraging family members to work in the industrial sector and informal jobs. The role of wives who work as factory workers and housemaids is carried out to increase family income. In addition to that, many of the children who have grown up work in the industrial and service sectors and are able to increase family income, in addition to helping their parents work on the rice fields cultivated by their parents.

External support contributes to 65 percent of the household income of smallholders, which comes from remittances from family members who work in the informal sector both domestically and abroad. The remittances come from children and wives who are workers in the informal sector. On the farm side, farmers rely on support from economic institutions in the form of financial assistance and agricultural production facilities through government assistance programs. External support from local institutions such as farmer groups plays a role in gaining access to subsidized fertilizers and rice seeds, which of course is very helpful in sustaining their livelihoods and farming sustainability.

4 Conclusions

The main livelihood for urban farm laborers could no longer be categorized, because of the fast and easy dynamics of transitioning from agricultural to non-agricultural livelihoods. This study also shows that the government's efforts are still not effective in suppressing the conversion of agricultural land to non-agricultural uses. The creation of new jobs based on urban agriculture is one solution that needs to be pursued to maintain food availability and the survival of urban farm workers.

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