The Application of TURIMAN JAGOLE Technological Innovation to Increase Crop Index and Urban Farmer Income in DKI Jakarta

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Abstract. The study aims to determine the effect of applying for intercropping food crops (rice, corn, and soybeans = *jagole*) on the cropping index and income of urban farming community activists. This study was conducted by comparing the use of six models of growing food crops, namely three kinds of monoculture model of *jagole*, upland rice-soybean, sweet corn-soybean, and sweet corn-upland rice polyculture/ "*Turiman"*. Observational data includes data on land characteristics, annual cropping patterns in related locations, and input-output data of the test models. Corn and soybeans are harvested young. Data were processed using descriptive analysis and the economic feasibility analysis of the tested technology was based on the R/C ratio. Based on data, it is known that there is potential to increase the cropping index of dry or limited land in the Jakarta area, from 1-2 to 2-3 a year by optimizing planting through intercropping systems/ food crop *Turiman*. such as corn-upland rice-soybean. The results of the analysis showed that the soybean monoculture technology model, with yields of young soybeans, gave a higher profit (R/C 2.58), compared to the other models, namely sweet corn monoculture, upland rice monoculture, upland rice-sweet corn polyculture, soybean-sweet corn polyculture, soybean-upland rice polyculture, and (R/C respectively: 0.24, 0.54, 0.17, 1.25, and 1.71).

1 Introduction

Land use in urban areas like Jakarta focused on developing residence and office, so usable land for cultivation is very limited. Total of harvested area on food crops only 578.4 ha while total area of Jakarta is around 6.6 million ha, that means area for food crops just 0.0087% from total area [1]. This condition forces farmers to optimize agricultural resources, especially land resources. They must increase crop production as high as possible with very limited land available. One goal of urban farming is to achieve highest land use efficiency so land limitation will be solved. The Jakarta government has made

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several efforts to utilize unused vacant land, such as planting ornamental plants under toll roads. The use of ornamental plants used is a plant with less intensive care, even though planting food crops will help meet food needs, especially in the area. A more active government role is needed to foster communities so that they can take more benefit of the limited land. Urban farming also has its own portion in the RPTRA (public space) which was built and developed by the Jakarta government which has a role to support food security in Jakarta [2].

Research in Argentina and other Latin American countries shows that 95% of the supply of food commodities is produced only by 58 countries in the world where there is still a production and energy gap between developing and developed countries. Developed countries have a more intensive system with a high level of resource efficiency so that there is still room for developing countries to improve the efficiency of their agricultural resources. The study shows that an increase of 10% of land area will increase input by 137% and an increase in main energy supply by 2.6% so that improvements in resource efficiency still must be carried out [3]. Effort to increase the efficiency could be done with implementation of intercropping. Intercropping will increase plant population which also increases plant density in certain areas. Natural resources such as sunlight can be used optimally with an intercropping system. Research of intercropping between soybean and maize on East Java, Indonesia show that intercropping model have 1.48-1.69 land efficiency ratio that show 48-49 % increase of land use efficiency [4].

Intercropping using more than one type of crops can help control pests and disease indirectly. The more types of crops that are grown, fewer food sources and host for pests and diseases. These conditions will prevent pests and diseases from breeding because of the limited food with various types of crops. On the other hand, intercropping will also support sustainable agriculture concepts due to its role to reduce chemical compounds on pesticides application. Things that are important to consider on intercropping implementation is the limited resource concept. As stated in Liebig's law "law of minimum" yield is affected by lack of one of lowest resources available to the environment. Increasing availability of limited resources should help increase crops yield. Light, water, oxygen, temperature and any one of 14 essential mineral elements are the most common limiting factor found [5].

Generally, intercropping will increase crop production, dry matter particularly. Selection of plant combinations becomes essential because plants with close relatives, like in the same family, have similar characteristics, and tend to use the same resources. Different plant canopy is one design to optimize utilization of sunlight. Meanwhile, to avoid competition for nutrient requirements between plants, different planting time strategies can be used so the highest time for nutrient absorption occurs at different times.

Increased crop production will affect the cropping index directly because crop production is one of the most influential factors on the components of the cropping index. One way to increase crop production can be done by implementing an intercropping system, so it can be said that by using an intercropping system we can increase the cropping index. On the other hand, the application of this intercropping method will also increase farmers' income in line with the increase in the number of crops that can be harvested. In addition, this will also have an impact on increasing food security in big cities where in general food in big cities is still supplied from neighboring cities/districts. This study was conducted with the aim of seeing how the application of the *Turiman Jagole* intercropping system will affect the cropping index and the income of farmers in urban areas.

2 Method

This assessment was carried out using a survey approach to obtain primary and secondary data, especially data related supporting conditions to the development of food crops cultivation in the location of urban farming in Jakarta, especially East Jakarta. The implementation of the rice, sweet corn, and soybeans cultivation technology package was carried out in a participatory the cooperator's farmer that had a cropping index 1-2.

2.1 Baseline survey

The activities of baseline survey used to be carried out in order to identify and make an inventory of existing conditions. This activity used to be carried out by means of quick survey methods and field checks which included desk studies, namely compilation of supporting data and field surveys. The data identified included the location identity, the existing conditions of using rice cultivation technology, and irrigation sources.

2.2 The assessment of *Jagole* cultivations technique

This study was conducted by comparing the use of six models of growing food crops, namely monoculture of upland rice, sweet corn monoculture, soybean monoculture, soybean-upland rice polyculture (*Turiman Gole* Super), soybean-sweet corn polyculture (*Turiman Jale* Super), and upland rice-sweet corn polyculture (*Turiman Jago* Super). The main/macronutrient requirements (N-P-K and pH) were estimated using the dry soil test equipment (PUTK). The land was processed using a no tillage system (TOT). The use of new superior varieties (VUB), particularly *Balitbangtan* products, which are adaptive or according to site conditions. VUB of upland rice, sweet corn, adn soybean respectively introduced into the area: Inpago-8, Bonanza, *Anjasmoro*. The corn seeds used have been treated with seeds by the company/producer. Soybean seed treatment was carried out with Rhizobium (*Biobus*) according to the recommendations of the Rhizobium producer. Meanwhile, upland rice was treated with seeds using the biological agent *Agrice*. The application of dolomite and manure is carried out at least two weeks before planting. The technique was based on modifications of IAARD's recommendations [6].

Monoculture of upland rice (P): The selection of empty upland rice seeds was carried out by soaking the seeds, then the resulting grain was discarded, and the sinking was used for further testing. Upland rice planting is done with a spacing of 20 cm x 10 cm, the tile system (without "*legowo*" / spacing between planting blocks). Seeds were planted in a single method and the number of seeds was five seeds per planting hole. Fertilization of upland rice was carried out three times, namely one third of part of NPK fertilizer 15:15:15 and one third of Urea, aged 21-25 days after planting (DAP), 40-46 DAP and 60-65 DAP. Application of liquid fertilizer on upland rice plants biosilica (Bio Sinta) 2-4 times at the age of 30, 45, 60, and 75 DAP.

Monoculture of sweet corn (**J**): Corn was planted three weeks after upland rice planting, using a spacing of 60 cm x 12.5 cm. The number of seeds used was two seeds per planting hole, which was then covered with manure. Fertilization of corn was done twice. The first fertilization was carried out individually at the age of 10-15 DAP with a dose of NPK 15:15:15 200 kg/ha, Urea 50 kg/ha, and SP-36 150 kg/ha. The second fertilization was carried out at the age of 28-35 DAP with the dose of NPK 15:15:15 200 kg/ha, Urea 100 kg/ha, by spreading.

Monoculture of soybean (**K**): Soybean planting was done at the same time as soybean planting, which was three weeks before corn planting. Planting soybeans in seeds of two grains per planting hole, with a spacing of 30 cm x 15 cm x 30 cm. Soybean fertilization was carried out at the age of 10-14 days after planting with a dose of NPK 15:15:15 of 90-120 kg/ha and TSP/SP-36 of 60-90 kg/ha.

Polyculture of sweet corn-upland rice (*Turiman Jago* Super = **JP**): Selection of empty upland rice seeds was carried out by soaking the seeds, then the resulting grain was discarded, and the sinking was used for further testing. Seed treatment uses Agrice biofertilizer. Planting corn that has been treated with seeds, between upland rice plants is carried out as many as two rows of plants with a spacing of 40 cm x 20 cm x 50 cm. Upland rice planting was done three weeks before corn planting. The number of corn seeds used was five grains per planting holes. The seeds that have been inserted into the hole are then covered with manure. Upland rice planting between corn plants was carried out as many as 9 rows of plants with a spacing of 20 cm x 10 cm x 50 cm. Fertilization of upland rice was carried out three times, namely at 21-25 DAP, 40-46 DAP, and 60-65 DAP with a dose of one third of each. Application of biosilica liquid fertilizer (Bio Sinta) 2-4 times at the age of 30 DAP, 45 DAP, 60 DAP and 75 DAP. Fertilization of corn is done twice. Basic fertilization was applied at the age of 10-15 days after planting, with a dose of NPK fertilizer of 200 kg/ha, Urea 50 kg/ha, SP-36 150 kg/ha. The second fertilization is done by spreading at the age of 28-35 days after planting with a dose of NPK 15:15:15 200 kg/ha, Urea 100 kg/ha.

Polyculture of upland rice-soybean (*Turiman Gole* Super = **KP**): Similar to *Turiman Jago* Super model, the initial stage was to treat upland rice and soybean seeds. Upland rice planting was done in the number of seeds at 5 grains per planting hole, and planting between soybean plants was carried out in nine rows of plants with a spacing of 20 cm x 10 cm x 30 cm. Soybean planting between upland rice plants was carried out as many as five rows of plants, spacing of 30 cm x 10 cm x 30 cm, with two seeds per hole. Fertilization of upland rice was carried out three times, namely one third of part of NPK fertilizer 15:15:15 and one third of urea, aged 21-25 DAP, 40-46 DAP and 60-65 DAP. Application of Bio Sinta on upland rice plants 2-4 times at the age of 30, 45, 60 and 75 DAP. Soybean fertilization was carried out at the age of 10-14 days after planting with a dose of NPK 15:15:15 (90-120 kg/ha) and TSP/SP-36 (60-90 kg/ha).

Polyculture of sweet corn-soybean (*Turiman Jale* Super = **JK**): Sweet corn was planted between soybean plants in two rows, with a spacing of 60 cm x 12.5 cm x 30 cm, in two seeds/planting holes and then covered with manure. Soybean planting is done three weeks earlier, before planting corn. Soybeans were planted between corn plants in seven rows. The number of soybean seeds used was two grains per planting hole, with a spacing of 30 cm x 15 cm x 30 cm. Fertilization of corn is done twice. The first fertilization was carried out individually at the age of 10-15 days after planting with a dose of NPK 15:15:15 200 kg/ha, Urea 50 kg/ha, and SP-36 150 kg/ha. The second fertilization was carried out at the age of 28-35 DAP with the dose of NPK 15:15:15 200 kg/ha, Urea 100 kg/ha, by stocking. Soybean fertilization was carried out at the age of 10-14 DAP with the dose of NPK 15:15:15 90-120 kg/ha and TSP/SP-36 60-90 kg/ha.

The other crop maintenance includes weed control, pest and disease control, and harvesting. To suppress weed growth before planting, it is best to spray herbicides when weeds grow/germ. Soybean weeding was done manually by pulling the grass 1-2 times, at the age of 10-15 days after planting and at the age of 30-40 days after planting. Weeding in upland rice was carried out by spraying selective herbicides with the active ingredient Sodium bispyribac 400 g/L SE at a dose of 200-300 mL/ha, then manually by pulling the grass two times, namely when the plants were 10-20 DAP and when the plants were aged 40-50 DAP. Weed control in corn was carried out by spraying selective herbicides with the active ingredients of Atrazine 500 gr/L and Mesotrione 50 gr/L at the age of 10-15 DAP. The control of plant pest organisms was carried out using organic pesticides, but if the population is above the threshold, then it is carried out with inorganic pesticides. Corn harvest is done at a young age, because corn is intended as a vegetable, namely when the cobs are 60-85 DAP. Soybeans are also harvested young, because they are intended as snack soybeans, when the pods are 65-75 DAP. while rice was harvested normally, when the panicle was 119 DAP.

2.3 Data observations and analysis

The observational data to determine the level of the cropping index includes data on land characteristics, water sources, agricultural machinery, and annual cropping patterns in related locations. The observation data of farmers' income is in the form of input and output data from the application of the six test models, namely needs of seeds, fertilizers, pesticides, the number and wages of labor, the amount and price of production produced, other costs incurred during planting, etc. The observational data were processed using descriptive analysis and the economic feasibility analysis of the tested technology was based on the R/C ratio.

3 Result and Discussion

Based on the baseline survey results, it was known that there are urban farming activities in East Jakarta which still have a planting index of 1-2, especially during the long dry season. This was due to the limited capital of farmers and water sources. The farmers were only able to plant rice in the rainy season, while in the dry season the land is often left in a fallow condition. The available reservoirs were not sufficient for all commodities. In addition to food crops, some farmers also cultivate vegetable crops. The position of the river that has the potential to be used as a water source is located some distance away, so only farmers with strong capital are usually able to provide water to their land. Therefore, the implementation of this activity was focused on minimal water management, namely by utilizing limited land and water resources for the cultivation of corn, upland rice, and soybeans (*Jagole*) in an intercropping manner. The rice variety used was Inpago-8, while the soybean variety used was *Anjasmoro*, and the sweet corn used the commercial product, Bonanza. The cropping condition display looks like Figure 1.

Fig.1. Intercropping rice-soybean-sweet corn crops on East Jakarta plot area (the three pictures above are polyculture/intercropping: KP: soybean-rice; JP: sweet corn-rice; JK: sweet corn-soybean ; and at the bottom are monoculture of food crops).

The results of harvest observations indicate that the polyculture models tend to give higher yields per land area for sweet corn and soybeans, while for upland rice the highest yields were in the monoculture model. Sweet corn yields were highest in the intercropping with upland rice, as well as the highest soybean yields in the upland rice intercropping model (Fig. 2). In the last two polyculture models, both sweet corn and soybean plants, respectively, were made in 2 and 5 rows (Fig. 1: Model KP and JP). This is thought to be the cause of more optimal corn and soybean yields. The space for growth and development of plants was better than in other models.

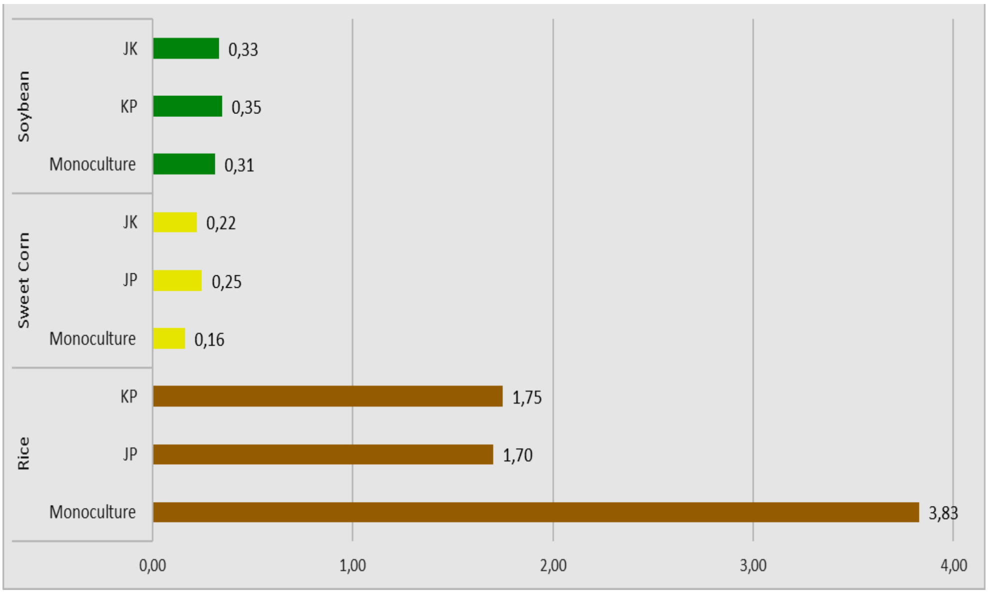

Fig. 2. Yield comparison between monoculture and polyculture/intercropping system (KP: soybean-rice; JP: sweet corn-rice; JK: sweet corn-soybean; kg/ha).

It was known that sweet corn plants grown in polyculture with either soybeans or rice gave better growth performance, when viewed from other generative growth aspects (Fig. 3). The other generative parameters included diameter, length, average and total weight, as well as the number of corn cobs. Likewise for soybeans, there was a tendency for better growth, especially total pod weight, in the polyculture model (Fig. 4).

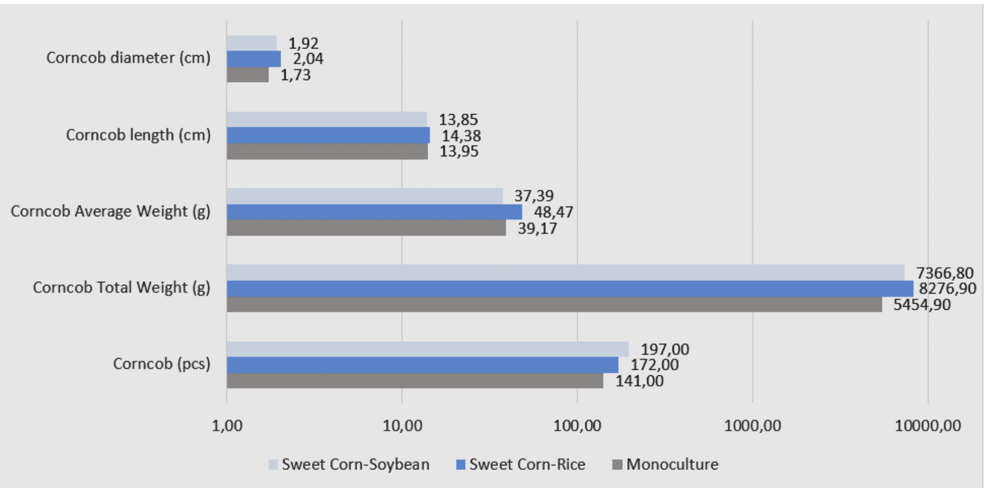

Fig. 3. The comparison of generative growth parameters of sweet corn in monoculture and intercropping systems.

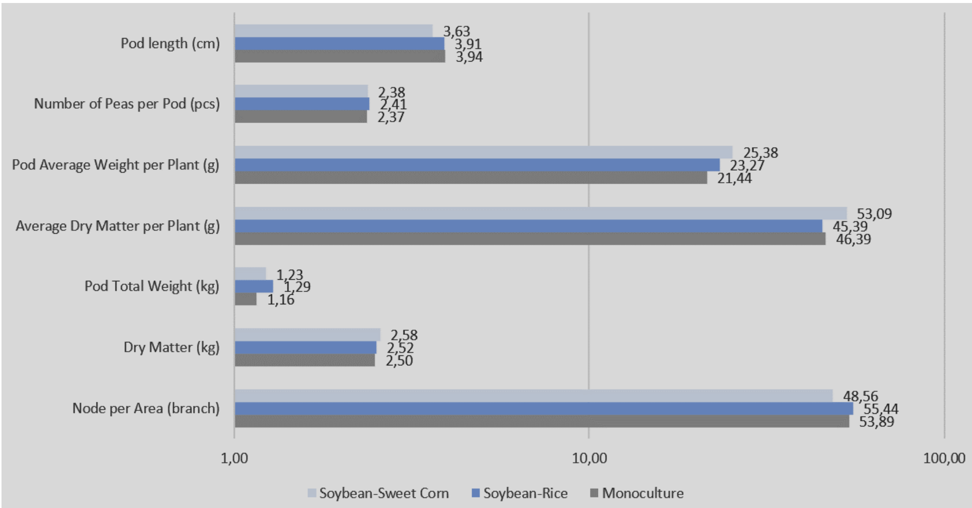

Fig. 4. The comparison of vegetative and generative growth parameters of soybean per hektar, in monoculture and intercropping systems.

The other research on intercropping of corn-upland rice-soybeans in acid-wetlands gave similar information that the yields of maize or soybeans, which used a polyculture pattern with upland rice, tended to be higher. The application of the intercropping model (*Turiman Jago* 2-9) gave maize yields of 12,959 kg/ha and upland rice of 2.104 kg/ha. In the intercropping model, upland rice was 3,175 kg/ha and soybean were 2,516 kg/ha (*Turiman Gole* 9-5). Meanwhile, the *Jale* intercropping model (*Turiman Jale* 2-7) gave 8,089 kg/ha corn and 1,971 kg/ha soybeans yields. It was also informed that there are several things that need to be considered in the application of the food crop cultivation model, including water use efficiency and calculation of the right planting time [7].

A different phenomenon occurred in the test of upland rice plants. In the case of rice plants using the monoculture model, it turned out to give higher yields than other models (Fig. 2). This is presumably because in the use of the polo culture model there is a higher incidence of pests on rice plants, especially bird pests than in the monoculture model. Similar to that reported by Jumakir et al. [8], that in the application of rice-corn intercropping, one of the obstacles is bird pest. However, it as not informed how much damage it caused. Based on a separate study, it is known that bird pests can cause rice yield losses of up to more than 75% [9]. Based on their research was known that the farmers' loss rate which is less than 20% is mostly caused by the simultaneous rice planting pattern or the cohesiveness of farmers in waiting for their fields. In our research, have not carried out intensive observation of pest attacks, so we have not been able to display the data more comprehensively. The condition of the plantation in middle of the city and limited sources of food for the bird pest certainly makes the plantation with a striking appearance as an attraction for the birds. However, it can be assumed that if there is no loss of yield due to bird attack, the yield of rice that can be obtained will be much higher. This was also in contrast to the condition of corn in the use of monoculture models which actually experience more attacks from armyworms (*Spodeptera* sp.). However, from the economic aspect in general, it gives a different tendency as well.

There was report of research also that the corn and soybean intercropping system provides an increase in the planting index from 100-150 to 200-300 in the rainfed lowlands in the 3rd planting season, with an average maize production of 9340 kg/ha and the average soybean was 1971 kg/ha [10]. Another study concluded that the use of intercropping with cereals or legumes could substantially increase land use efficiency and Phosphorus (P) uptake, which means that it has the potential to increase the efficiency of P fertilizer use in agriculture [11]. Another study [12] also reported that in intercropping corn and soybeans will significantly increase corn yields, but soybean yields decreased. It is suspected that the selection of the right combination of plants and cropping systems affects the relationship or symbiosis of mutualism between plants that are grown intercropping. Another study conducted from China [13], informed that the spacing in intercropping corn and soybeans will also affect crop yields. Setting the right spacing will provide a balance of yields and land ecosystems.

Based on the results of the economic analysis, it was known that the soybean monoculture technology model, with yields of young soybeans, provides a higher profit (R/C 2.58), compared to the other five models, namely upland rice monoculture, sweet corn, soybean-upland rice polyculture, soybean-sweet corn and upland rice-sweet corn polyculture (R/C : 0.54, 0.24, 1.71, 1.25 and 0.17) (Tables 1 and 2). When viewed as a whole, it is known that cultivation using soybeans, either monoculture or polyculture will always provide benefits, when viewed from the R/C value which is always more than 1. This is due to relatively lower production costs, while production and prices' relatively higher sales value can provide a higher income value as well. However, from a technical point of view, based on the results of interviews with cooperators and some local farmers, they tend to prefer the monoculture model because it is considered easier to implement.

Table 1. The analysis of food crops monoculture technology (upland rice, soybeans, sweet corn) on urban farming system in Jakarta (per hectare).

Descriptions		Price (IDR)		
		Rice (P)	**Sweet Corn (J)**	**Soybean (K)**
I. Variable Cost (A+B+C)		23,802,900	31,198,440	35,871,667
A	Production Cost	15,624,000	24,445,000	14,905,000
	• Seeds	375,000	7,200,000	1,800,000
	• Fertilizer	13,535,000	16,015,000	11,815,000
	• Pesticide	1,714,000	1,230,000	1,290,000
B	Labor	5,500,000	5,500,000	5,500,000
C	Rent	4,145,000	1,253,440	15,466,667
II. Fixed Cost		85,000	85,000	85,000
D	Depreciation of Equipment	85,000	85,000	85,000
III. Total Cost (I+II)		23,887,900	31,283,440	35,956,667
IV. Revenue, Profit, R/C				
E	Revenue	12,858,720	7,520,640	92,800,000
F	Profit	-11,029,180	-23,762,800	56,843,333
G	R/C	0.54	0.24	2.58

The results of the analysis are expected to be different if used in other regions. This is due to differences in production costs, which usually arise due to differences in land and labor rental payment systems. As with land in North Jakarta, in general, land rental costs are calculated based on the area of the land plot, not a profit-sharing system like the one in East Jakarta. Likewise, labor costs in North and East Jakarta are different from those in West Jakarta.

Based on the results of a separate study conducted by Dewi and Kushartanti [14], the *Inpago* 9 variety planted with *jajar legowo* 2:1 gave the highest productivity (5.5 tons/ha) compared to the *Inpago* 8 variety and other cropping systems so that the profit obtained was IDR 13,552,000/ha (R/C=2.99). The analysis of the break-even point of prices and production shows that if there is a decline in prices and production of 57.39−66.59%, farmers have not experienced losses. Changes in the cropping system from *jajar wayang* to *jajar legowo* 2:1 gave the proportion of increased profits for *Inpago* 8 varieties by 18.79% and *Inpago* 9 by 7.71%, indicated by NKB values of 1.24 and 1.09. Therefore, to increase the productivity of upland rice in dry land, it can be obtained with the 2:1 row *legowo* planting system.

Table 2. The analysis of food crops polyculture technology (upland rice, soybeans, sweet corn) on urban farming system in Jakarta (per hectare).

Descriptions		Price (IDR)		
		Gole Super (KP)	*Jale* Super (JK)	*Jago* Super (JP)
I. Variable Cost (A+B+C)		32,713,060	39,226,720	33,211,540
A	Production Cost	17,632,500	24,920,000	25,982,500
	• Seeds	1,500,000	6,000,000	5,100,000
	• Fertilizer	15,350,000	17,630,000	19,350,000
	• Pesticide	1,592,500	1,290,000	1,532,500
B	Labor	5,500,000	5,500,000	5,500,000
C	Rent	9,580,560	8,806,720	1,729,040
II. Fixed Cost		85,000	85,000	85,000
D	Depreciation of Equipment	85,000	85,000	85,000
III. Total Cost (I+II)		33,608,060	39,311,720	33,296,540
IV. Revenue, Profit, R/C				
E	Revenue	57,483,360	52,840,320	10,374,240
F	Profit	23,875,300	9,888,280	-27,574,460
G	R/C	1.71	1.25	0.17

Research conducted by Burhansyah and Sution [15] regarding rice-corn-soybean intercropping in other locations in the border area of Kalimantan, using a survey method, the data of which is then analyzed using the Multi-Goal Programming program, provides information that the income of rice-corn farming is amounting to IDR 33,699,000 (RC = 3.4); rice-soybean farming income is IDR 24,811,000 (R/C = 2.77); corn-soybean farming income is IDR 27,056,000 (R/C = 2.42). Optimizing the annual income of food crop intercropping is achieved by the availability of manpower (6,024 HOK), urea fertilizer (400 kg), NPK (1,500 kg), manure (3,000 kg) and (6,140 ha of land). Another result is that the maximum income for intercropping food crops is IDR 85,566,600 at a cost of IDR 31,249,250 with an area of 1.99 ha for rice-corn intercropping and an area of 0.73 ha for rice-soybean intercropping. In addition, the timing of intercropping is also one of the keys to success in increasing crop yields and farmers' income. As in the study, it was found that the appropriate planting times for the *Pajale* intercropping pattern were January to April for planting rice-soybean commodities; May to August for corn-soybean crops; and in September to December for rice-corn.

This shows that the use of cropping patterns adapted to existing resources is very important in an effort to increase farmers' income. Likewise for urban farming activists. Site selection, commodities, and cropping patterns remain the main considerations in doing farming. And what is no less important is that food crop commodities (paddy-corn-soybean = *Pajale*) in urban areas can still be developed with various technological improvements.

Based on several results from the implementation of the activities that have been carried out, it is known that there are still dry land or limited land for water resources in cultivating plants in the Jakarta area so that their utilization can be optimized by using a monoculture system or polyculture of food crops and secondary crops. However, the preference of farmers in production is more decisive, especially related to the selling price of the product and the ease of access to inputs. With the status of land, which is generally not a farmer's private land, the choice of commodities to be developed depends on the interests and needs of farmers.

The development of food crop commodities, especially rice and secondary crops in urban farming areas such as DKI Jakarta, needs to receive comprehensive support, not only from the relevant Agriculture Service, but also from other parties, especially landowners (developers) and City Planning, or other agencies. other related technical matters such as Public Works which handles infrastructure and Water Resources which handles water governance. Lands that have been considered as rice fields can be managed more effectively and efficiently while awaiting the transfer of their functions if there is a more transparent and cooperative planning. The formulation of the unification of unused land areas with boundaries in the form of metadata, along with predictions of the maturity period of the transfer of functions, is considered to be one solution to start the management of the 'rice field' land. However, this does require a strong agreement and commitment from various parties.

Although the results of the activity indicate that there is potential for implementing and developing an intercropping model for food crops, which aims to increase the cropping index and income of urban farming activists, there are also some risks that need to be considered. Some of these possible risks include Rapid conversion or transfer of land functions into other functional lands such as residential land in urban areas such as Jakarta. In addition, it is still difficult to obtain raw materials/components of the recommended technology package, such as: agrice, rhizobium, bio Sinta, and vegetable pesticides which are components of the recommended technology package, and it is still difficult to obtain data from relevant agencies. As for the anticipation of these possible risks, among others are: Early confirmation to producers of materials supporting super largo technology or related companies and continuous coordination with relevant agencies.

4 Conclusion and Recommendation

1. The optimizing the use of dry land or land with limited water resources for cultivating crops in the Jakarta area can be done by using an intercropping system (*Turiman*) of corn-rice upland-soybean (*Jagole*), although based on an economic analysis of the six models of cropping patterns, it is found that the monoculture cropping pattern is soybeans gave the highest profit, with an R/C value of 2.58.
2. Although there are still dry land or limited land for water resources for cultivating plants in the Jakarta area, so that their utilization can be optimized using monoculture or polyculture systems for food and secondary crops, the preference of farmers in production is more decisive, especially related to product selling prices and easy access to production inputs.
3. As a suggestion, it is conveyed that urban farming farmer groups still need guidance from related agencies, in this case not only AIAT but also related agencies.

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