Integrated farming system development based on local potential to improve food security and increase the farmers income: case study in Jatisari Village, Jatisrono Sub-district, Wonogiri Regency

S J Rachmawatie\textsuperscript{(a)}, L Widiastuti\textsuperscript{1}, J Sutrisno\textsuperscript{2}, E S Rahayu\textsuperscript{2}

\textsuperscript{1}Department of Agrotechnology, Faculty of Agriculture, Islam Batik University of Surakarta, KH.Agus Salim Street Number 10 Surakarta.
\textsuperscript{2}Department of Agribusiness, Faculty of Agriculture, Sebelas Maret University, Ir. Sutami Street Number 36 A Jebres Surakarta.
\textsuperscript{(a)}Corresponding author: sriejulirachmawatie@gmail.com

Abstract. Food security can be interpreted by ensuring access to food for each individual to fulfill their food needs in order to live healthy and active. The effort to improve food security is through integrated farming systems. Integrated Farming System (IFS) is a system of managing crops, livestock and fish with their environment to be closed to high productivity, security of production and conservation of resources that are relatively in line with limited land, labor and capital. The results of the analysis of the level of welfare of farmers in Jatisari Village used the indicator of Farmer Exchange Rate method. The results of the calculation can be known to the farmer exchange rate of 81.1\% in which Farmer Exchange Rate is less than 100\%, meaning that farmers in Jatisari Village are not prosperous. From the results of the analysis of local potential, it can be concluded that food crop farming (rice, corn, and soybeans) is a dominant potential and has not provided farmers' welfare. The conclusion of this study is that (1) IFS in Jatisari Village has good prospects as an effort to increase community income, (2) IFS will develop optimally by utilizing local resources from various sub-sectors synergy with technology as new sources of income for the community through empowerment.

1. Introduction
Development of integrated farming system models has been widely carried out and known to have a positive impact, seen by various sides. By its ability to form a massive agro-ecosystem with high diversity, integrated farming systems can guarantee the success of higher farming. He also said that integrated farming systems have the advantage of both ecological and economic aspects. The intended benefits, which are more adaptive to change environmentally friendly, energy saving, high biodiversity, more resistant, more diversified efforts, higher product diversification, healthier products, better farming sustainability, better continuous labor absorption [1].

Farmers in general still apply it partially in terms of managing each component individually. Whereas in the management of an integrated farming system consists of several management subsystems, namely integrated crop management (Integrated Crop Management/ICM), integrated nutrient management (Integrated Nutrient Management/INM), management of integrated crop pest organisms (IPM), water management integrated (Integrated Moisture Management/IMM).

In Wonogiri District, especially in Jatisari Village, Jatisrono Subdistrict, agricultural businesses continue to be developed. This can be seen by the increase in Wonogiri Regency food crop production...
in the past 5 (five) years (Department of Agriculture, Horticulture and Food Crops, Wonogiri Regency, 2014). The integrated farming program in Jatisari Village was finally able to win an award as the Pioneer Farming Village. Local potentials such as those in Jatisari Village, Jatisrono District, are extraordinary assets if the agricultural system can develop. Especially supported by adequate government policies and human resources. However, just like other regions, this integrated farming system has not been implemented properly due to various obstacles. As a result, the effectiveness of integrated farming systems in this region is still very small, therefore this research is carried out to help improve the effectiveness and the ease of implementation of integrated agricultural systems so that it is expected to help for improving food security and increasing farmers’ income. The purpose of this study are (1) Identifying the superior potential of agriculture in Jatisari Village, (2) Identifying integrated agricultural patterns that have been implemented in Jatisari Village, (3) Evaluating and analyzing integrated agricultural patterns that have been implemented in Jatisari Village, (4) Developing integrated farming concepts / models based on local potential in the village of Jatisari.

2. Material and Method
This study uses a combination research method, a combination research method is a method that combines quantitative and qualitative methods. This approach was chosen to describe something factually when the research was conducted, in which the depiction was carried out thoroughly, in depth and complete. Through this mixing method, researchers not only focus on measurement and numerical problems for data analysis purposes, but also examine the meaning and context of behavior and processes that occur in the interrelated patterns of various observed factors.

The study began with a survey in the village of Jatisari, Jatisrono District, Wonogiri. The survey was conducted to obtain data on the initial conditions for the implementation of integrated agriculture. The survey results on integrated farming systems in the first year include: (1) The level of feasibility of farming, is the indicator of the success of integrated farming systems, directly related to the income received by farmers in each harvest period, to take into account the need for cultivation costs, good business feasibility input and output in each harvest period, (2) the implementation of integrated agricultural of integrated farming systems that has been implemented, started from the type of cultivation carried out (plants, livestock, and fish), technical implementation to the technology used, (3) Mapping local potential is done as a basis for the development of integrated agricultural models. Integrated farming systems will be more reliable if the constituent components are local resources so that sustainability is more secure (Nurcholis and Supangkat, 2011). In addition to natural resource conditions, mapping is also carried out on social conditions in the community. According to [1] in the development of integrated agricultural systems, it is also necessary to consider the principles of rural development, namely the principles of community needs, self-help, educative, participatory, local potential, integralistic and openness.

The 1st year research method is more than a survey and exploration activity that aims to obtain a wide and in-depth information about the implementation of an integrated agricultural system in Jatisari Village, Jatisrono District, Wonogiri. The data collection process was carried out using questionnaires and deepened by interviewing mandalas (in depth interviews). In addition, data collection is carried out by collecting data from related agencies that support agricultural activities in Jatisari Village, Wonogiri. Data analysis methods used, include quantitative and qualitative descriptive analysis.

3. Results and Discussions
Analysis of the situation in the research village of Jatisari Village, Jatisrono Subdistrict, Wonogiri is one of the villages in the Wonogiri region which has an astronomical location at 111.106797 LS / LU - 7.836177 BT / BB. Jatisari village is at an average altitude of 450 meters above sea level. Jatisari village has a tropical climate and a temperature between 300 - 320 C. The geographical situation supports the agricultural activities carried out by the Jatisari community as a driver of economic life in Jatisari Village, Jatisrono District. Based on its geographical location, Jatisari Village has the following territorial boundaries, to the north: Jatisrono Village, to the south: Sumberejo Village, next to East: Gunungsari Village, West: Watangsono Village, all villages are in Jatisrono District. Jatisari Village, Jatisrono Subdistrict, Wonogiri has an average rainfall of 0.81 mm. The number of rainy months in
Jatisari Village is an average of 5 months per month, with a humidity of 85.00. Conditions from August to December are months with high average rainfall.

The total population of male in Jatisari Village, Jatisrono District is 2,486 people and the female population is 2,474 people. Jatisari village is a region with a high growth rate of the highest age group population in the range of 18 - 55 years with a total of 2,406 people. The population with the age of 55 years is 879 people, it can be counted the dependency of the population in Jatisari Village, Jatisrono Subdistrict, up to 1.14, meaning that every single family head bears 2 people, then this value is quite small and means that the Jatisari community has a low family burden. The agricultural sector in Jatisari Village, Jatisrono Subdistrict, currently has a strategic role as the main source of community life and income.

The agricultural sector in Jatisari Village is divided into several sub-sectors including the food crops and horticulture sub-sectors, the plantation sub-sectors, the livestock sub-sectors, and the forestry sub-sectors. The highest food crop is 170 ha of lowland rice. Food crops in Jatisari Village, Jatisrono Subdistrict are dominated by lowland rice plants, then crops with maize and cassava. Potential livestock is 4,182 native chickens, other resident pets are 512 goats and 95 cattles population. This animal is used as an additional source of family income and nutrition which means that at any time it is used to meet the consumption of the family.

Based on the results of the study, the cultivation of food crops (rice, corn, soybeans) in Jatisari Village, Jatisrono District was carried out on paddy fields with a one-year planting pattern of two to three times the planting season. The characteristics of the respondent farmers have an average age ranging from 30-70 years. The highest number of ages is at the age of 35 - 39 years by 23.3%, meaning that there are still many labor forces who are in the productive age who work as farmers. The level of education of farmers is mostly high school graduates by 40%, the level of primary school education by 36.7%. However, a low level of education does not necessarily make farmers not advanced with highly educated farmers. Farmers with low education who have long-standing farming experience are able to compete well to farmers with higher education but there are still few farming experiences. The average farmer has a land area of 0.25 - 0.49 Ha by 60%, land of 0.50 - 1 Ha by 36.7%, farmer respondents with land of 1.50 - 2 Ha by 3.3%. Most of the respondent farmers have a land area of 0.25 to 0.49 Ha. The majority of farmers have experience of farming for 11-20 years by 46%. Farmers have experiences of farming for more than 30 years about 10%, others have experience farming 21-30 years as many as 10 people or about 33.3%. Length of experience of farmers can influence decision making.

The financing of farming is noted that the largest component of farming costs is the average labor cost per planting season of Rp. 2,736,888 (58.41%). The next farming cost is the cost of production facilities with an average cost per planting season of Rp. 661,582 (14.12%). Other costs, such as taxes, salvation, profit sharing reach 27.47%. From farming activities, the contribution of farming income to food crops (rice, corn, and soybeans) to the total income of farmer families reached 54.9%, this value is included in the high class because it is in the range of 51 - 75% of the total income received. The results of the analysis of the level of welfare of farmers in Jatisari Village, Jatisrono Subdistrict, used the indicator of Farmer Exchange Rate method. The results of the analysis of the level of welfare of farmers in Jatisari Village, Jatisrono Subdistrict, used the indicator of Farmer Exchange Rate method. Farmer exchange rates are used to determine the level of welfare of farmers, by comparing the income which is received by farmers with the expenditure of farmers. The results of the calculation can be known to the farmer exchange rate of 81.1% in which Farmer Exchange Rate is less than 100%. This indicates that the farmers in Jatisari Village have not been prospered. This inadequacy is due to lower production prices than the increase in consumption prices and production costs. From the results of the analysis of local potential it can be concluded that food crop farming (paddy, corn, and soybeans) is a dominant potential and has not provided farmers 'welfare, this condition is used basis in the model of integrated agricultural development (IFS) and plays an important role in improving food security and farmers' income in Jatisari Village, Jatisrono District, Wonogiri.

The Integrated Farming System Model can be seen as follows:
4. Conclusions
The conclusion of this study is that (1) Integrated Farming System (IFS) in Jatisari Village, Jatisrono District has good prospects as an alternative for developing farmers 'and communities' businesses in order to increase community income, (2) Integrated Farming System (IFS) will develop optimally by utilizing local resources from various sub-sectors that are synergized with technology as a new source of income for the community through empowerment, (3) Potential human resources and local resources are the main components, integrated in the development of integrated farming system (IFS). It is recommended that (1) HR Synergy all stakeholders of Jatisari Village as the main factor must be prioritized to support integrated farming system (IFS), (2) It is necessary to strengthen institutions, especially organizations and management in the implementation of integrated farming system (IFS), (3) Increased knowledge and skills through training and seeking actual information in ensuring the integrated farming system continuity (IFS).

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