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Impact Of Right Riam Irrigation On Wide And Production As Well As Productivity Of Ricefarmers In Labuan Tabu Village, Martapura Sub District, Banjar District

Muhammad Wildan*, Hairin Fajeri, Hamdani
Master of Agricultural Economics, Fak. Agriculture - Univ. Mangkurat, Banjarbaru - South Kalimantan

Abstract.*The main obstacle faced by farmers in rainfed areas is the availability of water for limited agriculture, especially in the dry season. One action to overcome this problem is the water management approach. Water management can be done by utilizing irrigation water. This study aims to analyze the impact of RiamKanan irrigation on the area, production and productivity of paddy rice in Labuan Tabu Village, Martapura District, Banjar Regency. The results of the analysis showed that the rice planting area before using Right Riam irrigation water for rice farming was 21.86 ha, while after using only 7.23 ha. So there is a decrease in the area of rice planting by 14.63 ha. The level of rice production before using the RiamKanan irrigation water was 65.40 tons, whereas after using only 22.85 tons. So there is a decrease in the level of rice production by 42.55 tons. The level of rice productivity before using Right Riam irrigation water was 2.199 tons /ha, while after using Right Riam irrigation water was 3.18 tons /ha. So there is an increase in the level of rice productivity by 0.19 tons /ha.*

Keywords: *Riam Kanan irrigation, planted area, rice production*

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I. Preliminary

The development of rainfed agriculture has an opportunity to increase agricultural production through expansion of crop area, increase cropping intensity and technology adoption. However, there is a major obstacle faced by farmers in rainfed areas is the availability of water for limited agriculture, especially in the dry season. One action to overcome this problem is the water management approach..

Provision of water for agricultural purposes is a major problem for agricultural development, especially food crops, in Banjar District. The results of a study conducted by Setiani *et al*. (2003) found that limited water availability was the first priority problem that needed to be addressed. Meanwhile, a study conducted by the Center for Agricultural Technology Research and Development (BP2TP) in 2004 also reinforced these findings.

Banjar District is one of the regencies in South Kalimantan Province that has a land area of 59,829 ha of paddy fields. Rainfed lowland is one of the biggest components of existing paddy fields, which is 22.31% or 13,349.5 ha (BPS Banjar Regency, 2019).

Considering that water supply is one of the main obstacles faced by farmers, especially in Banjar District, the use of right cascade irrigation is the main choice in rice management. One of the sub-districts located on the coast of the right cascade irrigation for the use of irrigation water for farming in Banjar District is Martapura District. However, based on 2014-2018 data, the development of paddy fields in Martapura District has decreased.

Labuan Tabu Village is one of the villages in Martapura District, where the majority of the community's work is farming as a source of household income. The area of rice paddy farmers in the village is 138.7 ha while 69.3 ha do not use Riam Kanan Irrigation water. Based on the facts in the area of Labuan Tabu Village, the area of rice fields has decreased. This is because farmers who move in the fisheries sector use more irrigation water and when it is overloaded it will be transferred to the rice fields. Farmers engaged in the food crops sector, especially rice farming, cannot defend themselves more towards farmers engaged in the fisheries sector. The area of land for the fisheries sector business in Labuan Tabu Village is 20 ha or 5.59% of the total area of the village.

In addition, another problem is the lack of guidance to farmer groups regarding irrigation management. This development is carried out for optimal management of irrigation in the utilization of surface and underground water in an integrated manner, and is carried out with the principle of one irrigation system, a management unit with due regard to the interests of users in the upstream, middle and downstream in a balanced

manner. Based on this description, it is important to analyze the impact and contribution of right cascade irrigation to the area and production of paddy rice in Banjar District.

Goals and usage

This study aims to analyze: (1) the effect of Right Riam irrigation on rice planting area; (2) the impact of Riam Kanan on the production of rice; (3) the impact of Riam Kanan irrigation on the productivity of paddy rice in Labuan Tabu, Martapura District, Banjar Regency.

The benefits of this study: (1) as a material consideration for farmers in managing Riam Kanan irrigation for rice fields in Banjar District; (2) as material to determine the direction of policy carried out by the government in providing policies to improve the welfare of farmers; (3) as reference material or further research literature.

II. Method

Place and time of research

This research was conducted in Labuan Tabu, Martapura District, Banjar Regency, which started from March to April 2020.

Data Types and Sources of Data

In this study the data used are primary and secondary data. Primary data obtained from the results of direct interviews with respondents who became the study sample. Whereas secondary data is needed to support primary data obtained from literature studies, institutions or related institutions such as the Central Statistics Agency of South Kalimantan Province, the Central Statistics Agency of Banjar Regency, the Office of Food Crops and Horticulture in the Regency of Banjar, the Department of Public Works of the Regency of Banjar and The Agricultural Extension Center (BPP) supports this research.

Sampling method

This research was conducted using a purposive sampling method, on Labuan Tabu Village, Martapura District in Banjar District. With the consideration of farmers who seek paddy fields using Riam Right irrigation. The number of samples taken as many as 50 samples of rice farmers from the population of rice farmers in the study sample villages were 117 farmers.

Data analysis

To answer the first, second and third objectives, the impact of RiamKanan irrigation on the planting area, production and productivity of rice paddy farmers in Labuan Tabu Village, Martapura District, Banjar Regency uses descriptive analysis method. Data collected through questionnaires and in-depth interviews are tabulated and then analyzed to answer the research objectives using the Policy Analysis Matrix can be seen in the following table:

Tabel 1. Method Policy Analysis Matrix

Irrigation	Area (ha)	Production (tons)
Before irrigation A		
After irrigation B		
C = A - B		

III. Results And Discussion

Characteristics of Respondents

Age. The age of respondent farmers using right cascade irrigation water for paddy farming ranges between 46-68 years with an average age of respondent farmers is 53.86 years.

Table 2. Distribution of respondent's age group

Age group (years)	Amount (respondent)	Percentage (%)
45 – 50	19	38.00
51 – 55	10	20.00
56 – 60	14	28.00
61 – 65	4	8.00
66 – 68	3	6.00
Amount	50	100.00

Source: Primary data processing (2020)

The age group of farmers who were the most respondents were in the age group of 45-50 years, as many as 19 people (38.00%), while the age group of farmers who were the least respondents were in the age

group of 66 - 68 years, as many as 3 people (6.00%). Farmers who use right hand irrigation irrigation water for rice farming are included in the productive age, meaning that both physically the farmer has the ability to manage rice farming. From the research of farmers, respondents included productive age as many as 55 farmers, while the remaining 5 people did not include productive age. Although the 5 farmers are not included after being productive, they still work. This is because to meet family needs and increase household income.

Level of education. Distribution of respondent education level can be seen in the following table.

Table 3. Distribution of education level

Type of education level	Amount (respondent)	Percentage (%)
Not Graduated from Elementary School / equivalent	32	64.00
Graduated from elementary school / equivalent	18	36.00
Amount	50	100.00

Source: Primary data processing (2020)

The level of basic education of farmers who use right cascade irrigation water for rice farming, the majority of those who have not completed primary school / equivalent is 64.00%. The highest education of farmers using right cascade irrigation water for rice farming is the level of education graduating from elementary school / equivalent which is 36.00%. This shows that the educational situation of farmers who use right cascade irrigation water for rice farming is still low, mostly only at the elementary level / equivalent. The level of education will affect the ability of farmers to determine the decisions that will be taken. This will affect farmers in farm management.

Long experience in farming. The experience of farming influences the behavior of farmers in managing their businesses. Usually farmers have longer farming experience and lots of knowledge in farming so they tend to be careful in making decisions. Respondent farmers who have experience in farming with a range of 32 - 55 years, with an average of 39.14 years of farming experience. The respondent's long experience in farming can be seen in the following table.

Table 4. Long-term distribution of agriculture

Entrepreneurship (years)	Amount (respondent)	Percentage (%)
32 – 39	28	56.00
40 – 47	16	32.00
48 – 55	6	12.00
Amount	50	100.00

Source: Primary data processing (2020)

The highest farming experience of respondent users using right cascade irrigation for rice farming is 32-39, which is 56.00%, while the lowest farming experience of respondent farmers is 48 - 55 years at 12.00%. With a high level of experience in farming, a farmer can manage or manage his farm well.

Family dependents. Number of dependents of respondent farmers' families using Riam Kanan irrigation water for paddy farming between 2-5 people. The largest number of family dependents on the respondent farmer was 3 people at 42.00%, while the smallest number of family dependents on the respondent farmer was 2 people at 12.00%. This is because some of the children of farmers who are already married immediately move to their homes. The large number of family members can affect the level of household income. The distribution of the number of family dependents can be seen in the following table.

Table 5. Distribution of total family dependents

Number of family dependents (people)	Amount (respondent)	Percentage (%)
2	6	12.00
3	21	42.00
4	16	32.00
5	7	14.00
Amount	50	100.00

Source: Primary data processing (2020)

Land Ownership Status and Area. Distribution of status and land ownership can be seen in the following table.

Table 6. Distribution of respondent's land area

Land area (ha)	Amount (respondent)	Percentage (%)
0.29 – 0.35	9	18.00
0.36 – 0.42	9	18.00
0.43 – 0.49	18	36.00
0.50 – 0.57	14	36.00
Amount	50	100.00

Source: Primary data processing (2020)

The land selection status is very important for farmers because it can influence the decision making for farmers to increase their farming production. Based on the results of the study, the area of land owned by respondent farmers using right cascade irrigation water for rice farming ranges from 0.29 to 0.57 ha with an average area of 0.44 ha (15.30 stock). The largest group of land owned by the respondent farmers ranged from 0.43 to 0.49 ha by 36.00%, while the smallest ranged from 0.29 to 0.35 and 0.36 to 0.42 ha respectively 18.00%.

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Planted Area. Through irrigation development, there will be an expansion of paddy fields from previously non-paddy fields or an increase in the quality of paddy fields from low quality to higher quality paddy fields. For example with the construction of irrigated rainfed lowland rice fields can become rice fields with technical irrigation.

Table 7. Rice planting area before the use of Riam Kanan irrigation

Planting area (ha)	Amount (respondent)	Percentage (%)
0.29 – 0.38	15	30.00
0.39 – 0.48	17	34.00
0.49 – 0.57	18	36.00
Amount	50	100.00

Source: Primary data processing (2020)

Based on Table 7, the area of rice planting before the use of Right Riam irrigation water the most respondents tried in the area of 0.49 - 0.58 ha as many as 18 respondents (36.00%), while at least in the area of 0.29 - 0.38 ha as many as 15 respondents (30.00%).

Table 8. Rice planting area after the use of Riam Kanan irrigation

Planting area (ha)	Amount (respondent)	Percentage (%)
0.11 – 0.13	16	32.00
0.14 – 0.16	17	34.00
0.17 – 0.20	17	34.00
Amount	50	100.00

Source: Primary data processing (2020)

Based on Table 8, the area of rice planting after the use of Right Riam irrigation water the most respondents attempted at an area of 0.14 - 0.20 ha as many as 34 respondents (68.00%), while at least at an area of 0.11 - 0.13 ha as many as 16 respondents (32.00%).

Table 9. Rice planting area

Description	Planting area (ha)
Before the use of Riam Kanan irrigation water (A)	21.86
After the use of Riam Kanan irrigation water (B)	7.23
Impact C = A - B	14.63

Source: Primary data processing (2020)

Rice planting area data before the use of Right Riam irrigation water was obtained from interviews with respondents in the study area namely 1991 data, while data on rice planting area after the use of Right Riam irrigation water data in 2019. The rice planting area cultivated by respondent farmers before using cascade irrigation water right for rice farming in the study area is 21.86 ha. Whereas after the respondent farmer used the right cascade irrigation water for rice farming, the area of land he could cultivate was only 7.23 ha. So there is a decrease in planting area between before and after the use of right cascade irrigation water area of 14.63 ha. This happens because the respondent farmers can only plant rice in high-level paddy fields. In addition, during the rainy season, right cascade irrigation water is widely used by farmers engaged in fishing conductors. If excessive irrigation water is used, the farmer delegates it to paddy fields. So there was a shift in the planting schedule which was supposed to be carried out in February or March experiencing a shift to March or April. At that time the seedlings in the nursery (track) were old and entered the generative phase, so that when planting in paddy fields the number of tillers did not increase again (the number of tillers was less than normal tillers).

The results of the study are inversely proportional to the intended purpose of irrigation development based on theory. The purpose of irrigation development is the expansion of paddy fields. However, the facts in the field of research area have decreased the area of rice planting. This is because farmers who move in the fisheries sector use more irrigation water and when it is overloaded it will be transferred to the rice fields. Farmers engaged in the food crops sector, especially rice farming, cannot defend themselves more towards farmers engaged in the fisheries sector. Because, there are differences in economic status between farmers

engaged in the fisheries sector with the food crop sector (specifically rice farming). Farmers who work on rice have made several attempts in the form of fact reports in the field of wastewater from the fishery business that have overflowed into paddy fields which has resulted in a decrease in the area of rice planting to Government Agencies. However, there was no action from the results of the farmers report. This happens because farmers engaged in the fisheries sector have a higher economic status. So that it can cover the existing problems in the field.

Production. With the level of water availability in the fields will affect the shape of cropping patterns and cropping intensity of rice farmers which will ultimately affect rice production through an increase in planting area in a proportional way. Thus the irrigation development influences the increase in rice production indirectly and affects the timing of fertilizer, medicines, weeding and other cultivation technical factors. Data on rice production before the use of Riam Kanan irrigation water was obtained from interviews with respondents in the study area namely 1991 data, while data on rice production after the use of Riam Kanan irrigation water data were 2019.

Table 10. The level of rice production before the use of Riam Kanan irrigation

Production (tons)	Amount (respondent)	Percentage (%)
0.80 – 1.13	14	28.00
1.14 – 1.47	21	42.00
1.48 – 1.80	15	30.00
Amount	50	100.00

Source: Primary data processing (2020)

Based on Table 10, the level of rice production before the use of Riam Kanan irrigation water the highest level of production was 1.80 tons and the lowest was 0.80 tons. The level of rice production most respondents produced ranged from 1.14 to 1.47 tons as many as 21 respondents (42.00%), while at least at the production level of 0.80 - 1.13 tons as many as 14 respondents (28.00%).

Table 11. The level of rice production after the use of Riam Kanan irrigation

Production (tons)	Amount (respondent)	Percentage (%)
0.34 – 0.42	15	30.00
0.43 – 0.51	22	44.00
0.52 – 0.60	13	26.00
Amount	50	100.00

Source: Primary data processing (2020)

Based on Table 11, the level of rice production after the use of Riam Kanan irrigation water the highest level of production was 0.60 tons and the lowest was 0.34 tons. The highest level of rice production produced by respondents ranged from 0.43 - 0.51 tons with 22 respondents (44.00%), while at least the production level of 0.51 - 0.60 tons was 13 respondents (26.00%).

Table 12. Rice production level

Description	Production (tons)
Before the use of Riam Kanan irrigation water (A)	65.40
After the use of Riam Kanan irrigation water (B)	22.85
Impact C = A - B	42.55

Source: Primary data processing (2020)

The results of the study, the level of rice production produced by respondent farmers before the use of right cascade irrigation water for rice farming in the study area was 65.40 tons. Whereas after the respondent farmers used right cascade irrigation water for rice farming, the level of production produced by farmers was only 22.85 tons. So there is a decrease in the level of rice production between before and after the use of right cascade irrigation water by 42.55 tons.

The reason is due to a decrease in planting area and shifting the planting schedule of rice farming in the rainy season. At that time the seedlings in the nursery (track) were old and entered the generative phase, so that when planting in paddy fields the number of tillers did not increase again (the number of tillers was less than normal tillers). In addition, in the dry season farmers engaged in the fisheries sector will carry out storage or spare irrigation water for fisheries. This resulted in rice plants in paddy fields experiencing water shortages or drought, the number of panicle was small and the level of rice grain emptiness was high. This results in decreased productivity and ultimately decreased production.

Productivity. Rice productivity of rice farming is obtained from the production of the total area of paddy planted by farmers.

Table 13. The level of rice productivity before the use of Riam Kanan irrigation

Productivity (tons/ha)	Amount (respondent)	Percentage (%)
2.48 – 2.72	6	12.00
2.73 – 2.97	12	24.00
2.98 – 3.21	32	64.00
Amount	50	100.00

Source: Primary data processing (2020)

Based on Table 13, the level of rice productivity before the use of Riam Kanan irrigation water the highest level of productivity was 3.21 tons / ha and the lowest was 2.48 tons / ha. The level of rice productivity most respondents produce ranged from 2.98 to 3.21 tons / ha as many as 32 respondents (64.00%), while at least at the level of productivity 2.48 - 2.72 tons / ha as many as 6 respondents (12.00%).

Table 14. The level of rice productivity after the use of Riam Kanan irrigation

Productivity (tons/ha)	Amount (respondent)	Percentage (%)
2.63 – 3.07	19	38.00
3.08 – 3.52	28	56.00
3.53 – 3.94	3	6.00
Amount	50	100.00

Source: Primary data processing (2020)

Based on Table 14, the level of rice productivity after the use of Riam Kanan irrigation water the highest level of productivity was 3.94 tons / ha and the lowest was 2.63 tons / ha. The level of rice productivity most respondents produce ranged from 3.08 - 3.52 tons / ha as many as 28 respondents (56.00%), while at least at the level of productivity 3.52 - 3.94 tons / ha as many as 3 respondents (6.00%).

Table 15. Rice productivity level

Description	productivity (tons/ha)
Before the use of Riam Kanan irrigation water (A)	2.99
After the use of Riam Kanan irrigation water (B)	3.18
Impact C = A - B	0.19

Source: Primary Data Processing (2019)

Based on Table 15, the level of rice productivity produced by respondent farmers before the use of right cascade irrigation water for rice farming in the study area was 2.99 tons / ha. Whereas after the respondent farmers used right cascade irrigation water for rice farming, the level of productivity produced by farmers amounted to 3.18 tons / ha. So there is an increase in rice productivity between before and after the use of right cascade irrigation water by 0.19 tons / ha. This is inversely proportional to the planting area and rice production produced after the use of Right Riam irrigation water which is declining, but the level of productivity is increasing. This is due to the increasingly narrow rice planting area, so farmers are more effective in maintaining rice plants. So the level of productivity increases.

Irrigation development aims to increase the area of planting and production of farming, especially rice, which can later increase the income and welfare of farmers. So that the contribution of irrigation is quite large on the planting area and rice production. However, the results of the study are inversely proportional to these goals. Based on the results of the study, the contribution of right cascade irrigation water to the planting area and rice production of paddy fields decreased. For the rice planting area, there was a decrease between before and after the use of Right Riam irrigation water by 66.93% or an area of 14.63 ha, resulting in a decrease in the level of rice production between before and after the use of Right Riam irrigation water by 65.06% or by 42 .55 tons. However, the level of rice productivity increased between before and after the use of Right Riam irrigation water by 5.97% or by 0.19 tons /ha.

To increase the contribution of Riam Kanan water to the planting area and paddy production of paddy fields, efforts can be made to manage water resources and empower the farmers, some aspects of adjustment include:

1. To protect the interests of water services to farmers as a weak party in the competition for water use requires institutions that regulate effectively addressing water management so that the target for allocating water to farmers can be achieved. To achieve these objectives, it is necessary to implement management and protection of water resources in each river flow based on the principles of equity and social justice.
2. The development of irrigation technology, challenges in production needs to handle development in rural areas, operation and maintenance of water resources, causing the handling of irrigation tasks by farmers is no longer enough just to rely on traditional order mechanisms in the deployment of labor and materials locally , but requires a professional farmer organization.
3. In order for farmers' irrigation institutions to be able to handle off-farm activities more carefully and meaningfully, including cooperation with KUD and banks, these institutions need to be given legal entity status.

4. To develop an economic institutional system, it will require a systematic pattern of farmer development by the government that is not focused on sectoral concentrations which are not only guided by the sole purpose of each, but must be directed at fostering local farmers' independence and independence. In connection with this there needs to be a change in the way of thinking and an incentive system that can direct farmers to improve attitudes, the ability of farmers in various aspects and foster an agribusiness-oriented mindset, capital support (credit) and simplify the institutional system of farmers at the local level.
5. By taking into account the challenges of the certainty of water services in the future, it is felt that the difficulty of developing cooperation among farmers irrigation institutions involved in a hydrological system is at the same time related to the life systems of rural communities. By marrying the institutional system according to the needs of the local community and the more advanced institutional needs, the water institutional elements can be utilized as well as possible.

IV. Conclusions And Suggestions

Conclusion

Based on the results and discussion of the study recognizing the impact of right cascade irrigation on the planting area and production of paddy rice in Labuan Tabu Village, Martapura District, Banjar Regency, several conclusions can be drawn, namely:

1. The area of planting rice before using Right Riam irrigation water for rice farming is 21.86 ha, while after using only 7.23 ha. So there is a decrease in the area of rice planting by 14.63 ha.
2. The level of rice production before using RiamKanan irrigation water was 65.40 tons, whereas after using only 22.85 tons. So there is a decrease in the level of rice production by 42.55 tons.
3. The level of rice productivity before using Right Riam irrigation water was 2.199 tons / ha, while after using Right Riam irrigation water was 3.18 tons / ha. So there is an increase in the level of rice productivity by 0.19 tons / ha.

Suggestion

Based on the conclusions obtained, the suggestions that can be given are as follows:

1. Institutions that regulate effectively fear water management so that the target to allocate water to farmers can be achieved based on the principles of equity and social justice.
2. The existence of handling by a farmer organization that is professional in the operation and maintenance of water resources from irrigation.
3. The existence of a coaching pattern leads to local self-sufficiency and independence of farmers systematically by the government to foster an agribusiness-oriented mindset, capital support (credit) and simplification of the institutional system of farmers at the local level.

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