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**COMPARATIVE STUDY OF THE SYSTEMS OF CULTIVATION OF THE IMPROVED AND LOCAL LINKGI VARIETIES OF RICE AND THEIR YIELDS: study conducted at the BOLESA group in YAHUMA Territory, Tshopo Province, DR Congo.**

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## **ABSTRACT**

Rural Development is based on agriculture in both developed and underdeveloped countries.

The aim of our study is to make a comparative study between the yields of local rice varieties and those of improved varieties in the BOLESA group in YAHUMA territory. In view of the observed results, we note that the yields of improved varieties (LIENGI) are much higher than those of local varieties because of their less productive and hardy character.

The supervision of peasants, agricultural extension by the Congolese State would be strategies to improve agricultural production in this environment.

**KEYWORDS:** study, system, crop, liengi variety, rice, yield.

## **I. INTRODUCTION**

Today more than ever, development remains a fundamental concern, either for each individual or for each human community. Everyone therefore aspires to be sufficient, to raise their standard of living, to improve their living conditions. However, in order to achieve this change in rural areas, there must be an increase in agricultural production, which implies the use of appropriate agricultural practices and techniques.

Yet most of the population of African countries are experiencing very growing difficulties in improving the yield of agricultural production in order to meet basic needs such as food, health care, clothing, housing, etc.

This situation depends on the one hand on the frequent absence of a coherent policy of the agricultural sector and on the other hand, on the non-respect of modern cultivation techniques, the appropriate methods and policies. But in our Congolese rural areas in general, and the BOLESA group in particular, the agricultural yield of the population in rice, which is the basic crop of the environment is stagnating, or even unable to cover the specifically food needs. So, yields are only decreasing day by day and year by year.

This is why we ask ourselves questions about:

- What is the rice growing system adopted by BOLESA growers?
- Which of the rice growing systems used by BOLESA farmers gives the best yields?

Faced with this question, our study proposes to verify the hypotheses according to which, due to the lack of agricultural extension, the farmers of BOLESA would still adopt the traditional system on the one hand and that modern cultural techniques would not be adopted.

The main objective of this study is to compare the yields from the cultivation of modern rice varieties with those from the cultivation of local varieties with a view to making available to farmers the varieties enabling them to increase their agricultural production.

## **II. MEDIUM, MATERIAL AND METHODOLOGY**

The BOLESA group the middle of this study is located in the BOLINGA sector, Yahuma Territory, Tshopo Province in the Democratic Republic of Congo.

It is bounded:

- To the north, by the LOKUTU sector;
- To the south, by the YEMBU group;
- To the east, by the village LIEMBE;
- To the West, by the BOLOMBO II group.

The BOLESA group is in the central basin of Congo located between 200 and 500m altitude plus at least 23 ° C; of the northern longitude, dominated by hills separated by small valleys. It knows the equatorial climate characterized by a season, heavy rainfall whose maximum intensity is at the equinoxes, as well as

a strong heat observed almost all year round. The average temperature is 26.9°C. It is a hot and humid climate.

The activities are mainly focused on food crops (cassava, maize, rice etc.) whose most preferred crop is rice because of its nutritional value and profitability on the market. Despite this preference, yields of these culttures remain low. The BOLESA group is dominated by the Ngando autochones whose dominant language is the LONGANDO dialect and sometimes uses the national languages mainly Lingala to facilitate communication with other non-native people. It is a Christian population, but it is also much more attached to its culture. Its population is estimated at 9464 inhabitants. Under the experimental conditions of the environment, the natural vegetation of the BOLESA group is a rainforest currently sown with thinning carrying a very recent vegetation of anthropogenic origin. At the opening of the land, it was colonized by a fallow bearing shrubs and shrubs whose previous crops were groundnut and pineapple. The experiment took place from December 1, 2020 to August 31, 2021, at the capital of the group / village YAKOTE six Km of capital of ex-city Mosite.

The material of our research consists of the cultivation systems, rice varieties and yields produced.

**Table 1: Description of seeds used based on length, grain size and harvest duration**

Variety	Length type	Length (mm)	Type of training
Local	Long (L)	> 7	Medium 2.6-3cm
Liengi (improved)	Very long (TL)	6-7	Thin 3cm

**Source: our field surveys, 2021**

To conduct this study, we used the experimental method. This helped us to experiment with the cultivation system from two varieties of rice and allowed us to compare the yields obtained.

The techniques of document analysis, maintenance and direct observation made it easier for us to collect certain data.

As for the experimental conditions, the machete, spade and hoe were used for the opening and preparation of the ground; the tape measure was used for the measurement of the gaps, the dimensions of the flowerbeds. Spacing, in-line sowing and on-the-fly sowing are experimental techniques. After incineration, the land was demarcated and unsolounded. The experimental system adopted is that of plots with two distributions: in-line sowing and semi-on-the-fly.

The experimental plot was one hectare subdivided into two plots for the local variety and two other plots for the Liengi (so-called improved) variety.

One plot sown without cultivation techniques and the other with cultivation technique (in-line sowing) for the local variety and the same for the improved Liengi variety. Each plot had an area of 25 ares and the amount of seeds used is 7 Kg per variety.

### III. RESULTS

We point out that after discussions with the farmers of BOLESA and our observation, the farmers of the BOLESA group use the seeds of local varieties, do not use any modern cultivation technique. They make use of the system of association of culture.

#### 3.1. Different yields obtained after experimentation according to the cultivation system and cultivation techniques.

**Table 2: Rice yield versus local variety**

Variety	Surface (areas)	Cultivation technique	Seed qty (Kg)	Yield (Kg)
Local	25	Sowing on the fly	7	200
	25	Online sowing	7	250

**Source: our field surveys, 2021**

Source: our 2020 field experiment

It appears from this table 2 that the yield obtained in 25 ares is 200Kg after experimentation with 7 Kg of local variety seeded on the fly, while the yield is 250Kg in an area of 25 ares whose seed quantity is 7Kg, the technique of in-line sowing has been taken into account.

**Table 3: Rice yield compared to the Liengi variety (improved)**

Variety	Surface (ares)	Cultivation technique	Seed qty (Kg)	Yield (Kg)
Liengi (improved)	25	Sowing on the fly	7	300
	25	Online sowing	7	400

**Source: our field surveys, 2021**

It follows from Table 3 that for the improved variety Liengi, the yield is 300Kg for sowing 7 Kg of seeds on the fly; on the other hand in in-line sowing, the yield obtained after sowing 7Kg of seeds is 400Kg.

**Table 4: Yield Variety vs. Cropping Systems**

Variation	Yield in pure cultivation seedlings on the fly	Yield in pure cultivation in line sowing	Percentage change
Local	200Kg/25 ares	250Kg/25 ares	25
Liengi (improved)	300Kg/25 ares	400Kg/25 ares	33,3

**Source: our field surveys, 2021**

Table 4 shows that yield depends on the cropping system, the spacing adopted and the variety used. The improved Liengi variety gives a higher yield depending on the cultivation system. It gives a yield of 400Kg in 25 ares for in-line sowing and 300Kg for on-the-fly sowing. As for the local variety, the yield is 200Kg for sowing on the fly, on the other hand, it is 250Kg for in-line sowing.

#### IV. DISCUSSION

It is true that the valuation of a given culture depends on certain factors, in particular; the supervision of farmers, the area sown, the seeds used as some authors say.

It is probably recognized that the increase in agricultural yield is a function of the above factors. Nevertheless, rice cultivation is practised by farmers with a low level of education, using rudimentary farming equipment and lacking knowledge in the field, which is why their yield is still low.

Referring to our experiment (Table II, III, IV), we have the results according to which plots tested by modern agricultural techniques and practices give higher yields compared to plots with traditional agricultural techniques and practices.

It is true that the farmers of BOLESA do not improve their agricultural yield because the majority uses traditional cultivation techniques and practices, sowing on the fly, crop association, local seeds which are all elements negatively influencing the yield.

It should also be noted that the increase in yield is a crucial element for the valorization of the crop because it encourages farmers to produce better and to improve the quality of the product.

Unfortunately, however, the crop studied faces a number of problems, namely the problem of supervision of farmers, the absence of improved seeds and modern cultivation techniques, and agricultural extension.

It is likely that the quality and quantity of products come from agricultural extension, which is a significant aspect in the valorization of a crop; the more agricultural extension there is, the more there is an improvement in production that will lead to the improvement of the socio-economic conditions of farmers.

The lack of agricultural extension in the study environment means that farmers are attached to their traditional varieties, their local cultivation techniques not allowing them to increase their production. The supervision of peasants is essential.

## **CONCLUSION**

The objective of this study was to compare yields from local varieties with those from so-called improved varieties. By comparing the different yields obtained through our experiments according to the cultivation system and the techniques on identical areas, we found that the yields of improved varieties (LIENGI) are much higher than those of local varieties. So, if these crops are valued by farmers, they will be able to allow the population to increase their incomes, because they are seasonal and profitable crops. As a result, the Congolese state must regulate the peasants.

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