



## Case Study

# An assessment of the impact of intercropping on food security in Maramani communal area: the case of Shashe Irrigation Scheme: Beitbridge District: Zimbabwe

Noel Dube<sup>1\*</sup> and Darlington Ndlovu<sup>2</sup>

<sup>1</sup>Department of Geography and Environmental Studies, Zimbabwe Open University, Matebeleland South Regional Campus, Box 346, Gwanda, Zimbabwe

<sup>2</sup>Mapane Secondary School, P.O. Box 221, Gwanda, Zimbabwe  
noel.e.l.dube@gmail.com

Available online at: [www.isca.in](http://www.isca.in), [www.isca.me](http://www.isca.me)

Received 2<sup>nd</sup> December 2020, revised 4<sup>th</sup> April 2021, accepted 30<sup>th</sup> May 2021

## Abstract

*The purpose of the study was to determine the impacts of intercropping of food security in the Maramani Ward. A case study research design was adopted for this research because it is appropriate to the problem and the advantages it possess. The population of this study was confined to one hundred and eighty three villagers ward councilor, CESVI manager, irrigation committee member, agricultural extension worker and the Beitbridge District Council officer. The sample consisted of forty villagers, ward councilor, CESVI manager, irrigation committee member, agricultural extension worker and Beitbridge District Council officer. 89% of the respondents were of the opinion that intercropping had a positive impact on food security. However some respondents (8.9%) pointed out that the intercropping has led to some misunderstanding within family members. 2.2% of the respondents were undecided on the impact of intercropping on food security. The majority of the respondents (86.7%) indicated that intercropping had actually improved their standard of living as they were now producing a surplus which they could sale and purchased a number of necessities. They had now ventured into cash crops instead of depending on the traditional crops like maize and sorghum. The major factors affecting intercropping were identified as being availability of labour and access to capital to buy inputs. The majority of respondents (67%) were women and most of whom were afraid to guard their crops against wildlife at night. As a result most of their crops were destroyed by wildlife especially elephants at night.*

**Keywords:** Impact of intercropping, food security, agricultural production.

## Introduction

Globally, research findings on intercropping show the impact of intercropping as improving food security particularly in the developed world probably because of the abundant recourses<sup>1</sup>. Intercropping is often done by communal farmers using labour intensive techniques with minimal addition of other necessary inputs like fertilisers and herbicides and usually on small pieces of land<sup>1</sup>. Intercropping is best suited to such conditions and can lead to increased aggregate yields per unit input, at the same time ensuring that crop failure is reduced<sup>2</sup>. It also reduces the negative impacts of market fluctuations by spreading risk and helps to improve and protect soil quality. In Latin America, beans are intercropped with maize, potatoes and other crops on 70 to 90% of the land, whilst maize is intercropped on 60% of the maize-growing areas of the region<sup>3</sup>.

In Europe, intercropping is being practised in wooded grassland systems referred to as the Swiss *Paturagesboises* and in the Mediterranean cereals and vegetables are grown under trees in a system known as *coltupromiscua*. However, intercropping is gradually being phased out from many systems<sup>4</sup>.

Regionally, research was done in countries like Ethiopia, where the research findings show that's mallholder farmers practice different intercropping strategies which are determined by the local climatic conditions. The farmers intercrop sorghum with cowpeas and millet with groundnuts combinations in low rainfall years and then intercrop maize with beans, maize with groundnuts and maize with millet during the years with moderate rainfall. The use of multiple cropping by Ethiopian farmers based on maize and beans, increase yield per unit area and reduced the risk from crop failure due to climate change.

Food security in Zimbabwe is directly affected by a number of socio-economic factors which include local agricultural production, poverty, the occurrence of drought and/or flooding, the impacts of climate change on agricultural production, and changes in population distribution caused by the incidence of HIV and migration. The agricultural sector is a key driver of overall economic development and a major source of food and income for most households<sup>5</sup>. Drought or irregular rains have a negative impact on agricultural production (especially maize). There is a need for a shift in the mindset of communal farmers

in order to concentrate on growing the more drought tolerant small grains like sorghum and millet. Intercropping of the small grains would reduce the chances of crop failure in the more marginal western and southern parts of the country. The idea behind intercropping is the less drought tolerant plants like as maize are intercropped with the more drought tolerant crops such as sorghum and millet to militate against frequent droughts<sup>2</sup>. However, the majority of smallholder farmers prefer growing maize as a result of colonial legacy contributing to the structural food production deficit. For instance, maize sometimes fails to grow well particularly in drought prone areas of region 4 and 5 of the country due to many factors for example climate change. Therefore, reliance on sole cropping is negatively impacting food security in Zimbabwe. The research focused on Maramani Community which is in Beitbridge District of Zimbabwe.

**Statement of the Problem:** Beitbridge district lies in agro-ecological region 5 which is the driest region in the country and is the one most affected by food insecurity. Beitbridge west, covers Maramani ward area in which Shashe irrigation scheme is located, an area which is prone to droughts and periodic flash floods leading to food shortages. The impacts of climate change have negatively affected local communities in Maramani leaving them in a situation where they are food insecure and relying heavily on relatives in neighbouring countries for food.

A combination of high and rising levels of poverty, macro-economic and political instability, the negative impact of the HIV/AIDS pandemic and high levels of unemployment have worsened the situation<sup>6</sup>. Most communal farmers are found in the driest regions of the country where crop production without irrigation is a risky business<sup>2</sup>. Intercropping has therefore been seen as the best bet for increasing food production and income for local communities. Communities in Maramani ward have not been spared from food shortages, even though intercropping is practised at a lower level to bring any improvement in the general food security situation in the area. Even though a lot of effort and investment has been done to improve water supply and irrigation facilities for local communities tangible results in terms of improving food security are yet to be realised<sup>7</sup>. There was therefore a need to investigate the impact of intercropping in Maramani on food security.

**Purpose of the study:** The main aim of the study is to investigate the impacts of intercropping of food security in the Maramani Ward.

**Objectives of the study:** i. To determine the impact of Shashe intercropping project on food security in Ward 8 in Beitbridge district. ii. To determine the key factors affecting the Shashe intercropping project as a tool for improving food security. iii. To determine how intercropping has changed the agricultural production in Maramani ward.

**Assumptions of the study:** The researchers assumed that the stakeholders in Maramani would cooperate whenever their input

is needed and that problems highlighted are general across the area under study. It was also assumed that the respondents would give correct and accurate information. The researchers also assumed that the recommendations of the study would help in improving food security in future.

**Significance of the Study:** The study will assist various stakeholders interested in food security and rural development to come up with plans to improve food security. The study will assist district authorities in deciding whether to promote intercropping as a strategy to improve food security in the district. To Non-Governmental Organisations (NGO) and civic and social development organisations such as CESVI, the local communities and the private sector, the study can assist them to determine the impacts of intercropping on food security and assess the viability and applicability of intercropping as an alternative approach to agricultural production. The study will also guide the government in their policy decisions in terms of allocation of resources to intercropping projects.

The research findings are a valuable asset to policy makers in determining the way forward to enhance food security for rural communities. Academics and scholars shall find it handy to know gaps for further research.

**Scope (Delimitation) of the Study:** The research focused only on the impacts (both positive and negative) of intercropping in enhancing food security. The research was done in Maramani Communal Lands, Ward 8 of Beitbridge District. Therefore only community members and local authorities and organisations working in the area were part of the research.

**Limitations of the Study:** This was a case study and as such findings from the study may not necessarily apply to all situations in the country. The case study design like most qualitative research methods lack experimental and statistical controls which makes it hard to establish internal validity<sup>8</sup>. Even though it is also difficult to generalize findings of case studies to other cases such findings can be generalized to similar situations<sup>8,9</sup>. The conditions in Maramani are similar to conditions in other communal areas in Zimbabwe therefore the findings can be generalised to those settings. The local leadership was skeptical of the motives of the researchers and most of the locals were illiterate. The researchers managed to create good rapport with respondents and provided user friendly questionnaires which were unambiguous and easy to understand.

During interviews, the some respondents thought that the research findings would be used to determine who gets food assistance and in order to overcome this all respondents were advised that the research was strictly for academic purposes. The researcher shall also sought written permission from the responsible authority to carry out the research in order to get rid of any suspicions about the motives of the research.

**Ethical and Legal Considerations:** The participants participated on an informed consent basis. The purposes of the research was well articulated to the participants and any potential risks of participating in the study were spelt out. The participants were also informed that they reserved the right to withdraw from the study if they so wished. There were also advised that all the information collected was confidential and their responses would remain anonymous. The study was conducted in a way that made sure that the individual study participants did not experience any harm as a result of their participation in the research. The participants were also assured that the resulting research and publications would be for academic purposes only and would not be used in such a way that they may bring harm to the participants as a group.

**Organisation of the Study:** The first part of the paper outlined the background of the problem, described the statement of the problem, outlined the objectives, generated the research questions, gave the assumptions of the study, described the significance of the study, outlined the limitations of the study and gave the ethical and legal considerations of the study. This is followed by the research methodology which discusses the research design, the population and sample of the study, the instruments used, and finally data presentation and analysis procedures. Results and discussion then follow which covers data presentation, interpretation, analysis and discussion. The paper ends with a conclusion.

## Methodology

In this chapter, the researchers will focus on research design and the instruments and techniques that will be used in capturing the information on intercropping in Maramani ward 8, Beitbridge District, Matabeleland South. It will discuss the research instruments, data collection procedures and analysis procedures that will be used in the study. The section on data collection focuses on methods and instruments to be employed in collection of data. The last section on data analysis will describe how data will be captured, analysed and presented.

**Research Design/plan:** A research design is a plan for research that guides the researcher in data collection and analyzing data<sup>10</sup>. Are search design has also been described as the structure of the research, which provides the cement that holds the research project together and include the various aspects of the methodology<sup>11</sup>. It has also been described as a plan showing in what way, when and where a research is carried out<sup>12</sup>. A research design helps in getting answers to the questions under study. It is a plan for research that guides the collection of data and the method of analysis that are performed<sup>13</sup>. Research design involves the description of the format and theoretical structure under which the study would be carried out. It involves the discussions of the steps to be taken in order to safeguard the validity and authenticity of the findings<sup>14</sup>.

A case study research design was adopted for this research because it is appropriate to the problem and the advantages it possess. A case study is an example of a qualitative research design<sup>15</sup>. A case study design is a strategy for doing research which involves an empirical investigation of particular contemporary phenomenon within its real life context using multiple sources of evidence<sup>13</sup>. Case studies are in depth investigations of a single person or group. In this research, a case study of Shashi Irrigation Scheme shall be done. The case study shall be enriched with documents, interviews, observations, and questionnaires.

**Population and sample for the study:** A population is any target group that has common characteristic that are of interest to the researcher<sup>16</sup>. The population of this study was confined to one hundred and eightythree villagers ward councilor, CESVI manager, irrigation committee member, agricultural extension worker and Beitbridge District Council officer.

A sample is a part of population selected for observation and analysis by observing the characteristics of the population from which it is drawn<sup>16</sup>. A sample is a sub set of population that is used to represent the entire group as a whole in order to make inferences<sup>17</sup>. The sample consisted of forty villagers, ward councilor, CESVI manager, irrigation committee member, agricultural extension worker and Beitbridge District Council officer. This study targeted the farmers concerned with intercropping; workers at the Shashi irrigation scheme (agricultural extension workers, irrigation committee manager, villagers); and the Ward Councilor from Maramani ward. The simple random sampling technique for selecting villagers to participate in the research was used. The main advantage of random sampling is minimizing bias since it gives each individual an equal chance of being included in the sample. For this research, out of the 183 villagers, all of them randomly picked papers with numbers from a bucket. Only 40 papers were highlighted to indicate the people that would participate in the research.

The key informants for the research were the Agricultural Extension worker, the Ward councilor, the Manager from CESVI and SAFFIRE, Irrigation committee member and the Rural Council Officer.

**Research Instruments:** Research instruments are data gathering tools, which are used for research<sup>18</sup>. The researcher chooses the most appropriate instruments that provide for collection and analysis of data upon which hypothesis may be tested<sup>16</sup>. The choice of these instruments depends on the study at hand and for this study the researchers used secondary data sources, observations, interviews and questionnaires. Observations were used because they are a direct technique which depend on seen events and also lack the artificiality found in other techniques.

They were used to validate the messages obtained in the interviews. Interviews were used because they provide a high level of flexibility and give a chance for further probing into interesting issues. The interviews also gave the researchers a chance to explain unclear questions and observe hidden and non-verbal cues<sup>19</sup>. Questionnaires were used because they give interviewees independence and freedom of response as they can be completed in the absence of the interviewer. They can also reduce travel costs since they can be transported in bulk and also reduce chances of subjectivity and bias since respondents have more time to respond<sup>20</sup>.

**Data Presentation and Analysis Procedures:** Data obtained from the study will be presented in tables and graphs in order to give an overview of findings to identify trends and to establish relationships between parts of the findings. Tables conserve space and present data in such a way that the narrative may be reduced, and can also be self explanatory<sup>20</sup>. Relationship among data in a table may be visualized and this process facilitates the process of data comparison. Tables make it easy to summarize data by putting it into individual cells. Comprehension of tabulated data is enhanced as it is easier to understand and remember such data. Graphs will also be used to offer good visual presentation of the results.

## Results and discussion

In this part of the paper the results of the study will be presented and discussed and an analysis of the results will be given. The presentation shall be done through graphs and tables based on the different questions from the questionnaire. The discussion is based on the following research objectives: i. To determine the impact of Shashe inter cropping project on food security in Ward 8 in Beitbridge. ii. To determine the key factors affecting the Shashe intercropping project as a tool for improving food security. iii. To determine the impact of intercropping on agricultural production.

**Background of the local community:** The female correspondents were the majority constituting 30 respondents (75%) and 15 (33.3%) were men which tallies with conditions in most rural areas in Zimbabwe where the men usually work in urban areas and leave their spouses to till the land. An assessment of educational levels revealed that, 22 (48.9%) have attended up to Zimbabwe Junior Certificate level, 15 (33.3%) to secondary, 4 (8.9%) had 'A' Level and only 4 (8.9%) have attended to tertiary level. Only 2 farmers had degrees and 2 had diplomas and all the others had no tertiary qualifications. In terms of farming experience 90% of the farmers had more than 5 years experience with no farmer having less than one year farming experience.

**Impact of intercropping:** The main purpose of the study was to determine the impact of intercropping on food security in Maramani ward on the livelihoods of the local community involved in the intercropping project. There were 45

respondents and 89% of the respondents were of the opinion that intercropping had a positive impact on food security. They also pointed that they felt very proud of themselves, as they were now able to feed their families as compared to the past where they dependent on food handouts due to the failure to produce enough food. The project had also unite the community, which also felt the project belonged to them as they participated in all the stages of project formulation. The community also pointed out that intercropping activities had increased their incomes thus enabling them to meet their other community and social obligations. They also were now better able to meet their household expenses, pay education expenses and buy food and some assets. However some respondents (8.9%) noted that the intercropping has led to some social misunderstanding between households. 2.2% of the respondents were undecided on the impact of intercropping on food security.

The majority of the respondents (86.7%) indicated that intercropping had actually improved their standard of living as they were now producing a surplus which they could sale and purchased a number of necessities. They had now ventured into cash crops instead of depending on the traditional crops like maize and sorghum. Most of the local community members (84.4%) felt that the introduction of intercropping had increased variety and improved output.

The life styles of the households seem to have changed for the better and improved a lot this is proved by the answers from the participants who gave positive answers. 86.7% of the respondents showed that they were happy with the changes in their lifestyles brought by intercropping. Their standard of living improved tremendously. However 13.3% seemed not convinced with changes of their lifestyles.

**Factors affecting intercropping at Shashe irrigation:** The factors affecting intercropping were identified as being political, socio-economic and climatic. Political factors were identified by 33.3% of the respondents but they were however not willing to discuss them for fear of victimisation. Socio-economic reasons were identified by 22.2% of the respondents these were identified as being availability of labour and access to capital to buy inputs. The majority of respondents (67%) were women and most of whom were afraid to guard their crops against wildlife at night. As a result most of their crops were destroyed by wildlife especially elephants at night. Lack of capital to purchase inputs such as fertiliser and pesticides was identified as one of the major limitations to improved crop production.

## Conclusion

The majority of respondents felt that intercropping had improved agricultural production and increased the variety of crops produced thus leading to improved food security. They also felt the improved production had led to an improvement in the standard of living of local communities. However, the project was negatively affected by the unavailability of labour

and the lack of capital to buy inputs. Wildlife especially elephants were wreaking havoc on the community crops especially women who were afraid to guard their crops against wild animals at night.

### Acknowledgements

We would like to thank the Maramani community for their cooperation during the study especially the traditional leadership and the councilor of the ward. Special thanks the Agricultural Extension worker, the Ward councilor, the Manager from CESVI, SAFFIRE staff, the Irrigation committee members and the Rural Council Officers for their cooperation and support during the study.

### References

1. Mudima, K. (2002). Socio-economic impact of smallholder irrigation development in Zimbabwe: A case study of five successful irrigation schemes. In Private Irrigation in sub-Saharan Africa; Proceedings of Regional Seminar on Private Sector Participation and Irrigation Expansion in sub-Saharan Africa, pp. 21-30.
2. Rukuni, F., (2006). Africa: Addressing growing threats to food security. W. K. Kellogg Foundation, University of Pretoria, Hatfield.
3. Francis, N., (1986). Your Research Project. London: SAGE Publications
4. FAO (2002). The state of food insecurity in the world 2001. Rome.
5. Mudzonga, E., and Chigwada, T., (2009). Agriculture: Future scenarios for Southern Africa. A case study of Zimbabwe's food security. International Institute for Sustainable Development (IISD), Winnipeg, Canada.
6. Mushunje, A. and Mukurumbwa, (2010). Irrigation development: A food security and household income perspective University of Fort Hare, South Africa.
7. Peter, G. (2011). The impact of small scale irrigation schemes on household food security in Swaziland. *Journal of Sustainable Development in Africa*, 13(6), 102-117.
8. Flick Uwe, (2009). An Introduction to Qualitative Research. 4<sup>th</sup> Edition. Thousand Oaks CA, SAGE Publications Ltd.
9. Cohen, M., and Marion, R. (2011). Imperial Education. Pretoria: UNISA.
10. Leady P.D. (1980). Practical Research: Planning and Design. New York. (1980)
11. Cloward C. and Ohlin K. (2002). Data collection in context. London: Longman.
12. Kothari C. R., (1985). Research methodology: Methods & techniques. Wiley Eastern, New Delhi.
13. Harwell M.R. (2010). Research design in qualitative, quantitative & mixed methods. University of Minnesota.
14. Holloway I. (1997). Basic concepts for qualitative research. Oxford. Blackwell Science.
15. Lieber, E. (2009). Mixing qualitative and quantitative methods: Insights into design and analysis issues. *Journal of Ethnographic & Qualitative Research*, 3(4).
16. Best, J. and Khan, W. (1993). Research in Education. Boston: Allyn and Bacon.
17. Cohen Louise and Manion Lawrence (1994). Research Methods in Education. 4<sup>th</sup> Edition, London, Routledge.
18. Driscoll, D. L., Yeboah, A. A., and Salib, P., (2007). Merging qualitative & quantitative data in mixed methods research: How to & why not; University of Nebraska, Lincoln.
19. Gwimbi, P. and Dirwai C. (2003). Research Methods in Geography and Environmental Studies. Harare, Zimbabwe Open University.
20. Neuman, L. W. (2000). Social Research Methods, Qualitative and Quantitative Approaches. New York.