

Master's Degree Thesis
In
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**Working with Farmers in Upper Nile State, South Sudan for
farmers to adopt Multi-cropping practice in Nakdiar and Doleep
Payams.**



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Declaration.

This is to officially declare to every reader of this report (local, National and International) that, this Master Thesis Report, is only for scientific and academic purpose. It has never been ever presented before by any one from South Sudan to any higher institution in the country and world.

Secondly, is to promise you that, I have done this Practical Action Research Project myself. It bases on my true experience and knowledge, and it is free from any plagiarism. In this report, I have carefully recorded what I meant in mind and mean what I wrote. And therefore, any conclusions I came to, I mean it to be so.

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Abbreviations/ Acronyms.

A R P -Action Research Project.

FMA- Farm management Approach.

PFA-Participatory Farm Approaches.

AESA-Agro-Ecological System Analyses.

MAVP-Master of Vocational Pedagogy.

CPMR-Crop Production and Management Research.

FFS- Farmer Field School.

OAUC- Oslo and Akershus University College.

AEP-Agricultural Extension Packages.

OFT-On Farm Training.

OFFFT-Off Farm Training.

MAF- Ministry of Agriculture and Forestry.

EPs -Extension Paradigms.

GoSS- Government of Southern Sudan.

GoN-Government of Norway.

MoDC-Method Of data Collection.

AR -Action Research.

MCS -Multi- Cropping System.

UNSU-Upper Nile State University.

MIS-Mixed Intercropping System.

ICS-Inter Cropping System.

MCS-Mono Cropping System.

IGA- Income Generating Activities.

RDTPC-Rural Development Technology Promotion Centre.

FRA -Farmer Researcher Approach.

RFA-Researcher farmer Approach.

TOT- Transfer of Technology

PRA-Participatory Rural Appraisals.

NPA- Norwegian People's Aid.

FFG-Farmers' Focus Groups.

Other important Terminology used in this action research Dissertation Report.

Upper Nile State. It means one of the Regions in the Republic of South Sudan and usually headed by the governor.

Malakal. It is the capital of Upper Nile Region/State.

County. It is the second largest town, next to Region in South Sudan, and often headed by the commissioner.

Payam. It is the third town or a small town in the rural areas, headed by the executive director in collaboration and consultative administrations with local chiefs.

Farmers' focus groups. These are the target farmers who have participated in implementing the idea of this action research project on multi-cropping system/practices in the two payams of Nakdiar and Doleep. They are headed by farmers' chairman.

MAF. It means Ministry of Agriculture and Forestry.

NPA. It means Norwegian People's Aid.

Stakeholders. Are all those involved and participated with me in this action research project implementations.

NGOs. It means, None Governmental Organizations.

WVO. It means World Vision Organizations.

Abstract.

This Thesis is presenting an action research carried out and conducted in the Republic of South Sudan in 2011. It tried to interrogate and investigate mono-cropping practices by farmers in South Sudan and Upper Nile State/Region in particular. Mono-cropping is done by traditional practices by the farmers in the State/ country. To avert such problem of practices, I decided to conduct my Master Thesis by working with farmers and encourage them to adopt multi-cropping practice in the state/region. The major objective and goal is for farmer to improve and increase food productions for their households/families.

The type of professional / qualitative approach applied in this action research was the Application of Group Dialogues and Discussions with the participant / farmers. It is the main Methodology used in this Action Research Project. The reason for not using individual approach is because of the complexity to reach vast number of farmers on one by one. This study has managed to work and train 75 farmers in Nakdiar and Doleep Payams, Panyikang County and it was successful.

1. Introduction.

1.2. Personal Introduction Including My Educational Profile.

I was born in 1983 in a small village named Jikmier. It is currently the biggest Payam among all the Nasir County's Payams in Upper Nile State according to April, 2008 Southern Sudan General Census Commission Count for all the Sudan and Southern Sudanese populations.

I grew up there till I became 12 years old. When I was 13, I joined the military services and served as red army soldier. During the struggle for freedom, some of us (the young soldiers) got lost during the struggle for the South Sudan movement and who are currently known as "the lost boys" in Southern Sudanese History during the SPLA movement.

Before joining the military services, I had already completed my elementary school in my village [in Jikmier Village), Nasir County] up to grade-3.

While I was in the military, I served as a bodyguard of certain war commander for 5 years. During this period, I was also helping him as his secretary. I also knew how to read and write in my local language (Nuer), and so, I used to record his documents in Nuer and sometimes in broken English language.

While I was doing this secretariat job for him for 5 years, in 1995, he was so thankful and impressed by my work. And then he told me that I had a good mind and Intelligent enough and said I should not only be serving in the army, but advised me to go to refugee school in Ethiopia. His advice inspired me and I felt so proud of him and my local knowledge I had in mind and this gave me courage to go to school in Ethiopia.

In 1995, I left for Dimma Refugee camp in Ethiopia and started my primary school and secondary school till 2002.

In 2003 I passed my Higher Ethiopian Education Entrance Examination and got an admission to Haramaya University, faculty of agriculture.

In 2006, I received my Bachelor degree of Science (BSc) from Faculty of agriculture, department of agricultural extension and rural development.

In 2007, I came back home to Southern Sudan and applied for a job in the Ministry of Agriculture and Forestry Government of Sudan. The Ministry employed me and sent me for field work in Renk County –Northern Upper Nile State, under government food security project so as to carry out extension work with farmers.

During this time, I learnt that, most farmers in Upper Nile and other SS farmers are still following traditional way of farming which is highly dominated by mono cropping practices instead of modern farming of multi-cropping system.

This also reminded me of the question I had asked my father long time ago in Jikmier Payam about why only growing maize on his farm annually without mixing it with other crops. The answer he gave me was that, I should grow up and grow many other crops if I wanted to.

Based on these experiences, this come to my mind to ask myself about why don't most farmers in Southern Sudan practice multi-cropping system like what other farmers are doing elsewhere in the world or Africa. That is the main reason why I am inspired to change farmers' attitudes from mono-cropping to multi-cropping and evaluate the impacts of the two practices in Nakdiar and Doleep payams in Upper Nile, Southern Sudan.

After four years of service in the Ministry of agriculture and forestry, I was offered a scholarship in 2010 by the Norwegian quota scheme student program. It is a two year master program in the department of Vocational Pedagogy at Akershus University, which has currently been merged and changed to Oslo and Akershus University College of Applied Sciences in 2011.

With the same aspirations, I have now again in this master program raised my career to the next horizon of knowledge to do my master. My topic of Thesis is to encourage farmers to adopt multi-cropping system/practices. My major goal is for farmers to improve and increase food productions in Nakdiar and Doleep Payams.

1.3. General Background of the Theme /Study.

This Master Thesis research focuses on the challenges faced by farmers in South Sudan in general and Upper Nile State in particular in Nakdiar and Doleep payams. The major challenge being faced by farmers is mono-cropping practices. The Mono-cropping system means, growing of only single type of crop varieties without mixing it with other crop varieties. Such practice is highly dominated by traditional way of farming practices. I believed to have been the main cause of cause of low crop yield productivity in the region/state.

In this action research project, I worked with farmers so as to encourage them to adopt multi-cropping system/practices. The idea behind this action research project is for farmers to try out to implement the idea of multi-cropping system/practice whether it could help them in profit maximization of their productions or not.

Before Comprehensive Peace Agreement (CPA) was signed in 2005 between South and Northern Sudan, Upper Nile State / Malakal, was the Capital of greater Upper Nile Region. The former greater Upper Nile provinces were; Bentiu province, Jonglei province and Malakal itself during the old Sudan system. But now Upper Nile is the northern most state, bordering North and South Sudan after secession /separation between Northern Sudan and South Sudan last July the 9th, 2011.

It is located north of Jonglei State, North -East of Unity State and bordering Ethiopia with its Eastern most point. In the next sub-topics, I will be discussion about the scope of the study, the descriptions of the situation of the study area, the reason, interest and why studying multi-cropping system in this research and the cause and effect of mono-cropping system/practices in South Sudan in general and Upper Nile in particular.

1.3.1. The Scope of the Study.

Generally, the scope of any research is to outline what the study will cover or how it range from where to where in terms of study program. It is usually very specific to the problem /situation under investigation for further solution and actions with in the provided scope of the study. In other word, it is a parameter in which the study will be operating (i.e. the geographical scope of the area of research from the whole). For instance, this research was conducted in Upper Nile Region, Panyikang County in the two payams (Nakdiar and Doleep), and Republic of South Sudan.

In this Master Thesis, the scope of the research focused on studying the impacts of multi-cropping system or modification/changing of traditional farming practices to modern farming system. This is done by studying the impact of multi-cropping system over mono-cropping practices. It is also based on how multi-cropping system/practices be done. The main is goal for farmers to adopt the idea of multi-cropping system so as to improve and increase food productions.

1.3.2. Description of the Situation in the Study Area under Investigations.

In South Sudan, there are three major problems that I thought needs to be addressed by the new nation across the Country's' ten states of the Republic of South Sudan. Insecurity and protection in South Sudan (The security of the country will be dealt with by the government).

- Educational development (that is my profession to teach at school and may not reach the farmers on time).
- Poverty eradication through agricultural practices by trying to introduce new idea of multi-cropping over mono-cropping system (which is believed by the farmers to be the cause for low crop yield productions), and this is the major focus of this research study and focus. But I decided to pick only one state for my study and identified two payams (small town under Panyikang County administrative system of government), and only the two problems (challenges).
-

1.3.3. Reason, Interest and Why Studying Multi-cropping system/practice.

1.3.3.1. Reason.

According to the experience I had earlier when I was working for the Ministry of Agriculture and Forestry in South Sudan, farmers were complaining of low crop yield of productions. Because of this, I derived my intension to carry out my Master Thesis to help farmers. I planned to advise and encourage them to practice modern agricultural extension methods of productions and improve their situations.

1.3.3.2.. Interest.

My major interest is to work and help farmers adopt multi-cropping system/ practices so as to improve and increase food production in their communities. This is because of my personal values, knowledge, curiosity; commitment and love for my society that made me wonder why the farmers of my country should suffer as such.

The government has not been doing enough to train farmers on modern agricultural system so as to increase and improve food productions. If are trained and succeeded in doing so, they will be able to send their children to school like those children in the urban areas.

As one of the Southern Sudanese, responsible and educated person, I have decided to try my knowledge and value in the society whether it could be helpful or not.

I came up with this idea by conducting my Master Thesis on this action research project in Upper Nile State, so as to serve my country's' farmers from producing low crop yield production.

1.3. 4.Cause of low crop yield Productions by the farmers.

Mono-cropping system/practice by farmers has been the major problem in South Sudan in general and Upper Nile Region in particular. This is because farmers are still following traditional way of farming system/practices.

1.3.5. Effect of mono-cropping system/practices.

The lowness in crop yield in most areas in Upper Nile is caused by long usage/practices of mono-cropping system (traditional way of farming) by the farmers.

For instance, farmers used to grow only a single type of crop without mixing it with other crop. When there is any problem happened on that single type of crop type/variety, (such as insect infestations, too much rainfall/rainy season, acidity or alkalinity of the soil), everything will be destroyed and there could be no food for farmer and his/her family to feed on.

I decided to work with farmers in this Master thesis to encourage the adoption of multi-cropping (mixed cropping) practice. The idea behind this research is for farmers to improve and increase crop/food productions. If one crop failed because of acidity, alkalinity, too much rainfall or insect infestations, farmer will be able to harvest some food to feed his/her family and survive from other unaffected crop varieties. The farmers in South Sudan are left behind in terms of modern agricultural farming because of civil war in Sudan which has lasted for many years.

The civil war between north and south in Sudan has been causing a lot of impacts in the life of the people of Southern Sudan. Marginalization and denials of the people's right, especially the black people of Sudan who are the original people from the land of Kush (which mean black) and the native of Sudan were deprived from all human basic needs in Sudan from their own land .

There was no free access of human rights, all physical infra-structures, health facilities, education, and agriculture in any of the ten states of Southern Sudan.

Since Sudan received her independent in 1956 from British Government, Sudan government had never been delivering services on modern farming system for farmers in South Sudan. Most of sustainable agricultural development and extension research activities were only directed for farmers living in the Northern states of the country. No services delivery across any of the ten states of Southern Sudan.

In addition to such reasons, most of the professionals, agricultural experts, extension activities and research works, were only concentrating and carried out in the northern Sudan. The government in Khartoum neglected and denied South Sudanese farmers from adopting modern agricultural extension methods of crop production in their respective communities.

Because farmers were not exposed to modern farming and extension systems, most farmers in South Sudan are still having no idea of modern agricultural system until the CPA was signed in 2005.

The coming of the CPA (Comprehensive Peace Agreement) opened the door of freedom for all people in the Republic of South Sudan. They are now all enjoying all human rights other people have been enjoying throughout the world, including the northern part of the country who had been denying them their right.

For this reasons, South Sudanese farmers' right from the CPA time in 2005, which brought all the opportunities to all people of southern Sudan started enjoying their basic rights. Some farmers began to adopt modern agricultural extension system/methods of crop production in other states, but not multi cropping (bi-intercropping or triple cropping system). And some farmers are still following traditional way of farming practices in other states. This practice is dominated by mono-cropping system/practice across the ten states of the Republic of South Sudan.

Among these, Upper Nile state is one of the regions having the mono-cropping practices. During my field work with the National Ministry of Agriculture and Forestry in the past five years, communities were complaining of earning low crop yields, saying that It was caused by heavy practices of mono-cropping practices/system.

When I toured many Payams in Upper Nile Region, the same complain was still being raised by farmers. One of the farmers asked me, ‘‘why you agricultural extension officers working with the government’ don’t want to show us (we the farmers) whether there is any new way of farming system or not, such that we can adopt it for our better practices?’’

He also added that, if they continue growing only single crop (mono-cropping) on their farms without mixing it with other beneficial crops that could enable them improve and increase crop yields productions, they would continue suffering and that their children would not be send to school in the future.

Then, I asked him why?

The answer they gave me was that, they had no money to pay school fee for their children and thus, telling me that, they would be becoming poorer and poorer in the future and forever they said.

In the whole Republic of South Sudan, there has not been any research work conducted so far on studying the impact of multi-cropping system. Farmers were have never been given technical advice on how to practice multi-cropping system so as to improve and increase their crops yield productions by the government.

Thinking about the life of local people/farmers who have no salary and other income does not make me feel good. In my personal feeling, taking no part in community problems while believing in good values in myself in terms of knowledge that could help farmers change their life in to a better living standard was not a right thing I should do. It is better to deliver my knowledge for these farmers because I’m part of them in the community/country.

For this reason, as one of the intellectual citizens, competent agricultural extension professional with relevant knowledge and responsible person, I decided to take part in the upbringing of the newly born Nation, the Republic of South Sudan.

I decided to take part in the community problems by working with farmers and studying of the impact of multi-cropping system in a participatory manner. The purpose is for farmers to improve and increase crops yield and food production. If such Idea is properly and effectively implemented by farmers, they could be able to change their life in the near future and send their children to schools.

In 2010 semester and 2011 first semester, we (the students of Vocational Pedagogy) worked with three consecutive three projects focusing on three different concepts.

According to Luise, Lawrence and Keith (in their book titled Research Methods in Education, page 105), ‘Choosing a research project is normally the decisive feature research’. Many novice students are researchers and start with overambitious project’’(LOUIS COHEN 2011).

This is one of the reasons why I have chosen to conduct my research study as an action research project. Their ideas (Luise, Lawrence and Keith) inspired me and for this reason, I wanted to see my contribution/ bit in the society for the first time in South Sudan. I just had wanted to try whether I have a relevant and significant knowledge that could help local people change their traditional practice through my knowledge, value, competence and commitments.

✓ **The first semester project.**

It was focused on my professional practices during my undergraduate level. My experiences, reflections, competence working experience while working with the government in South Sudan as an inspector for agricultural extension services.

✓ **The Second semester project.**

It focused on the identification of needs of my society from several options and problematic situations being faced by farmers in South Sudan.

✓ **The Third semester Project.**

The third project was based on the needed improvement, preparation and planning for field work on what the Thesis was going to investigate to fill the gap in farmers’ productions.

It focuses on preparation and planning on how to work with farmers to adopt multi-cropping system/practices over mono-cropping system in Upper Nile State, Panyikang County in Nakdiar and Doleep Payams. This was the major intention of Master Thesis (project four deals with action research project).

In project four, it is the Master Thesis, which is the main focus in this report on how to work with farmers to adopt multi-cropping system/practice so as to fill the gap in farmers’ productions.

This is done by trying to find out whether the need/problem of the society identified in the previous third projects (the mono-cropping system/practices causing low crop yields) is really a challenge to local farmers in South Sudan in general or in Nakdiar and Doleep Payams in Particular in Upper Nil or not.

This was done through carrying out and conducting an action research project in the two mentioned payams (Nakdiar and Doleep payams /Payam- means a small town under county administrations in South Sudan). The idea is to encourage the farmers to adopt multi-cropping system/practices over mono-cropping system so as to improve and increase crop yield productions. I planned all these while still in Norway before reaching to South Sudan.

When I reached in South Sudan, I began to contact relevant authority so as to cooperate and support me in my action research project process to be able to work with farmers through their permission and administrations.

See the organizational structure of the relevant authorities I was working with in the Republic of South Sudan, Upper Nile State. The process to obtain permission letter took me a month to implement my action research project because of many challenges and bureaucracy system. But, I was lucky for having received my permission letter at final stage and started implementing my action research project successfully with support from both government institutions, NGOs and other stakeholders operating in those research areas/payams.

Below are organization structures that have been supporting me during my action research project. The support started from Oslo and Akershus University to relevant authorities to farmers areas (Nakdiar and Doleep Payams).

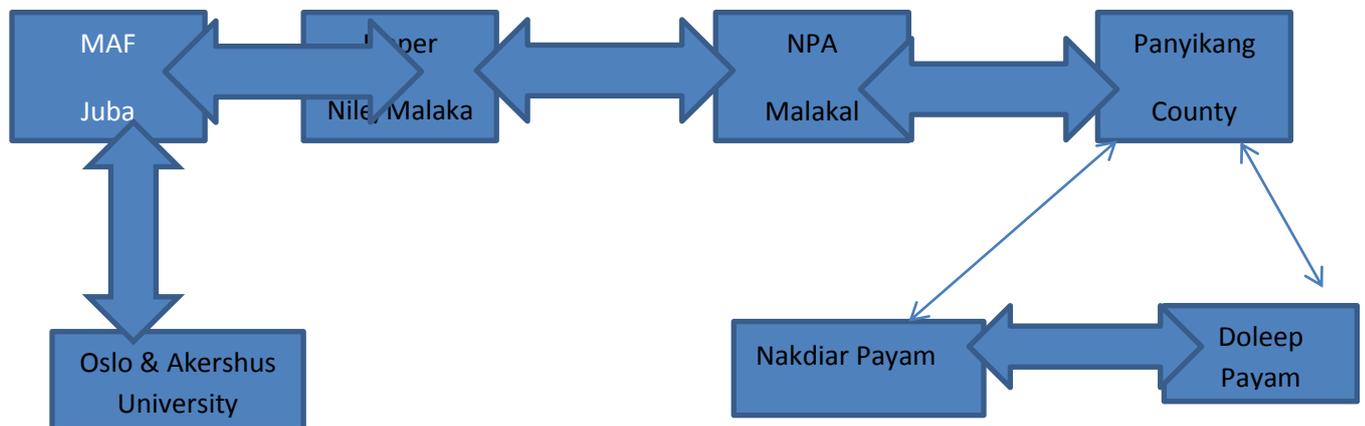


Figure 1. organizational structure that supported me in my AR.

1.4. Geographical Location of South Sudan.

It lies south of latitude 12 degree north and extends as far as latitude 3'5 degree north. It is between longitude 23 '5 degree E and longitude 36' 5degree E.

Sources: (Internet Google December, 2007).

Internationally, it is bordered by 5 countries. They are Ethiopia, Kenya, Uganda, Democratic Republic of Kongo and Central Africa Republic northwards. It is also bordered by five Sudanese states. These are South Darfur, South Kordofan, the River Nile (White Nile), Sennar and South Blue Nile.

Southern Sudan according to the Comprehensive Peace Agreement signed in 2005, it comprises of three old provinces. These are:

- ✓ Upper Nile provinces.
- ✓ Bhar ElGhazal province.
- ✓ Equatoria province.

It has a total area of 640, 000 square kilometres. About 50% of the total land surface is prime agricultural lands, forests, mountains and wetlands.

In the next sub-heading, I will discuss about;

-The composition of South Sudan

-The population of South Sudan

-The Resources in South Sudan.

-The Geographical Location of Upper Nile State.

-The Population of Upper Nile State.

-The Location of Nakdiar and Doleep Payams (the research areas). After this heading, I will also discuss about the Brief culture of Shiluk tribe and their kingdom.

1.5. Compositions of South Sudan.

Presently, South Sudan is composed of ten states based on the three old provinces as I mentioned earlier. They are:

Upper Nile old provinces

A/ Upper Nile State.

B/ Unity state

C/ Jonglei state.

Bhar El Ghazal old state provinces.

A. / Western Bhar El Ghazal state

B/Northern Bhar El Ghazal state.

C/ Warrap state.

D/Lake state.

Equatorial old state provinces.

a/ Central Equatoria state.

b/ Western Equatoria state.

c/ Eastern Equatoria state.

1.6. The Population of the South Sudan.

The population of the Southern Sudan is 8.5 million people according to 2008 National population Census. It is made up of many tribes. Some sources put it as 56 tribes.

In Upper Nile, the tribes are Nuer (the dominants), Shiluk, and Dinka Annuaq, Maban (Burun) and some tribes from Arab origin in the northern part of the country, intermingling with Fellata, Fur and many other minor tribes from the north, who are also now in South Sudan.

In Bhar ElGhazal state, there are: Dinka, Jur (Chol and Bel) Feratit as the dominant tribes.

In Equatoria, The dominant tribes are : Zande, Baria speaking tribes,Mundari, Kakwa, Madi, Lokya, Lokora, Pojulu, Nyaguara, Lotuka, Lopit, etc.

According to the National Commission for Statistics, the population of the Southern Sudan has been fluctuating since the first population Census was carried out just after the independence in 1956.

In 1956, the population put by that commission had registered Southern Sudan to have only 2,762,451 and jumped to 5,536,359 in 1983 while dropping to 4,321,788 in 1993.

The reason for fluctuation has been attributed to civil war and taboos by some tribes in giving their exact number of their families' members. And above all, some tribes connect the population count with poll tax which used to be levied on the mature males during the colonial era.

Presently, FAO/WFP (in 2005) put population census for Southern Sudan as 9, 500,000, expecting to rise to about 12,000,000 in the forthcoming population census in the year 2008, especially so after the expected returning of the Internally Displaced people (IDP) from some part of the Southern Sudan and repatriations of refugees from Diaspora.

1.6.1. Resources in southern Sudan.

But currently, Oil is the only main sources of economy in the country. This is because it is accounted for about 98%. Besides, the major challenge is that, all oil pipelines pass through Khartoum and Khartoum government demanding south Sudan to pay \$36 as transport fee for Oil, while South Sudan is willing only to pay 2-3 dollar. This is the major cause of on-going disputes between Sudan and South Sudan besides borders and citizenships between two countries. The development of water resources of Southern Sudan is the vital part of the overall economic development potential of the regions. There are also other resources in South Sudan, such as water, livestock, fish and wild life conservation and protections.

In addition to this, presently, an absence of strategic planning for developing precipitation both in time and in space is not uniform, and consequently, some areas in South Sudan have surplus water while some areas face water shortages

Livestock. It is another source of income like agriculture in the region. Many people in Southern Sudan entirely depend on mono-cropping systems, which cause low crop yields of productions compared to multi-cropping system. They use this traditional way of farming mostly only for subsistence, and also based on pastoral and agro-pastoral livelihoods. Forestry resources are being demarcated in other states like Upper Nile. Nurseries for afforestation are being established in great number in Southern Sudan.

There are extensive range lands and large number of livestock in Southern Sudan. It may soon move from consistence from commercial production if this idea of multi-cropping system is going to be adopted and shared with other farmers across the ten states in Southern Sudan.

A distribution of precipitations both in time and space is not uniform in all places in Southern Sudan. Some areas in Southern Sudan have surplus water while some areas face water shortages. Foreign sectors have developed on commercial bases in Western Bhar El Ghazal, Western Equatoria, and Eastern Equatoria states.

Fish is abundant in Southern Sudan. It forms a significance proportion of diet of its people. It has a huge potential for commercial fishing for local sales and exports. The potential catch is estimated for Sudan by Sudan Productive Capacity Recovery program (SPCRP) in 2006 assessment. Some farmers in Nakdiar and Doleep Payams were not only agricultures, but also practice fishing for their families and take some for sale to Malakal local markets.

Wild Life Conservation and protection Is another resource of importance in Southern Sudan. It is a source of food both during the food abundance as a coping mechanism during the food gaps.

1.6.2. The Geographical Location of Upper Nile State, Malakal.

The arrow shown below on the geographical map of ten states of the Republic of South Sudan showed the study area of study in Nakdiar and Doleep, South –East of Malakal.

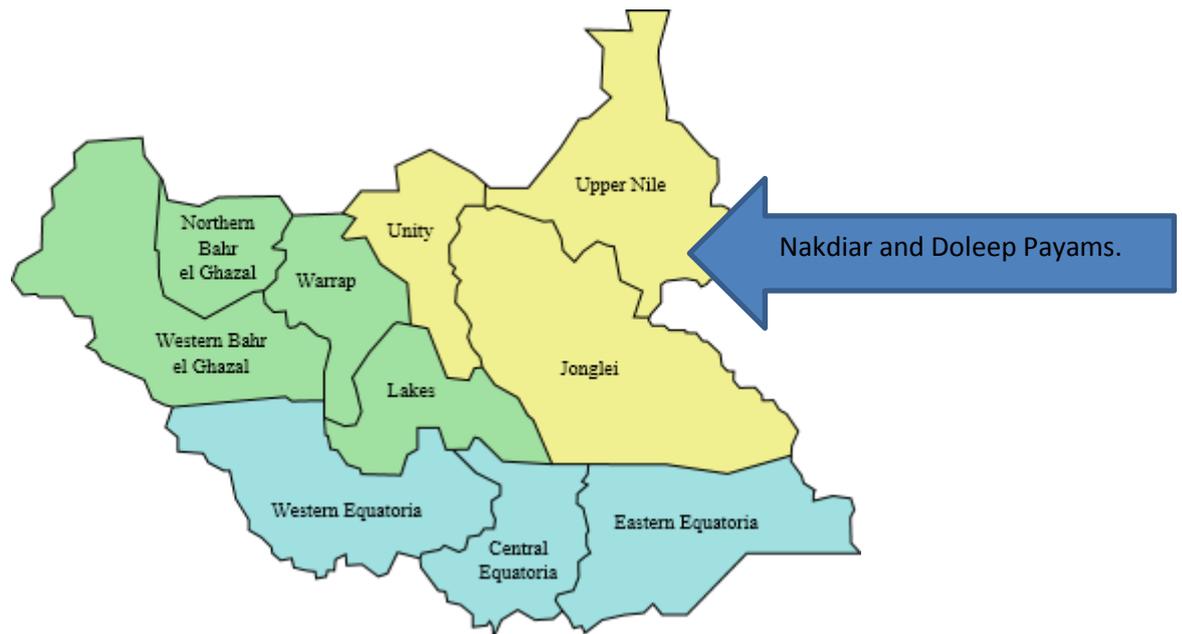


Figure 2. Ggeographical Map of the Republic of South Sudan.

Adopted from the Google source on South Sudan map for time being.

1.6.3. The population of Upper Nile State/Region.

In Upper Nile State/Region South Sudan, the population is over 9800,000 people according to 2008 population Census.

1.6.4. Location of Nakdiar and Doleep Payams, Panyikang County.

Nakdiar and Doleep payams are located south and eastern of Malakal main town, and about 54 kilometre away along the Sobat River, while the main Panyikang County is located 85 kilometre way.

The Tribes of this Payams (Nakdiar and Doleep) is Shiluk followed by Nuer, and the minor tribe in these two Payams, is Dinka.

1.7.3.1. (A).Brief Culture of Shiluk Tribe.

Shiluk tribe is one of the South Sudanese tribes living along Sobat and Nile River in Upper Nile Region. They like to wear a well decorated bed sheet across their shoulder. Both men and women are doing this kind of wearing practice as their cultural wearing norms.

They are in the world widely and regionally recognized by many scared dots on their forefaces. Both the male and females have scare dots on their faces unlike that of Nuer (with six parallel line scars ended at the back side of the male's ear)

This facial scaring is mostly done with a sharp knife by a careful skilled person on the face of the male ones. Such act of facial scaring is not allowed for female ones by the Nuer tribe, in contrary to that of, Shiluk, Dinka, Mundari and other tribes in the Republic of South Sudan..

1.7.3.2. (B).The Shiluk belonged to Shiluk kingdom.

They believe in Panyikang (a green aquatic snake) as their cultural God although some they are Christian like other South Sudanese. The name of their king is called 'Mek'. This Mek is like their God. He is responsible for Shiluk cultural administrations, heritages, respect and honour for their culture norms. They are culturally very good people and well-disciplined according to the way they are taught by Mek. If any of the citizens of Shiluk found misbehaving, he /she must be punished according to Mek order and the Mek punishment is always very painful. Everybody always obeyed Mek order and authority.

But in the current situation, they are not doing it severely anymore because the country is now engaged in democratic governmental process with the rule of laws. Nobody is above the law, even Mek himself. Previously, Mek used to deny some of members' right because of his unlimited and excessive power system. Such change in excessive power of Mek because of democracy system of government from South Sudan, relieved pain from those who were affected by Mek too much and absolute power.

When the Shiluk have a problem with other tribes, Mek is always the one in charge to declare war or no war against that tribe against Shiluk tribe.

Sometime, Mek doesn't declare war by orally or by words in disclosed manner that they should fight people/tribes, but rather he might just decide to go ahead towards the enemy. During this time, his people do not allow him to go and will just push him back not to go to war himself. His people are the one to fight bitterly with enemy.

The Nuer and Dinka are the two major tribes in Southern Sudan. But in this research, my understanding is that, Shiluk, are number four in terms of South Sudanese ethical/ tribal populations in the country.

1.6.4. The institutions and stakeholders involved during this action research project.

- National Ministry of Agriculture and Forestry (NMoAF).
- Norwegian people's Aid (NPA).
- World Vision Organization (WV O).
- State Ministry of Agriculture and Forestry (SMAF).
- Farmers' focus Groups (FFG).

All these stakeholders mentioned above have given me some support during my action research project implementation process. But the most committed stakeholder among all, was

the Norwegian People's Aid (the NPA) compared to other stakeholders. It used to provide me with all the supports I need and to work together with its staff to help farmers in adopting multi-cropping system/practices.

In this Master Thesis, there are three important theories and other ideas from different authors/writers that I used to back up my research idea during my action research project process.

The First one focuses on Action Research theories (will focus on Jack Whitehead and Jean McNiff books, David Greenwood, and Selva Abraham).

The second theory focuses on Agricultural part of this research study (from the book of Raymond N Gallaher, SOFIA NATARANJO and D. KAHAN B. SEIFERT, Hoddinott and Billkinsey, Institute of Food and Agricultural Science.

The third theory based on experiential learning from David Kolb, has also helped me in backing up my idea on field experiences and challenges during the research process

1.6. 5. The Purpose of Studying Multi-cropping System.

The overall purpose of this action research is for farmers to adopt multi-cropping system/practices as a new technique for agricultural productions.

1.6.5. Problem statement.

‘How can I work with farmers for them to adopt multi-cropping system in a participatory way/manner?’

My intention in this action research was to approach farmers, work with them, and to systematically ask for their willingness and participate in this action research.

*This research project, also has an elements of **participatory, action and research** as cited by Greenwood (Greenwood 1998).*

He says if a research report does not contain the element of ‘ participation, research and action’ then It is not an action research.

Therefore, I asked the farmers’ willingness and voluntary to participate in the action research process of implementing multi-cropping system.

For this reason, I decided to conduct my action research project in a participatory manner.

The term systematically- refers to an agricultural extension terminology concept, which mean, ‘a smooth way of approaching farmers’ when inducing some change/idea to the farming communities.

The term willingness- refers to how the consent of the farmers was ensured or volunteered in the action research project process.

The term participation- refers to how effectively/actively the farmers were involved in the action research process.

‘The call to action in research, in terms of participatory action, particularly in respect of oppressed, disempowered, underprivileged and exploited group, finds its research voice in terms of Participatory Research (PR) (e.g. Freire, 1972; Giroux, 1989)(LOUIS COHEN 2011).

1.6.6. Objective of the study.

According to Kothari(Kothari 1985)From the view point of objectives, a research can be classified as;

A. Correlational Research.

Correlational research attempts to discover or establish the existence of a relationship/interdependence of two or more aspects of situations.

B. Descriptive Research.

Descriptive research attempts to describe systematically a situation, problem, phenomenon, services or program or provide information about, say, and living conditions of a community or describe attitudes toward issues.

This descriptive research idea is very interesting, important and it is directly related to my understanding of the situation the farmers were facing in South Sudan in the two Payams. They have a challenge of having low crop yield productions since many decades because of civil war in Sudan and this is, caused by heavy uses of mono-cropping system.

The understanding of such situation led me wondered about how I could work and help these farmers to improve and increase food production for the group and families. That is my major intention to systematically work and help farmers to be able to adopt multi-cropping system. Encouraging them to try it out and if successful, they can be able to maximize their income generating activities on to what they already have from before.

I also learnt that, some farmers have incomes from fishes and milk from their cattle they have in their local community. They used to collect some money from these all sources so that they could send their children to school in the near future. Rich farmers with other different income a part from agriculture have started sending their children to schools unlike those do not have.

1.6.6. Specific of Objective of the Study.

- To approach farmers to adopt multi-cropping system/practices in a participatory way.
- To improve my practices in studying multi-cropping system by working with farmers.
- To train farmers about multi-cropping system/practice.
- To inform farmers about the modern agricultural extension method of production.
- To improve and increase food production to gather with farmers.

1.6.7.. Research Questions.

1. What could be my best way of approaching farmers to achieve my objectives in a participatory Manner?
2. What do I need to do to inform farmers about modern agricultural extension methods of productions?
3. How can I give farmers some professional skills on multi-cropping system/practices?
4. How can I get the relevant information I need in a participatory manner from concerned NGOs and Ministry of Agriculture?
5. How can I improve my practice in multi-cropping system?

The relevant information was accessed through the support of NPA and The Ministry of Agriculture and Forestry by asking the director of agricultural extension whenever I am in difficulty on certain information.

1.6.8.. Significance of the Study.

The study also sensitizes and created more awareness for the farmers about the modern agricultural extension method.

It encouraged farmers to be decision makers of their own choices of productions.

It is significance in that; the research study improves farmers' knowledge and skills about agricultural extension methods according to my observation during and after the process of project implementations.

It will also enable farmers to be self-reliance and improve their living standard if they properly adopt the idea of multi-cropping practices.

The study will identify and spread to other areas where multi-cropping system can be practiced in Upper Nile, in the near future a part from Nakdiar and Doleep payams who are the focus in this year of 2011.

If this idea is effectively adopted, practiced and continued, the farmers believed to be commercial farmers in the near future. They thought that not only for their families' subsistence/ consumptions and earn more money, but also to be able to send their children to school as urban children. This was according to my interaction with them during and after the discussions in most of our project activity process.

According to our judgement (NPA staff, MAF staff, Local government staff, farmers themselves and I), we believed that if the new idea is going to continue, the farmers will be able to improve an Increase food productions for their families in the future.



Figure 3. recommended farm for future look.

www.knowledgebank.irri.org

1.7. Summary of the first part.

This part deals with the main idea of this action research project. It deals the general descriptions of the situations faced by the local farmers in South Sudan.

It focuses on whether mono-cropping system/practice as a problem to farmers in South Sudan.

Therefore, this master Thesis deals with how to work with farmers to adopt multi-cropping system/practices so as to improve and increase food productions.

It discussed mono-cropping system and how it could be solved by the application of multi-cropping system/practice in this study.

1.8. How this report is organized and built up.

This report is categorized into 8 parts.

The first one. Deals with Personal, Educational and General Research Background.

The second. Deals with major theories used in this action research Thesis Report.

The third. It deals with Research Methodology (Theoretical part).

The fourth. Focuses on Practical Methodology Applied During the Research Process.

The fifth. Focuses on Major Limitations /Challenges Encountered During the Research Process.

The sixth. It focuses on Evaluation of the Research Process

The seventh. This deals with Major Reflections During and After Research process.

The eighth. It deals with careful Presentation of Data / the Research Result. In the next chapter, I will focus on major theories and literatures to back up my idea in this research process.

The Ninth and tenth part of this report deal with the lists of references used during action research project and implementation process.

The final part of this report deals with appendixes and guideline questions used during interview process with the farmers. The appendix is sub-divided into list of figures and tables used in this Master Thesis Report.

2. MAJOR THEORIES USED IN THIS STUDY.

2.1. Introductions.

In this chapter, I will explain how I tried to establish a different understanding of theories and literatures from different authors and writers and merge their ideas and views to my action research project so as to back up my idea.

Action Research is a process of finding out new ideas and creation of new knowledge. Action research has the elements of Action, Participation and Research during the process of its implementation (Greenwood 1998).

During the process of action research project implementations, I tried to encourage the farmers and other stakeholders to involve and participate in the project as dialogues during and after the process of implementations.

This means, without the willingness and participation of local chiefs and other NGOs, the process could not have been effective and could be challenging to me. It could have been difficult for me during and after the implementation process to realise its effectiveness. Having managed to involve all these stakeholders, the implementation process was easier, interesting and was a great experience to us who took part in that process.

Varun Vidyarthi and Patricia A. Wilson, deal with facilitating Collective Reflection for Sustainable Change. Steinar Kvale and Svend Brinkman focus their work on qualitative interviews. Kolb, Freire, Illeris, Dewey deal with experiential learning. I have learnt a lot by reading further their works and ideas and were interesting.

My experiences and knowledge in this action research project is backed up by four theories of action research from Jack Whitehead, Jean McNiff, Greenwood and Selva Abraham. When I read their works and ideas in their books, I found that they differ in their professional way of understanding and doing action research. This also caused confusion in my understanding of 'Action Research, Research and Theories.

I tried to first understand the difference among these three terms conceptually by defining them. I begin by asking;

- What is Action Research?
- What is Research?
- What is Theory?

A. Action Research (AR).

As you might have learnt earlier, action research Action Research is a process of finding out new ideas and creation of new knowledge. The same in my action research I am trying to improve my practices by conducting my Master Thesis on working with farmers so that they adopt multi-cropping system/practice to improve and increase productions.

B. Research.

It is a way of finding out what is not known now to be investigated and become known or finding out by asking question that might lead to the answer to the problem under investigations.

According to Kothari, C.R, Research, is a way of examining your practices(Kothari 1985). He wrote about the how to deal with Research Methods and Techniques on dealing with research field work. His idea helped me during my field work on how to be careful in dealing with my methodology during group dialogues and discussions with farmers.

I regarded this as a very interesting concept and it directly answered my research question of 'How can I improve my practice?' In my opinion, without questioning myself whether my practice is satisfactory to me or not, there could be no need for me to conduct this study. Moreover, having found it important to find out whether my practice is improved or not, I decided to integrate his idea (Roger C. Shank) into my work because it is useful to me.

According to Dawson, Catherine, (2002), Kothari, C.R.,(1985), Kumar, Ranjit,(2005),when you are undertaking a research study to find an answer to the problem you want to study, you are implying the process in a procedural ways (i.e. your steps or procedures to follow to guide you in your discussions based on your philosophy).

The qualitative, quantitative, and methodology depend on which approach the researcher think should be an appropriate and is interested to apply to achieve his objectives under investigations.

In my case I preferred to use a qualitative approach in this action research project by approaching the farmers through the use of dialogues and discussions in a participatory way.

In conclusion, the three writers (Dawson, Catherine, (2002), Kothari, C.R.,(1985), Kumar, Ranjit,(2005),) defined the term research as a structural enquires that utilizes a specific acceptable scientific methodology to solve problem and create new knowledge that is generally applicable.

According to Kumer, Scientific methods, consists of systematic observation, classifications and interpretation of data(Kumar 2005).

This means that, I had to make sure a proper and effective observation is carried by all the parties involved in this action research process. The idea is to have a better quality judgement of the situation and how it could be addressed by the groups (to have joint problem identification knowledge and skills besides group dialogues and discussions).

C. Theory.

A theory is a set of assumption, propositions or acceptable facts that attempt to provide a plausible or rational explanation of cause and effect (causal). It based up on hypothesis and often backed up by evidence. The theory also describes the change the types of interventions need for a given situation/problem (a single program or a comprehensive community initiative).

In relation to my action research project, I tried to understand the cause and effect of mono-cropping system/practice happening in the farming areas (Nakdiar and Doleep payams). Then after that I had to intervene and encourage farmers to adopt multi-cropping system/practice so as to improve and increase food productions for their families. They have accepted the idea because it is fact for them to benefit from it by improvement and increasing their crop yields.

In the next headings, I will focus my discussions on action research theories from;

- ✓ Jack Whitehead,
- ✓ Jean McNiff,
- ✓ Greenwood,
- ✓ Abraham Selva. After that, I will focus my discussions on agriculture part of theories and some concepts from different authors and writers.

2.2. Some theoretical concept from Jack Whitehead.

2.2.1. Generating Living theory and understanding in action research studies.

According to Jack whitehead Pg.85(Whitehead March 9, 2009), individual can generate their living theories from action research as the explanations for their educational influences in learning by putting a question ‘How do I improve what I am doing?’

In the context of my research study, I had wanted to try to find out whether I can manage to improve my practices in training farmers on multi-cropping system or not. And that is why I conducted my Master Thesis on how to help farmers adopt multi-cropping system/practice so that farmers can be able to improve and increase their food productions.

As a facilitative researcher, I was just trying to sell out my idea whether it could be helpful to farmers or not.

This concept is as also cited by Ortrum (pg.31, 2009),’’A good teacher/facilitator’’ is seen as an expert who conveys his/ her knowledge to novices/people who acquire and accumulate that knowledge for their benefits.

2.3. Some theoretical concepts from Jean McNiff.

(From the book of ‘Doing and writing an action Research).

Planning and undertaking an action research project means asking questions about what we are doing, why and how we can evaluate our practice in terms of the values we hold (p.71. Jack (Whitehead 2002).

When relating this concept to my work, it provides me with an opportunity to ask myself on what I was doing in my field work on action research project. It is a direct and practical question to realize how I was engaged in working with farmers to adopt multi-cropping system/practices in Upper Nile South Sudan.

‘‘The why question’’ reminds me on how I was asking myself of why I’m I concerned to help farmers adopt new practice of multi-cropping system over mono-cropping system in Upper Nile.

The ‘‘How question’’ reminded me on what qualitative method / methodology I should use in approaching farmers so as to accept my idea of new practice. The general impression about this concepts (concept of asking What, Why and How), is to know where a researcher is going, doing and how (the way or road) to make the idea of research study happened in a realistic way and scientifically.

According to Jean McNiff, page123, ‘‘Dialectical critique means being aware of the historical, political and cultural forces that led you to your present situation, including the way the researcher think’’(Mcniff 2009).

During and after my dialectical process and discussions with the farmers, I had to first keep in mind that, I informed all the relevant authorities, local chief, NGOs and the farmers about what is to be done before we got to do it.

I often did this because I wanted to know whether they are fully aware and interested in the idea I’m conveying or not. The pre-season behind this idea is to avoid political or cultural distortion that may hinder my work.

After they accepted the idea, they had to inform me about the place to meet, date and time, based on what is convenient for them. In so doing, it made my action research more participatory and interesting to all of the parties involved in project implementation process.

According to Jean McNiff and her colleagues Jack Whitehead (page 123rd in the same as the above book title),’’ Reflective critique’’ means being aware of your thinking, how it manifests in your speech and action (your discourse), and how it change over time(Mcniff 2009).

Having applied the same way of reflection and keeping such concept in mind, I found it vital/useful to use Jean and Jacks’ experiences to be careful and reflect on effective approaches in every stage I arrived at.

I started keeping this reflection in mind starting from the National Ministry of Agriculture and Forestry in Juba, South Sudan. And also to other NGOs, who were also cooperative and supportive to me. Such NGOs were NPA and World Vision organization. Particularly, NPA supported me in my field work throughout my research period. I used to go for field trips with their staffs and their cooperation and experiences helped me a lot while working with farmers throughout my action research project implementations process. This made me so proud and thankful to them.

“Your conceptual framework plan you have decided as your work plans, are grounded in your values” (Mcniff 2009).

Throughout my field work period, I experienced that, without doing one’s professional framework plan and recording of daily logs from one’s on going activities, there could be no clear flow (sequences) of activities. And therefore, there could be no clarity of vision to obtain a quality result in one’s objectives.

According to both Jean McNiff and Jack Whitehead, ‘Critical engagement’ serves to strengthen the validity of a knowledge claim (Mcniff 2009).

This means that, it was a must for me to be able to describe and demonstrate how the situation is a challenge/problem to the local people on the ground. And also how I managed to try to find out and provide some solution to that problem at hand for farmers. It means how much I could be able to exert my whole senses of organs and energy to find out by investigating the problem faced by local community /farmers.

This demands more critical engagements, commitments, critical thinking and also on how to address this problem practically and in this report.

“To hope for change is essential but it takes courage to go beyond hope and bring about change (page23rd ”(Whitehead 2002).

When I reflected back on farmers /people’s life in South Sudan during the civil war, Life was very difficult and complex to explain about how people were suffering and leading their livelihood with their families.

People live in a completely deep down of poverty line. Government did not care of local people. I used to submit a lot of reports to government about the need to train farmers on modern agriculture and farming system/practices, but there was no positive response. Yet, I still taking courage and did not lose hope on how to find another way to help farmers with my knowledge.

In this master Thesis report, I decided to work with farmers to adopt multi-cropping system/practices as a new agricultural practice so as to improve and increase food productions.

“Self-study is now widely recognized as a powerful influence for personal and social renewal” (See the forward by Douglas Barnes, in Hamilton,1998, Zeichner, 199)(Whitehead 2002).

Before joining and learning in Oslo and Akershus University College, I thought I knew a lot about knowledge of multi-cropping system, but now I realized that I knew nothing compared to my current knowledge and learning practices.

Having learnt something from this University, it encouraged me to reflect and remember back about farmers’ life in South Sudan.

I tried to imagine the life of local people with no salary and earning low crop yields of production. Realization of the relevance of my agricultural extension back ground knowledge; it enabled me to feel proud of my knowledge to be able to bring change in farmers’ current practices in South Sudan.

I experienced that farmers life (livelihood situations) should be made better and bring change in their life through agricultural practices rather than any other mean.

The epistemological basis of approaches is that theory determines practices(Whitehead 2002).

This means that without relating and backing up of one’s research idea he/she wanted to investigate with other international authors/writers theories or opinions, any research is impossible.

According to the two colleagues (Jean and Jack Whitehead page53), In avoidance of values ignorance, practice is taken to be performance as an execution for technical tasks(Whitehead 2002).

In my opinion, it means not to ignore one’s value because it is the quality value of researcher that makes one to be useful or important to the society. Responsible citizens, have good care for their societies and are termed to be valuable and have good performance in the society. They used to perform professional and technical tasks whenever they are given some offers by the community or organization to do the tasks and such people normally satisfy the societal need

Research which encourages practitioners to investigate their own practices on the job and share their insight can be educational minded (page 55(Whitehead 2002).

This means that it helps participants (farmers)/people make sense of their own situations/realities and account for their own leanings. It also means showing someone how to fish and will survives with such knowledge throughout his/her life time than to give him/her a fish to feed on, in a day.

2.4. Some theoretical concepts from David Greenwood.

2.5.1. Linking theory and local understanding from the book social research for social change.

In page 71 in the above titled book, 'Action Research' visualizes research processes in unique ways, and uses this visualization to help keep the process moving in useful direction (Greenwood 1998).

This means that as a facilitative researcher having the idea to sell out to the local communities, I had to have a clear guideline for field work plan on what I'm going to do to gather with the farmers.

Having done both clear guideline and field work plan, made my work flow very smoothly following my activities I planned to be carried out on monthly basis. I planned that; my works should go month by month, week by week and day by day on my own student daily logs. Every month, I used to report to my supervisors about what I did in the previous month and what to do next.

These monthly log reports continued for six months until the harvest time and evaluation of the project process completed in December 2011.

If any process of action research does not contain the balance of some elements, such as, 'Research, Participation and Action' then that process is not an action research, as said by Greenwood (Greenwood 1998).

In my action research process, I managed to try my best to apply dialogues and group discussions as my major methodology when approaching the farmers/participants.

I did this by encouraging farmers to adopt multi-cropping system/practices through effective participations. I also involved other stakeholders in the research project process, such as NPA officers, local government authorities' officers, and staff from World vision organization in the two Payams.

According to David J. Greenwood and Morten Levin, 'In conventional social research', expert knowledge is the basis of the high status of the researcher and his/her ability to impose controls and methods on research situation' (Greenwood 1998).

My intention in this action research project is that, I was just trying to convince and advise farmers to adopt multi-cropping system by encouraging them to decide on whether it was a good idea that could benefit them or not.

Greenwood also mentioned (in page 98 in the same book mentioned earlier on social research for social changes), action researcher should rely on local knowledge (Greenwood 1998).

Before and after my intervention to the local communities, I learnt that without respecting and depending on local communities' information, interests and norms, nothing to be researched. Why because without gathering of information about the problem /situations from

the local community members, I could have known nothing about communities/Payams. But with the help of farmers, I received the information when I was working for the Ministry of agriculture and Forestry in 2008,

This means that, it needs the creativities of the researcher. Because without the researcher's creativity, values, ability, commitment competence, relevant knowledge and the clarity of his /her objectives or goal, he /she will not be able to solve farmers' farming practice problem. As a result, he/she will not be able to achieve good result of his/her action research results and findings.

Moreover, it will neither benefit him/her in particular or the society in general. And that is not the case in my action research. I wanted both my society and I to benefit from it this action research project, be in terms of knowledge or kind (agricultural produces).

It might be true in most research approaches, but in my case, I used to ask farmers whether to use /apply individual interviews or group one. They often prefer group dialogues and discussion in most of our activities. For this reason, I would suggest that, this should always be depending on the situation or circumstances in which the researcher will afford to apply or which approach to apply based on his/her experiences to suit the situation under investigations.

2.5. Some Ideal and theoretical Concepts from Abraham Selva.

(From the book of Exploratory Action Research for manager Development).

According to Abraham Selva (page 63 in the above book title), 'An exploratory study examines new areas of inquiry, including new and previously un integrated social phenomenon /situation as well as of data collections(Abraham 1997).

When I looked at this concept from my action research project point of view, I felt that introducing new idea of multi-cropping system to the farmers was a right thing to do to help farmers adopt multi-cropping system. This could be a better solution to solve problem of mono-cropping system/practice, which caused the slowness in crop yield production.

It will often be associated with specific projects committed to quality of access to services or education to legitimate participants(Abraham 1997).

My action research project study focused on quality outcome than quantitative outcome. This means that I just wanted to commit myself to help farmers adopt the idea of multi-cropping system/practices. If they found it important to improve their local situation, they had to implement it and see whether it could be beneficial to them or not.

In page 40 on the same above mentioned book(Selva's) ,'' Action Research will become part of a form of life for groups broadly committed to social action and education reform (Abraham 1997).

The involvement and participation of all farmers, stakeholders and I during and after the project process, created more commitments and cooperation between and among all parties

involved. This is because it was really a very crucial matter of concern and important for the life of farmers, and also for all people in the country, whether directly or indirectly.

In accordance to Lewin's in page 24th on the same book (From the book of Exploratory Action Research for manager Development), ‘‘action research provides a way to solve practical problems’’ and ‘‘the same time to discover general laws that govern groups life.

Farmers in the Payams involved have suffered from low crop yield productions for many years. This problem is caused by traditional practices which is dominated by mono-cropping practices. Farmers complained that, they need new technique of agricultural production.

For this reason, I tried to introduce for them new idea of multi-cropping system whether it could suit and fit to be a solution to their problem or not. When I tried this idea, farmers accepted the idea, adopted, implemented it and finally harvested more crop yields than before.

To me, adoption of multi-cropping system by the farmers over mono-cropping system, means action research provides a way to solve practical problem as cited by Selva from the above mentioned book earlier (Abraham 1997).

Based on my experience from this project, heavy mono-cropping practice is a problem that could be solved by applying the used of multi-cropping practices and effectively exercised by the farmers.

The next part will focus on agricultural theoretical concepts, Farmers' Freedom of Associations and its importance impact of agricultural extension on farmers' productions, development and technology for improved multi-cropping system/practice on limited supplies,

2.6. Theoretical concepts from Agricultural part of this action research from different authors.

2.6.1. Theoretical ideas from Sofia Naranjo and D. Kahan and B. Seifert.

Agricultural research and development can improve linkage and cooperation between farmers through farmers' organizations, agricultural research agencies, and extension services are needed at all levels not only at farm levels.

This should be facilitated through periodic of all these key stakeholders, saying that farmer organization should always participated in planning meetings to have a greater say in research agenda (Sofia Naranjo 2007).

This idea benefited me during my research field work process and implementations

It benefited me in the sense I used to keep inviting and involving all farmers' representatives, NPA staff, MAF staff, local government staff and the farmers themselves to participate in the research activities and process.

The idea is to make a joint concrete decision and choices about how the practices (multi-cropping practices) should be effectively implemented in a participatory way in the two Payams (Nakdiar and Doleep).

2.7. Farmers' Freedom of Associations and Its Importance.

In recognition of the article 20 in Universal Declaration of Human Rights, says that everyone has the right to freedom of Peaceful Assembly and Associations, as well as ILO (International Law Organization) convention 87 and 88 on freedom of associations, the right to organize, collective bargaining, all government should be recognized by laws, the right of farmers to organize and act collectively (Sofia Naranjo 2007).

In South Sudan, the case is different. Most of the times, farmers are not consulted (approached) and not informed about their right of association during decision making process about modern farming system. Rather they are subjected only to follow what is decided by the central government. This kind of approach is known as top down approach.

But during my action research process, I used to ask farmers for their willingness. I used to involve them and participate in decision making process of their choices.

In most agrarian communities in the world, as well as in South Sudan, farmers perceived/ regard agricultural income and benefits as a banking way of life. But this perception of teaching, is synonymous to what Freire refers to as the 'Banking concept of education' where he compare teaching as an act of depositing ,a teacher as a depositor of information (in this report as done by the facilitative researcher), whereas the students are the depositories(FREIRE 1921 -1977).

But in Freire concept, teacher is the one pouring knowledge to students and students depends on what teacher said. But in this research context, farmers were given technical idea/information about how they should adopt multi-cropping system as a new practice. And it is up to them to find it useful to improve and increase productions or not. They have the right to make their own choice of productions.

The group dynamic stream flowed on from Lewis's work with an emphasis on leadership, power, group dynamic, stress and identity, concentrating on individual and group process rather than larger scale social systems (Abraham 1997).But in this action research project, it was based on group dynamic then individual one.

This is because farmers were working in groups for group benefits, rather than individual benefits. The income from their farm had to be sold out and keep the money for groups' purpose and interests. Individuals also have the right to have his/her private farm a part from the group one. The same policy is applied in the two Payams (Nakdiar and Doleep).

2.7.1. Importance of Farmers' Freedom of Associations.

Organization is a tool for empowerment and equitable developments. Through farmers' organization, farmers can improve their political powers as a group, increasing their

livelihoods where their needs opinions are heard by policy makers and publics (Sofia Naranjo 2007).

During my action research and implementations in Upper Nile, it was a participatory and effective process. We did this through cooperation with NPA staff, MAF staff, local government staff and farmers' focus groups, (the FO- the Farmers' Organization in this research).

2.8. Impact of Agricultural Extension on Farmers' Productions.

According to John Hoddinott and Bill (Kinsey. January 2001), It is widely recognized that increases in agricultural productions in many parts of developing world, as an important components of a strategy to increase income, reduce hunger and contribute to the improvement in other measure of wellbeing of the farmers. In doing so, it requires improvement in the productivity of agricultural produces.

As one of responsible citizens with agricultural extension knowledge system and methods, I decided to take this initiative to alert and aware farmers to adopt multi-cropping system so as to improve and increase food productions for their families.

This initiative created significant impacts on farmers' practices to realize and modified their indigenous to better practices by adopting the above mentioned practices. One may wonder about how I give some skill training to farmers on multi-cropping system/practice.

This is telling you how I did it by giving them some short workshop training and on-farm training on their farm and demonstration. This was carried out on the demonstration garden where farmers had to stand or sit down around, making circle. During this time, every farmer had a chance to perform practical exercise on how to grow a particular crop in the middle of the group demonstrating on the task given and all of them have to apply this knowledge and skills on their individual respective farm.

Birkhaeuser, Evenson and Feder (1991) and Evenson (1998) and have argued that, agricultural extension represents a mechanism by which information on new technologies, better farm practices and better managements practices can be transmitted to farmers (Kinsey. January 2001).

I personally appreciated the two authors, but however some African governments do not consider the challenges involve in the farmers local situations. Only few countries that often effectively deliver information/extension packages or services for farmers. According to my experience in Africa, such countries are Ethiopia and Tanzania and are good examples for extension package delivery. The farmers are often consulted for decision making about their choices and types of productions they needs unlike that of other countries in Africa.

2.9. Theoretical concepts on development and technology for increased multi-cropping system on limited supply of arable land (by Raymond N. Gallaher).

This part will present you different agricultural cropping terminology/names of crops types in the field of agricultural extension. It is also known as cropping system/practice.

2.9.1. Cropping System Terminology.

2.9.2. Succession Multiple-cropping.

This is the first major category of multiple cropping systems, in which two or more crops are grown in succession on the same land per a year. These forms are generally known as double cropping, triple cropping, quadruple cropping, etc., and ratoon cropping system. Some time, the term “Sequential multiple cropping,” is used interchangeably with succession Multiple cropping system.

2.9.3. Double Cropping System.

This is a form of multiple cropping in which two crops are grown in sequences or interplanted on the same land in a 12 months period (a year). Small grains (wheat, rye, oat or barley) succeeded by soybean, corns, grain sorghum, forage sorghum or sorghum x Sudan grass, and are example of sequential double- cropping system.

2.9.4. Triple-cropping system.

This is a form of multi-cropping system, in which three crops are grown in sequence, and or interplant on the same land in 12 months period (a year). Small grain for silage succeeded by corn, then succeeded by forage sorghum, are example of triple-cropping system, but ever to me, these succession, vary from country to country and from farmer to farmer based on their favoured choices.

2.9.5. Quadruple, Quintuple-cropping system, etc.

It is a form of multi-cropping system where four (quadruple), five (quintuple), six (sextuple), seven (sextuple), etc. Crops are grown in sequence on the same farm land in 12 months period (a year). Numerous quadruple cropping are routines in most countries in the world.

2.10.6. Ratoon Cropping System.

This is a form of successions cropping in which regrowth occurs from root or stem stubble of the original crop that has been planted and harvested. It is often grown and harvested one or several time in the course of a 12 months period. Grain sorghum succeeded my sorghum regrowth, are the good example of ratoon multiple cropping system.

2.10.7. e. Mono- cropping/monoculture system.

Mon cropping or monoculture system is a form of cropping succession system in which only single/the same types of crop is grown on the course of a 12 months period(N.GALLAHER 1995).

In this Master Thesis research report, it deals with multi-cropping /mixed cropping system or ranging from quadruple, quintuple, sextuple up to Eightuple cropping system (i.e. mixing of up to 8 types of crops on the same farm, using a qualitative land fragmentation and organizations).

This means that each corn/maize type will be grown in a square unit of land from a squared farm land for plantations. During my action research implementation process, local farmers/people had a very important and interesting socio-cultural activity, where all farmers/people used to gather and participated jointly in their community tasks. Their culture influenced and helped me a lot in inducing the idea of adopting multi-cropping system in the two payams more effectively by encouraging effective participations of participants through their representatives.

2.10. Other Theoretical Ideas from different Authors.

2.10.1. Some theoretical views from Patricia A. Wilson and Varun Vidyarthi.

According to Patricia Wilson (pg.31, (A.WILSON 2005) , the control of decision-making is one important element and the other is how collective decisions are made, saying that the quality of decision-making is relevant no matter who is controlling the resources, even if it is a non-governmental community-based organization. Unless the different voices are heard and recognized as an asset, the kind of decision-making happens may not allow the best - possibilities to emerge.

In my opinion, it means that, the community always need to be democratic. In the non-democratic communities, their rights (views, interests, needs, opinion, and problems) are not normally included and consulted in decision making. They are always more likely to live in poverty, and in problems in their communities. The same thing is currently happening in South Sudan during my research period. Government do not usually consult farmers or local people for their views and opinions to be included during government long term strategic planning. Rather, they are found of using top-down approaches instead of bottom-up ones, like that of pure democratic world with fair democratic principles.

Patricia and Wilson Views on Collective Reflections pg.108 (A.WILSON 2005), collective reflection is a part of many traditions and takes various forms. For example, in India, it takes the form of Watsang, literally translated as ‘Good company’ or ‘truth seeking group’ and one can observe Sat sang being organized in different parts of the country.

But in Upper Nile South Sudan, the nature of practices, vary from community to community and this is because, South Sudan have many tribes with different cultural practices. Nuer, Shiluk, Dinka, Equatorians, Anyuak and many other tribes, have different cultural practices based on how they lead their life. But some time, they have common norm on agricultural practices. Example, mono-cropping system /practice is common across all the ten states of

South Sudan. In Nakdiar and Doleep Payams, local people believed in a traditional god, known as ‘Nyikang’ as their god, and being led by ‘King named Mek’. They ask him for ever thing they want as a community when there is a need.

2.11. Some Theoretical views from Steinar Kvale and Svend Brinkman.

(From the book of Learning Craft of Qualitative Research Interviewing).

Social Science Research should serve scientific and human interest in page 62 of the book titled above (Brinkmann 2009).

This Master Thesis research topic deals with the idea and thinking about the life of local farmers in South Sudan who suffered a lot from low crop yield productivity for many decades because of the civil war between. They had never been exposed to modern agricultural extension method and systems. The idea is to approach farmers, work with them, give them some training on multi-cropping system and improve their knowledge through better practices so as to solve their local situation of low crop yield productions.

Qualitative methods of interview ranging from participant observation to interviews to discourse analysis have since the 1980s become key methods of social research (Brinkmann 2009).

During my field work experiences, I found it interesting and important to apply and conduct my action research in a qualitative way. This was done by using qualitative approaches, carefully and smoothly to convince farmers so as to adopt new techniques of agricultural practice if they feel they need to improve and increase food productions.

According to Steinar Kvale, "In the social sciences, qualitative interviews are now increasingly employed as a research method in their own rights, with an expanding methodological literature on how to carry out interview research (page 11, of the same book of qualitative research Interviews (Brinkmann 2009).

In relation to my field work research study, qualitative interviews helped me in dealing with farmers' quality learning outcome in their practices then quantity reasons. My objective is to engage large number of farmers to adopt multi-cropping system to be able to improve and increase food productions.

From the Steinar Kvale (in his book) and Svend Brinkman learning the craft of qualitative Research Interviews (page 133), the role of the "Why", "What" and "How" questions differ in the case of research questions and Interviews questions (Brinkmann 2009).

This is because;

"Why" question focuses on the reason for concerns by the researchers.

"What" question deals with clear picture of what is going to be done by the researcher.

"How" question focuses on what kind of methodology and approach the researcher is going to carry out during his/her interview process with the participants.

2.12. Some Theoretical concept from Paulo Freire on Pedagogy of the Oppressed.

In the banking concept of education, knowledge is a gift bestowed by those who consider themselves knowledgeable up on those whom they consider to know nothing (page 53)(FREIRE 1921 -1977).

In agricultural extension concept, receiving productive information about farm products that enable farmers improve and increase production is regarded as beneficial/ productive extension package. Increase in crops yields by the farmers has a lot of advantages to the farmers.

.As individual or people, by fighting for restoration of their humanity they will be attempting the restoration of true generosity (page 27th)(FREIRE 1921 -1977).

This concept goes back to the time of colonization when the world super powers were colonizing Africa or other continents. In South Sudan, people from the South were marginalized and did not have any freedom as citizens of the country and their interested are not always consulted for decision making. But now a day they restored their freedom from Northern Sudan and are enjoying individually or as a group of people with full right in their country.

The oppressed, having internalized the image of the oppressor and adopted his guidelines are fearful of freedom (page 29th) (FREIRE 1921 -1977).

In the South Sudan context, they suffer a lot for many decades from old Sudan regimes and every time, people were being illegally killed by the securities without accountabilities. When they South Sudan received her independent last year in 2011, all people are now not living in fear any more. Because of having their freedom, they rejected the old Sudan image and replaced with autonomous and responsibilities of their own.

The struggle to be more fully human should already be begun in the authentic struggle to transform the situation (FREIRE 1921 -1977).

Although local people have been oppressed and ignored by old Sudan government system for many decades, the people of South Sudan finally managed to receive their freedom and transformed their country in to present time.

The oppression in the past also affected and contributed in worsening the relation between the two countries now a day between them. Generally, the more the oppressors dominate on the oppressed, the more the conflict would become when the oppressed come to power and resumption of conflict is often imminent at any time. This experience is true across the globe be it local or international relation.

Educators and politicians always speak and not easily understood by local people (page 77th)(FREIRE 1921 -1977).

In my views, it is because their language is not attuned to the concrete situation of the local people they address. Sometime politicians speak lies, and that not all what they told the community that they are going to implement, but only some. After they are elected or delegated, they usually tend to be abided /motivated by self-interests than the community ones. During the campaign process, they pretend as if they were going to fulfil their promises, but later on, they change their mind not achieve all their promises they told the publics in the first place.

2.13. Some Theoretical concepts from David Kolb on Experiential Learning.

According to David Kolb in his book titled ' ' Experiences as a sources of learning and development ' ' (page 26th)Experiential Learning is conceived as the process, not in terms of outcome(A.KOLB 1984

).In relation to my field work concept, my action research project focused on the qualitative process done by the farmers and satisfactory they are about the adopting of multi-cropping system/practices. It has a long vision to fully achieve high productions on how the farmers could effectively make use of it to bring a significant and sustainable change in farmers' productions.

A four stages of cyclical theory of learning , Kolb's experiential learning theory, is a holistic perspective that combines experiences, perception, cognition and behaviour (David A. Kolb 1939), But building up on earlier work by John Dewey and Kurt Levin, American Educational theory, Kolb believes that(in page 38)' ' Learning is the process whereby knowledge is created through transformation of experiences (Kolb 1984).

In my views, this mean that transfer of agricultural knowledge (information about multi-cropping system) to rural farmers' areas from Oslo and Akershus University College, means transformation of knowledgeable experiences to farmers in South Sudan. Thus, this is a knowledge creation for farmers (the beneficiaries) and facilitative researcher himself (I) in this case.

The theory below presents you cyclical models of learning, consisting of four stages as shown below.

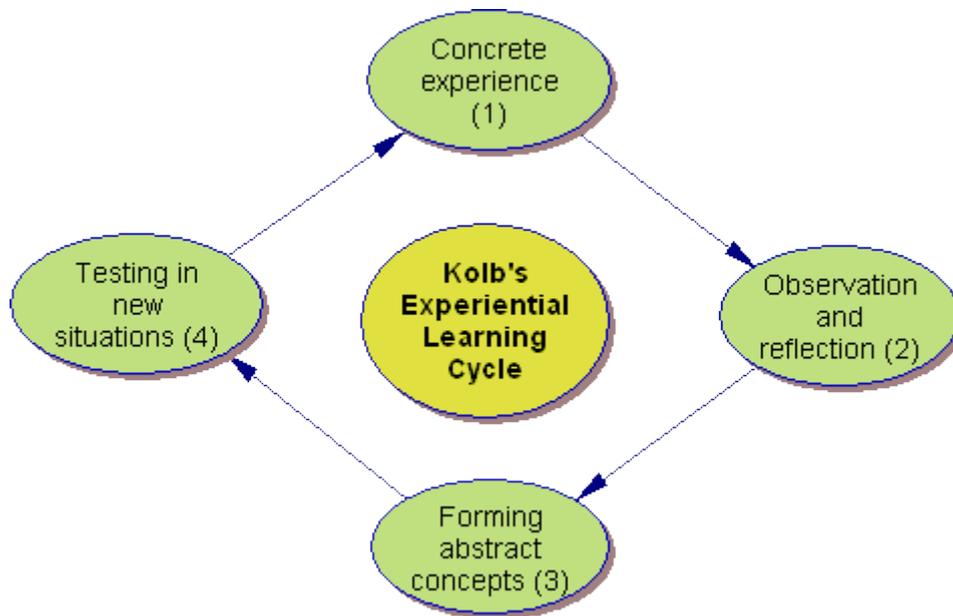


Figure 4. Kolb Experiential Learning Cycle.

Relating the idea from the above diagram in to my action research project during my fieldwork and research, first of all, we had to sit down around the table with the farmers, sharing knowledge and experiences to have a common concrete /understanding of the situations they were facing.

Secondly, we had to observe the real situation and reflect on it jointly, and put the ideas/opinions down of what could it mean and how could such situation be solved.

Thirdly, the formation of theoretical or abstract on idea / opinions into practical practices, and writing for further actions was done.

The Forth step focuses on practical exercises and finally evaluation of the overall steps and activities done throughout learning exercises.

2.14. Some theoretical Concepts from Dewey.

According to Dewey and Kolb, "learning" is a dialectic process integrating experience and concepts, observations, and action (page 22nd. (A.KOLB 1984

)In any research field work process, without integrations and shares of experiences between the researcher and participants and among participants, the research could not be researchable and successful. In conducting the research process, the communication should always be a two ways interactions, not unidirectional process to achieve a significant and fundamental result in one's research project.

2.15. Some Theoretical Concepts from Piaget on Learning.

According to Piaget and also supported by Dewey and Kolb, The key to Learning lies in the mutual interactions of the process of accommodation of concepts or schemas to experience in world and the process of assimilation of events and experience from world into existing concepts and schemas.

This means that without recalling/accommodating and reflections from one's past experiences into present learning process, effective learning could not take place. Thus, there could be no professional knowledge and skilful experience taking place. Strong culture from local people also helped me during my field work to conduct my research more collaboratively.

2.16. How Culture of Local People helped me during my Research Process.

It helped me in terms of cooperation. For example, when there is a new idea/information in their community, their local chiefs, local authorities, farmer's representatives, school teachers and the farmers themselves come together, cooperate and welcome the idea or reject it. This gave me an opportunity to meet them in groups and in a consultative way before conducting my interviews in July last year.

Participation in the community socio-economic activities by all local authorities, farmers' representative, NPA, I and other stakeholders allow for good interaction and experience sharing.

Due to cultural traditions, visitors are to take part in community events or team work that was carried out by the farmers in physical exercises. For example, one time I participated in the community socio-cultural activities, carrying a wooden boat/rowing boat from river to land side so as to be repaired on land and used for local transport of their goods/commodities from rural to town (Malakal). During this process, farmers felt very happy about me, saying that, they did not expect me to participate in carrying the boat from the river to the dry land. Due to their cultural and traditional norms, they had wanted me to isolate myself as a boss, but never the less, I involved myself and participated practically in the exercise. The reason is because I decided to work with them in a participatory way.

Their Culture also played a greater role in bringing group solidarity, team building for common goal and cooperation among the group members and with the facilitative researcher (i.e. me).

See the figure below showing how I and farmers participated in the community social activities.



Figure 5. My participation in Socio-cultural activity.

3. RESEARCH METHODOLOGY.

3.1. Introduction.

In this chapter, I tried to learn more about various aspects of different topics that took place during action research project process and implementation. These are:

3.2. Research Design and Philosophy.

The research design or philosophy is a belief about the way in which data about phenomenon should be gathered, analysed and used. The term epistemology (what is known to be true) as opposed to doxology (what is believed to be true) encompasses to various philosophies of research approach.

3.3. Positivism.

Positivism believes that reality is stable and can be observed and described from an objective view point (Levin, 1988) i.e. without interfering with the phenomena being studied. It is most often deal with forecasting future in scientific research.

3.4. Interpretivism.

The interpretivists contend that only through the subjective interpretations of and intervention in reality can that reality be fully understood. The study of natural phenomena in their environment is a key to interpretivist philosophy, together with acknowledgement of scientist cannot avoid affecting that phenomenon they study. It is one of the common forms of action research in interpreting the meaning of situations or phenomenon under study/investigations.

3.5. Discussion and Rational for Choice of Approach.

Both research tradition start in classical Greek time with Plato and Aristotle on the (Positivist) on the one hand and the sophist (anti-positivist) on the other hand. After long, dark period in Europe Scientific thought, the renaissance of the discipline came in sixteen and seventeen century. Since that time, well known positivist have included; Bacon, Descartes, Mill, Durkel Russel and Poppel in their considerations.

On the opposing side we have Kant, Hegel, Marx, Preud, Polanyi and Kuhn (Hirschheim, 1985)

3.6. Research Strategies.

A large number of research methodologies have been modified Galliers (1991) for example listening fourteen, while Alavi and Carlson (1992) reported in Pervan (1994b) and use hierarchical taxonomy with three levels with eighteen categories.

In the table below, I justified the choice of our methodologies and explain how they both operate and interoperate in most research process.

3.7. Taxonomy of Research Methodology.

Scientific/positivist		Interpretivist/anti-positivist	
Laboratory experiment		Subjective/Argumentative	
Field experiment		Reviews	
Survey	✓	Action Research	✓
Case study	✓	Case study	✓
Theorem proof		Descriptive/Interpretive	
Forecasting		Future Research	
Simulation		Role/Game playing	

Figure 6. Taxonomy of Research of Methodology.

3.8. Ethical Issue/ Ramifications.

Ramification means development or consequence growing out of, and sometimes complicating a problem, plan or statement.

Ethical Issue / problem.

This mean talking about problems and how people explore problem, lay questions and interpret its meaning based on the context of the topic under discussions.

3.81. Validity of Data.

It refers to the quality, strength or believability of information/data collected during the research process about mono-cropping and multi-cropping system/practices.

There are several types of validity that contributed to the overall validity the studies. The two main dimensions are internal and external validity.

- A. **Internal validity.** Concerned with the degree of certainty that are observe effect in an experiment are actually the result of experimental instrument or condition (the cause), rather than intervening, extraneous or confounding variables.

Internal validity is enhanced by increasing these other variables, but this is not the case in this action research, which is carried out in field working area. It is mostly applicable for laboratory research and experiments.

- B. **External validity.** Is concerned with degree to which research finding can be applied to the real world, beyond the controlled setting of the research. This is the issue of generality.

Attempts to increase internal validity are likely to reduce external validity as the study is conducted in a manner that is increasingly unlike the real world.

3.8.2. Reliability of Data.

It means yielding the same or compatible result. In other words, it is a probability in which a component part, equipment or system will satisfactorily performs its function under in a properly manner.

There are many forms of reliability, all of which will have an effect on over all reliability of the instrument in data collections. It is an essential pre-requisite for validity. It is also possible to have reliable measure that is not valid; however valid measure must also be reliable.

3.8.3. Credibility of Data.

The quality or power of inspiring belief in the meaning of the research outcome based on the information gathered during the interview process about the adopting of multi-cropping system.

3.9. Solving Ethical Problems.

We tend to equate ethical decision with resolution of ethical issue through negotiations and reconciliations or political dialogue process. In South Sudan, there is a lot of tribalism among citizens. But now people started making reconciliation through communal dialogues and local leadership. It was a great experience for me to learn and experience ethical issue situations in South Sudan.

Any evaluation has human, ethical and political ramifications. Overshadowing the methodological and technical issues of identifying the most appropriate information sources and collecting credible useful information is concern about right of human subjects. Involvements of all those stakeholders and other local people with various different knowledge backgrounds also made my work easier during and after the project implementation process.

3.9. Research Survey.

During action research process, I also some time carryout research survey, on whether mono-cropping system/practice is really a problem or not. When I tried that, I found out that, mono-cropping system is really one of the major causes of low crop yield productions. So research survey is very important to obtain a thorough investigating with in short period of time. But a case study type of research is mostly carried out by government agencies for decision making about the urgent need for project planning and funding process.

3.10. Case Study.

There are a number of important articles describing the case study approach to the research referred to. Key among these is Benbasat et al (1987, pg.370) paper with its comprehensive definitions and suggestion with conduct of case research. A second paper and the one that is closer to GSS domain, is Pervan (1994b.).

The case study is considered by Benbasat et al. (1987.pg.370) to be viable for three reasons.

- It is necessary to study a phenomenon in its natural setting.
- The researcher can ask ‘How and Why’ questions’ so as to understand the nature and complexity of the process taking place.
- Research is being conducted in an area where few, if any previous study have been undertaken.

Note that, I read the case study to gain some knowledge and experience from it, but not my major concern. It is just to learn about case study during my reading while referring my work to many other types of researches such as research survey and action research (i.e. my major concern in this research).

3.11. Action Research.

The origin of action research, and the way in which action research is perceived and conducted today, are open to dispute, yet it ‘has been a distinctive form of inquiry since 19940s (Elden, Chisholm, 1993). The term ‘Action Research’ is popularly attributed to Kurt Lewin (1946) thought other authors at the same time were calling for similar action research oriented approaches to research (e.g. Collier (1945) and Corey (1953). Elden and Chisholm (1993) go on to note that, action research is changed oriented seeking to introduce change with positive social values, the key focus of the practice being on the problem and its solution.

3.13. Different between Case Study and Action Research.

Table 1. Different between case Study and Action Research.

Case Study	Action Research.
Researcher is observer	Researcher is active participant
Exploratory, explanatory/descriptive	Prescriptive and Intervening
Focus on ‘How and Why’	Additional focus on ‘How to’
May be positivist/interpretivist	Usually interpretivist

3.14. Research Model Instrument.

It deals with key areas of literatures, which are relevant to this action research report with group of participants. This type of research model, deals with the socio-psychological aspects of group process in the research implementation.

3.15. Research Facilitation and Planning process.

In my Field work plan I used during the research process, it follows the following.

- The type of approach applied for information collection for action (Methodology Applied).
- How farmers were organized for dialogue and group discussions to collect data/information for action.
- What I did before conducting interviews.
- Reason for Applying group dialogues and discussions during the process.
- How data were collected.
- How farmers responded to the approach applied.
- Farmers' learning as pedagogical concepts.
- Data Interpretation/analysis.
- Other reason for using dialogues and group discussions
- Action taken as farmers requested seeds for the implementation of action research project.
- Language used during the dialogue and group interviews process of the research.
- And many other interesting and important topics and sub-topics in this Thesis report.

3.12. My Strategy Field Work Plan.

This is the field work plan I was following after my first plan got changed. The change in my first work plan came as a result of change in my first research area of operation changed from Fashoda to Panyikang County, Upper Nile Region/State (in two small towns in the rural areas named Nakdiar and Doleep Payams).

The period in which this research was conducted is 6 months, starting from June to Dec.2011.

During the first month (June), I, completed all my permission process to start my research in Upper Nile. South Sudan.

In July, I conducted my group interview and dialogues process with farmers in the two payams (Nakdiar and Doleep payams).

In August, 2011, I started implementing my action research by planting multi-cropping system/practices, but only cereal crops were planted that time because it was to the right time for the vegetable crops because of too much rainfall. This may cause water logging for vegetable to survive.

In Sept.2011, I started planting vegetable crops (three months crops or warm crops) in the two payams.

In October, 2011, I conducted farmers training workshops in the two payams. About 75 farmers were trained in the area of multi-cropping system/practice.

In Nov. 2011, it was the harvesting time, the final assessments and evaluations for all farmers' performance on how to practice multi-cropping system/practices.

This was done by exposing farmers to a similar exercise on how to grow different types of crops. If he managed to grow all of the crops, he had to be graded according to how he/she performs the task under considerations.

In Dec. 2011. I completed my action research field work implementation and came back to Oslo and Akershus University.

In this Master Thesis on action research project about multi-cropping system study, two types of approaches were used during the project implementations process.

- ❖ **Structured approaches.**
- ❖ **Unstructured approaches.**

In Structured approaches, usually classified as a quantitative research. It deals with quantifications of data as its aim to achieve its objectives. This type of research approach is commonly carried out in the laboratory statistically, and therefore it is not much emphasized in this research project process.

But in Unstructured approaches, it focuses on a qualitative research, in which this action research is all about. Qualitative approach is applied for qualitative research with focus groups of participants / respondents. Accordingly to Kothari, this approach allows more flexibilities in all aspects of research process and appropriate method to overcome most fieldwork challenges the researcher might encounter during the process(Kothari 1985).

That is my major significant reason why I applied this approach during my action research project process. In the first place, I was in dilemma on which approach to use to cover 75 farmers in the two Payams. In other words, counting of farmers on a head to head was not my intention.

After several options/attempts of dilemma on which method I should be using, I finally decided to choose unstructured approach (Qualitative approach) through group dialogues. I did this because I was aiming at qualitative outcome of action research project result from the farmers, not quantities. Which means that I was focusing on how large number the farmers could accept and adopt multi-cropping system/practices in the two communities. Before conducting my action research process, I followed some stages before starting the process of interviews.

4. PRACTICAL METHODOLOGY APPLIED DURING THE PROCESS.

4.1. Introduction

Before reaching farmers' community, I had to make sure that I'm in contact with NPA staff, farmers' representatives, and local government staff and farmers themselves through communication before starting the Dialogues, Discussion and interview process with farmers.

4.2. The Procedures Followed During farmers' sample selection process.

The procedures I followed were;

- A. Consultative meeting with local chiefs.
- B. Consultative meeting with farmers' representatives.
- C. Meeting with the selected sample of farmers for group interview process (through group dialogues).
- D. Group dialogue and Interview process started through discussions with farmers.

(A). Consultative meeting with local chiefs.

Firstly, I greeted them both in Arabic and their local language (Shiluk language). I said to them in their local language that ‘‘ Yi Shiw?’’. Which mean, good morning (though I had my language interpreter near me) and other stakeholders' staff members (such as MAF staff, NPA staff and World Vision staff). During that time, they smiled and laughed at me for knowing how to greet them in Shiluk language. They were very impressed and interested in listening to me

After greeting process, I introduced to them the idea of multi-cropping system and carefully explain the concept of it, so that they can try it out whether it is a good idea or not, and to grow multiple crops if they find it vital and useful to adopt. After our meeting with local chiefs, they accepted the idea of multi-cropping system. After acceptance, they delegated one of their community members to direct me/us and introduce us/me again to farmers' representatives so as to meet farmers at last.

(B). Consultative Meeting with farmers' Representatives.

In this stage, I greeted them again in their local language and smiled again like what their local chiefs did during my consultative meeting with them because of greeting and speaking in Shiluk language.

After finishing greeting process, I introduced them my intention about the idea of adopting multi-cropping system/practices. We started the discussion process and finally accepted the idea and told me to give them some few hours to discuss this idea with their fellow farmers and inform them about the idea, on whether they have to accept it or not.

When they finished discussion with their fellow farmers, they informed us (stakeholders' staffs and I) and gave us feedback. They told us they have accepted the idea, but also suggested that, not all farmers will be involved in the interview process. They

asked/suggested that, we had to deal with only five selected sample of farmers. They argued that it should be done by using group dialogues and discussions as a group interviews. They agreed we had to discuss the idea with their representatives because they knew that their representatives will represent their group interests and problems. And so, I welcomed their ideas and go ahead with it as they requested.

(C). Meeting with the selected sample of farmers for group interview process (through group dialogues).

In this stage, I first asked them about the method to use, whether they like individual interviews or group dialogues in the action research process of interviews.

The farmers' response on the method applied.

The second stage during this time is that, farmers suggested that, it should be difficult to cover all the 75 farmers in the two payams by using individual interviews, and have therefore agreed to use group dialogues than individual interviews. Since I wanted to be democratic to them, I had no choice than to follow what the farmers need, and all agreed to go for group dialogues and interviews.

(D) Group dialogues Started (through discussions) for interview and how farmers were organized.

There were 75 farmers (50 farmers in Nakdiar and 25 farmers in Doleep Payams respectively) in the two payams.

In Nakdiar Payam, there are 50 farmers. These 50 farmers were sub-divided into five big groups of farmers. These five groups agreed to select only two member/farmers from each group to attend group dialogues and interviews with me to make 10 farmers. I sub-divided them into another two groups of five members to have dialogue with. During this process I first read out the question and then discuss with them. After finishing discussion, we went to the next question.

And also note that, we got to the next question in the guideline interview questions only when the first question is clear and agreed by all farmers and stakeholders involved in the interview process. After the dialogues and discussions, they accepted the idea of adopting multi-cropping system/practice, but they finally asked me difficult question.

The question was the issue of seeds for implementing the idea of multi-cropping system/practices. They asked me,

“Where are we going to obtain seeds to implement the idea of multi-cropping system/practices?”

(b) My response to the issue of seeds requisition by the farmers.

My response was the following:

1. I asked them to mobilize their local existing resources (farming tools) and to contribute some money from their pockets to purchase some seeds as in groups. E.g. the farmers managed to contribute 500 SSP for seed purchases.
2. Reporting and begging for funds and seeds from the Ministry of Agriculture and Forestry in Malakal, Upper Nile State.
3. Reporting and begging for funds and seeds from NPA (Norwegian People's Aid) office in Malakal. E.g. it Contributed 1,500 SSP for seed purchases.
4. My personal Contribution. E.g. I, Contributed 600 SSP for seeds purchases.
5. Professor Johan Houge Thiis, contributed \$100 which is equivalent to 400 SSP.

In summing up all these funds from those funding sources, we (the farmers, stakeholders involved) collected 3,000 SSP to buy only vegetable seeds because the farmers already have cereal seeds locally. Having guaranteed the funds, we purchased the following vegetable seeds so as to implement the idea of multi-cropping system.

- Tomato
- Okra
- Egg-plant
- Tobacco
- Guava
- Cucumber
- Water Mellon
- Cassava
- Green pepper.

These crops are also known as warm crops which usually grow ripen in three months' time. After this time, I planned for the right plantation time to plant these vegetable crop varieties. But it was not possible to plant them in July and August, 2011 why because they do not grow well in too much rainy season to survive. Then we had to wait until Sept., 2011 (a warm month to grow them and survive in it)

According to Jack (Whitehead March 9, 2009)' 'How do I improve what I'm doing?' in his action research book educational context and also by McNiff, J. (1989). He also says, it is an explanation for an individual's educational development through the dialectic of action research with the participants on how it should be done.

Similarly, in my action research project, I was using a 'Qualitative approach' through dialogues, group discussion with farmers' focus groups in the two Payams (Nakdiar and Doleep), Upper Nile State South Sudan.

My reason for Applying Group dialogues and Discussion during the Interview Process.

The reason for using group methods of approaches, dialogues, discussions and involving in the action research project process is to have a good interactive and participatory approach. I also had wanted to have a concrete joint problem identifications, shared experiences and develop problem solving knowledge and skills with the farmers and all stakeholders involved

in the process. This was also as cited by Thomas Gordon (pg.244, 2003) that, "two heads are better than one".

This means that gathering opinions from community elders, farmers, teachers, parents, chiefs, local authorities to cooperate and solve problem, helped me positively during my action research project. The joint analysis was carried so as to help the farmers identify and choose better choice of productions, and to help them judge the idea in terms of knowledge and benefits outcome of the project.

Another reason why I was using group discussion and dialogues is that, the crucial ingredient in sustainable social change is dialogues as cited by Patricia Wilson and Varun (pg.41,(A.WILSON 2005). He says, the result of the group reflection and learning as well as the personal transformation happens through dialogues.

4.3. How Data were collected.

a. The Primary data/ Information collections.

First primary data were collected from local chiefs during Consultative (joint meetings) meeting with the relevant authorities, local chiefs, staff from NPA, World vision and other local stakeholders. The idea was to obtain their views and opinions in the two Payams. These were Primary methods of information/ data collections.

Second primary data were gathered directly from farmers' representatives and farmer members themselves.

See the fig. below showing sample of dialogue and group interviews during the real process.



Figure 7. Group dialogues and interview process

b. Secondary data/ Information collections.

Secondary source of information were collected from the National Ministry of agriculture and Forestry-Juba, Republic of South Sudan. But the challenge is that most of the literatures were destroyed during the civil war between North and South Sudan. And so, there was no relevant document to access. Some of the documents that I found were generally focusing on mono-cropping system, and not very specific, not even related to my research topic on multi-cropping system.

Some sources were also collected from the State/Regional Ministry of agriculture and Forestry, Upper Nile State-Malakal.

In Upper Nile, there was no specific document about multi-cropping system. Secondary Information was collected from;

From (NPA) Norwegian People' Aid in the National level and in Upper Nile state-Malakal. NPA was the only organization which is currently giving awareness for farmers about modern agricultural system, but yet not introducing multi-cropping system. The work of NPA is to support farmers to realize their weakness and develop their agricultural knowledge so as to be able to improve and increase their crop productions systems.

From other NGOs, such as World Vision, NGOs, deals with the educational sectors in the two Payams and giving support to teachers and students. It provides them with educational facilities. But for me, it was the Ministry of agriculture and forestry that provide me with all the support I need besides NPA office in Malakal.

Local records from farmers' focus group (local record book kept by financial secretary) in the two Payam, but it only contains information of sorghum and maize prices earned in 2010 by the farmers groups.

4.4. Data Analysis and Interpretations.

After the completion of data gatherings, a joint data analysis was carried out by all the parties involved during the action research project interviews process. The involved stakeholders (parties) were; NPA staff, MAF staff, farmers' representatives, farmers themselves and I, took part in the data about the idea of adopting multi-cropping systems.

What was the major cause of the problem in the previous crop production practices?

We found that the previous practice was based on traditional practices (dominated by multi-cropping practices). And so it was the major cause of low yields of crop productions for most farmers. But in this action research project, the farmers were interested to adopt the new technology/idea of multi-cropping system to be able to improve and increase food productions.

We also tried to discuss on How was the previous practice was done and the different between the two practice?

The focus of the analysis was based on whether the idea of action research of multi-cropping could be beneficial to them or not.

Given the fact that the idea of adopt multi-cropping practices was new to farmers, the stakeholders, farmers and I also accepted and found it vital and significant to adopt.

This was realized during and after the harvest of what they planted in 2011 after implementing the idea of multi-cropping system/practice became successful. Example, they have managed to harvest more products from Tomatoes, okra, tobacco, guava, cucumber egg-plant, maize, sorghum. The farmers' representatives, the farmers themselves and local chiefs in their communities were very happy and expressed much more contents about the idea of adopting multi-cropping system/practice.

They reflected from their local existing knowledge (their indigenous knowledge they have from before) and added to the new innovation (idea of multi-cropping system). Such idea was also cited by Bjerknæs et al (2002), "The most important element in the learning is what you know from before and which demand action and reflections".

Their (farmers) indigenous knowledge contributed a lot and helped in decision making and taking action on it by inducing the new idea of multi-cropping system/practices. After data analysis, we (farmers, staffs and I) found it that there is a great deal of need to change farmers' practices/attitudes from local (mono-cropping) to modern agricultural practices (multi-cropping system/practices).

4.5. Technique for Enhancing the Credibility and Quality of Data Analysis.

Although many rigorous techniques exist for increasing the quality of data collected, the heart of much controversy about qualitative finding, are doubt about the nature of analysis.

Statistical analysis follow some formulas and rules, while, at the core qualitative analysis, is a creative process depending on the insights and conceptual capability of the analyst.

4.6. Understanding of Reliability and Validity in Qualitative Research.

The use of Reliability and Validity are common in Quantitative Research and now it is reconsidered in Qualitative Research Paradigm. Since Reliability and Validity are rooted in positive perspective, then they should be redefined for their use in naturalistic approach. Like reliability and validity as used in quantitative research are providing springboard to examine what these two terms mean in the qualitative research paradigm, triangulations as used in quantitative research to test the reliability and validity can also illuminate to test some ways or maximize reliability and validity of a qualitative study, which is the main focus of this research.

Therefore, Reliability, Validity and triangulation, if they are relevant research concepts, particularly from qualitative point of views, have to be redefined in order to reflect multiple ways of establishing truth.

4.7. Language Used during the Communication Process.

The following four local languages were used during my action research and communication process in the two payams of Nakdiar and Doleep, Panyikang County.

Arabic language was used and there was no need of translator since me and the people I worked with knew the language.

Shiluk local language. With this was a need for a translator to convey the message to the participants during the interviews, dialogue and discussion and also inform me of the participants' responses.

Dinka language. There was also a need for translator for me as well.

Nuer local language. There was no need of translator for me because I knew this language very well since it is my local language.

4.8. Planting Time.

4.9. Field Observations and Planting Process.

According to JAMES McKER NAN, 'observation' is the fundamental basis of educational research and action research requires rigorous and systematic methods for data collection (NAN 1996).

This means that without any joint observations with people (in my case in presence of NPA staff, MAF staff, local Gov. staff, farmers' representatives and farmers themselves on how the idea could be implemented and earn something better out of it), was impossible to make it more effective.

He also added that (in page 63), participant observation is the practices of doing research by joining in the life of social groups or institutions that is being researched (NAN 1996). That is one of the main reasons of whatever I did during my field work was to first make sure I had to contact and involve all my stakeholders, participants (farmers). These were the NPA staff, MAF staff, local Gov. Staffs among others. The reason during this time is to have common understanding of what solution to give to the local existing situation/ problem at hands based on a particular topic of concerns and team observations.

The plantation for cereal crops [maize and sorghum], was done in August but for vegetable crops, was carried out late on Sept. 26th, 2011 because of too much rainy season that delayed the process of on-time plantations in the two payams (Nakdiar and Doleep).

4.10. Planting process.

The farmers had started planting vegetable crops from Sept and harvested in Nov. 2011. They had planted three months (warm crops) crops such as;

Tomato, Okra, water melon, green pepper, tobacco, egg-plant, cucumber, cassava and Guava.

After two months and half later, farmers requested for on-farm training workshop on multi-cropping system/practices.

On October 17th, 2011, we started conducting training workshop for farmers. Staffs from NPA, MAF and I involved and participated in farmers' training workshop. But I was the main facilitator of that workshop because the training workshop topics of concerns about multi-cropping system/practices were prepared by me.

4.11. Materials Used during the implementation process.

Gumboot. Gumboot was the main shoes used by all participants so as to be able to walk in a muddy black cotton soil in South Sudan and Upper Nile State in particular.

Hand tools. These tools were used for cutting and digging process on the demonstration garden /farm.

Mosquito net was used by all participants and guests who travelled from far distant to attend training workshop in another locations to protect from mosquito bites.

Water pump. Water pump was used for generating water from river source to the demonstration gardens during planting time and irrigation practices whenever the rainfall is absent.

Stationeries. Used by the farmers' representative, NPA staff, local government staff and I for taking note during the meeting and discussions.

Rowing boat. Rowing boat was also used for crossing the river to visit farmers at the side of the corridor, and also as a mean of transportation of goods and farm produces from farming areas to Malakal local market (town).

Tractor. Tractor was used as a meant of transport, especially by NPA officer and I whenever there is no transport of going to and from field work (In Nakdiar and Doleep payams).

Camera. Camera was used for photo graphing during the implementation process for gathering the evidence

Farmers' focus group centre. It was a centre used for meetings and discussions before going for practical field works.

Tap measure. Tap measure was used for measuring the size of land under cultivation for the groups and for individual's practices. The group farm size was 600 ha by 750 ha (for cereal crops), while it is 0.5ha for individual farmer in the two Payam for vegetable crops varieties.

I also learn that farmers have learnt something during the process and suggested for the need to conduct on-farm training on multi-cropping systems.

4.12. An On-farm Training workshop Plan in the two Payams.

On 17/10/2011, I (together with my partners or cooperative stakeholders) conducted on-farm training on multi-cropping system for farmers in the two payams. We first began by defining the concept of agricultural extension.

Definition of Agricultural extension

The meaning of agricultural extension was also orally explained and defined to the farmers during the workshop training. It was defined that; Agricultural extension was once known as the application of scientific research and new knowledge to agricultural practices through farmer education.

The field of extension now encompasses a wider range of communication and learning activities organized for rural people by professionals from different disciplines. Extension practitioners can be found throughout the world, usually working for government agencies.

Theme of the training workshop.



Figure 8. Theme of On-farm training workshop.

Source: do-apply-reflect.gif. Or 4h.wsu.edu.

Explanations for the above diagram.

First activities focused on group interactions and experience sharing among the groups and every group member has a chance to go to the centre of the circle and demonstrate, explain and share his/her experience, knowledge and skills to the group.

After sharing his experience, knowledge and skills, the result of his/her idea had to be discussed by the group and post their observations, reactions and questions to what was said by the participant demonstrating.

The group had to carefully look at the idea, discuss their experiences, analyse and interpreted the meaning of the thought the participant was talking about, and finally make group reflections about the task/exercise.

Application of what was learnt during the process to their respective communities through better practices and to be able to generate more income for the families.

Practical experience development through’’ learning by doing’’ as cited by Roger S Chank as mentioned earlier in the methodological part (page 27 in this report(’ Roger C. Shank 1999).



Figure 9. Learning by doing.

www.ncsu.edu/felder-public/.../Active.pdf.

For the Nakdiar and Doleep Payams farmers focus group to practice multi-cropping system in their respective communities/payams. The goal is to improve and increase food productions for their households in a participatory way.

4.13. Women Participation in adoption of Multi-cropping system in an On-farm Training workshop.

This training was conducted on Oct. 17th, 2011 in Nakdiar and 18th, 2011 in Doleep payams. Women played a very great role in organizing and mobilizing women in their respective communities to participate in action research project implementation process. Their participation influenced significantly and motivated the whole community and sometime took part in project activities and applied it on their own individual farms.

Reason for Training workshop?

The reason for training the farmers is that, farmers were demanding for more training, despite of the fact that they were shown during the interviews process. They told me they need to be trained again about multi-cropping system to gain more knowledge and skills for their future income and benefits in the long run.

To be able to interact, share their knowledge, skills and experiences with each other about what he/she has learnt among the groups.

4.14. Women s' action as part of a Participatory Action Research.

Their action as part of the research was that, they were able to put the idea of multi-cropping system practically like male farmers. I purposely encouraged them to participate in an action research project in participatory way and work by their hands (theory to practices, as said by Roger, learning by doing to gain more knowledge and skills).

According to James Doyle (PP130, 1995) in his book of measuring the effect of system thinking intervention on mental models, In many systems of thinking interventions, clients are taught a new way of thinking about their mental models, such as the hexagon method or causal-loop diagram.

I also experienced and applied the same way of thinking when I was conducting my training work shop with farmers in the two Payams. This was conducted by approaching them in a group of six or five farmers (especially during occurrence of absenteeism from farmers' members) and telling demonstrating to them how to apply new method of multi-cropping system/practices on their farms practically on the demonstration gardens.

Both the male and female farmers were encouraged to willingly participate in the training and demonstration exercise in the demonstration garden farm. This demonstration farm is located along the Sobat River bank in Upper Nile State /Region coming from Ethiopia from the East of Malakal. At the beginning of the action project process, some farmers were feeling confused about the multi-cropping system and how it could be implemented of the practically on the farmers. But when we (the farmers, NPA staff, other stake holders participated in

demonstration/ exercise) while doing it by hands, they found it interesting and useful and therefore began to get motivated and inspired.

Below group photo graph was taken during the on-farm training in Nakdiar to showing the women commitment and level of participation in action research project implementation process. The women participation was higher than men during the process as you can see and observe here.



Figure 10. Women's' participations in multi-cropping training workshop.



Figure 11. Women participations in demonstration garden.

The Purpose of an On-farm Training workshop about multi-cropping systems.

1. To practice and promote multi-cropping system in Nakdiar and Doleep Payams.
2. To learn how to mobilize and organize local existing resources and to make a professional farm fragmentations.
3. To create more awareness for the farmers about the modern agricultural extension methods and system.
4. To learn about the meaning and importance of multi-cropping system through a participatory approaches.
5. To provide the farmers with the basic knowledge and skills of multi-cropping system/practice. To learn the advantage and disadvantage mono-cropping system and the advantage and disadvantage of multi-cropping systems /practices as well.
6. To create an opportunity for the farmers to learn how to identify and grow different types of crops on the demonstration garden practically.
7. In my opinion in practical field work experience, I believed that practice can provide a man with more professional basic knowledge and skills.

Note that, I experienced this situation practically when I was working with farmers by doing it with our hands in the two Payams (Upper Nile, South Sudan), as also said by Roger (‘ Roger C. Shank 1999).

I observed the impression while the farmers were performing physical tasks in growing multi-crops practically. That is how I knew it, based on my observation and experiences while I was on the demonstration garden doing practical exercise with them. During this time I also learnt that farmers knew:

How to make land fragmentation and growing of different types of crops in raw according to the recommended spacing between crops grown on the farm as modern agricultural extension recommended spacing and rowing. For example, 75cm by 30cm for cereals and 60cm by 40cm for vegetable crops.

The farmers were also expected to learn how to organise one's own farm based on the recommended modern agricultural extension methods of land fragmentation system.

They had also learnt about soil types, colour, soil erosion and soil conservations through group identification of different types of soil colour, textures.

The common soil in both of the two payams was black cotton soil and to some extent a loam and silt soil in Nakdiar Payam than Doleep Payam.

To be able to identify which crops are; disease and drought resistant crops , how to control pest , insects, nematodes by applying some repulsive insecticides and nematocysts, fertilizer applications, which crops that can grow and getting ready in two to three months old to be harvested, such as tomatoes, Okra, cucumber, eggplant, green pepper, water Mellon, etc.

Farmers' learning on Pedagogical Concept and Learning Style.

Learning is a holistic complex process involving cognitive, affective and social elements (Bjerknes, 2002). Farmer centre learning and approach was also used during the dialogue and discussion process. The idea of farmer centred approach was adopted from the concept of student centred learning approach I had learnt last year during lecture from John Dewey's idea. In Dewey's book of democracy in education, students are expected to take own initiative /roles in learning process after getting the concept from the teacher's knowledge.

This concept was put to their attention so as to be included in their on-farm-training work conducted in October, 2011 where the farmer were expected to demonstrate what they learn theoretically to practices by their hands.

According to Selva (Abraham 1997), in order to achieve economic independence and self-management, they must be provided with appropriate education and training including management training for their local community leaders

For this reason, I believe that if this idea is properly/effectively adopted and implemented by farmers, they will be able to improve and increase food productions for their families. They could also be able to send their children to school as they continue applying the idea of multi-cropping practices in their respective communities in the time to come.

4.15. Types of vegetable crops requested by farmers for an 'On-farm training workshop.

The following crops types have been mixed /used in the demonstration garden as examples for the idea of the adoption of multi-cropping practices. They also demanded and required some of the seeds for the implementations of the idea so that they should try the idea of multi-cropping system whether it could be successful or not.

These seeds were used during the exercise to practically demonstrate the idea of multi-cropping system. Such idea was applied in order for farmers to gain more knowledge and skills in multi-cropping system and 'doing it by their hands'' as said by Roger C.Schank.,'' learning by doing' so as to create more professional skills and experience in learning by doing things by hands and also supported by Tamara, R. Berman, Kimberly and Mackpherson (PP.161, (' Roger C. Shank 1999).

This means that when aiming at developing more professional knowledge and skill, one has to learn by doing thing by his/her all senses of organs in the working process so as to achieve more knowledge, skills and experiences.

What I thought about conducting the training workshop.

I thought it was a good idea to training farmers on multi-cropping systems because the farmers requested for it and interested in it.

There were also some concepts which they did not learn during the beginning process of action research project implementation that they requested to learn in training work shop. Such concepts were farmers' centred learning as pedagogical concepts and knowledge, advantage and disadvantage of multi-cropping system/practice, and also many other related modern agricultural extension knowledge and methods of crop productions practices.

What the farmers thought about the training workshop.

Since farmers were interested in the idea of adopting of multi-cropping system during the interviews process, they found it vital and useful to have some training conducted. This was the main reason /experiences or motivations for farmers to demand for more experiences and skill training on multi-cropping system practically.

Each farmer/participant had to participate in demonstration exercise practically and improve his/her knowledge and understanding of multi-cropping practices. This is because it was a new concept to lean about multi-cropping system/ practices in their areas and every farmer felt interested and wanted to try it out whether it could be successful or not.

Having earlier accepted the idea of adopting multi-cropping system/practice by the farmers during the interviews process, they also demanded for more training despite of what they learnt earlier. The farmers also request for more improved seeds for training workshop and carry out the demonstration exercise. So, it was based on farmers 'request and interest to practice multi-cropping system. This was carried out on the demonstration garden and I had to show them how to make land fragmentation (dividing one's land into a square shape and grow each crop in that square piece of land).

During the training workshop, pedagogical concepts such as:

Farmers focus group centre learning has been be used/ emphasized. During that time, the practical exercise /concept was paid more attentions for the tasks under taking during the training and this was demonstrated practically.

Farmer's indigenous knowledge, experiences and skills will be emphasized in learning.

Farmer to farmer exchange experiences and learning was also emphasized as well, on the demonstration garden through the roles play models.

The farmers respond it by asking me some questions on how to show it (the idea of this research) practically and also share their own indigenous knowledge, skills and experiences. They did this by asking each other and shares of one's his/her experiences with the group members in front of the audiences/farmers.

The interpretation of the concept was that, I had to explain how the idea can be implemented practically using role play model. I had to show them how the exercise can be performed practically in front of them (the farmers and invited stakeholders).

The table below show how farmers fragmentised their lands according to modern agricultural extension land fragmentation system.

Explanation of the meaning of the table.

Each crop plant was grown in that square space it is placed on this table (assume that this is the fragmented farm land for plantation of different multi-cropping system with the intention of intensifications (i.e. more products on small piece of land in each square plot of land).

INTEGRATED POLY-CULTURE FARMING - MODEL

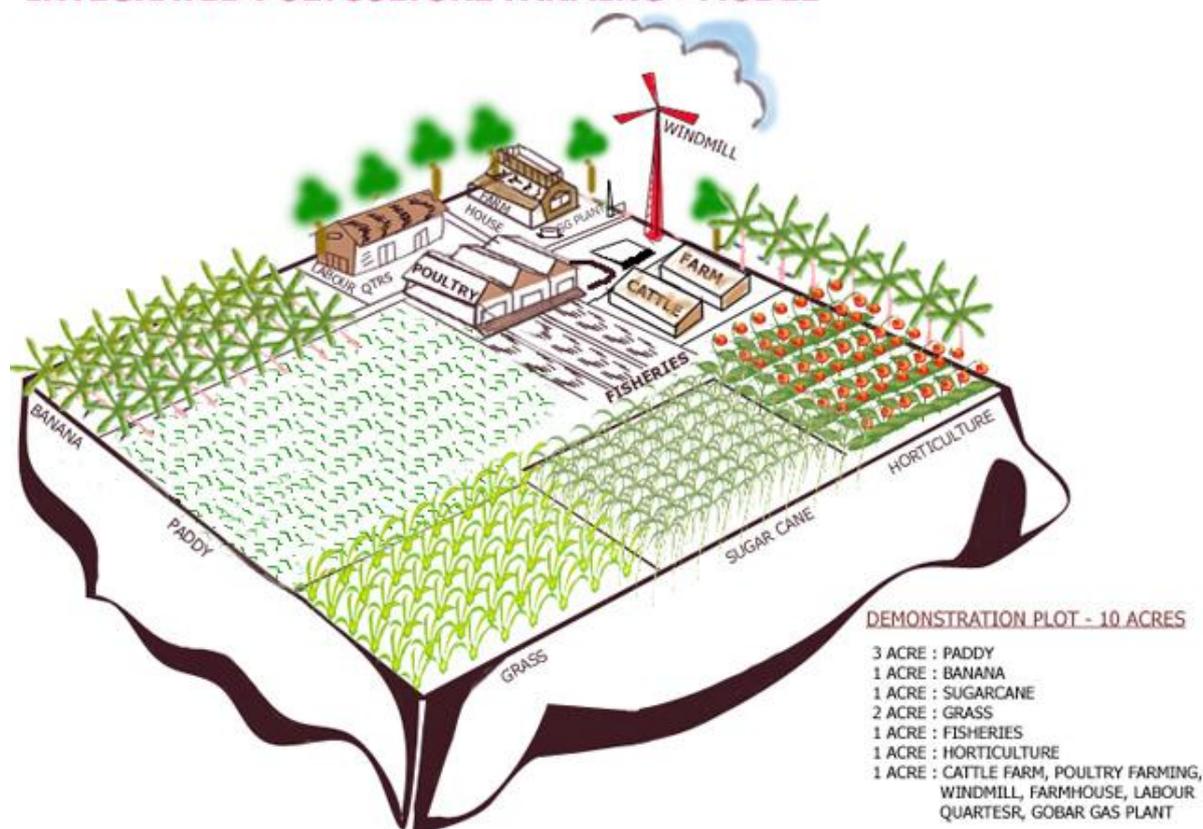


Figure 12. Integrated poly-culture farm

This table was adopted and used as an example from: blog.agriculture.ph.

Table 2. Multi-cropping variety

Cassava production	Potato production	Okra production	Tomato production	Water Mellon production
Red Onion production	White onion production	Green Mellon production	Eggplant production	Kale production
Green Mellon production	Lemon production	Tobacco production	Maize production	Eggplant production
Green pepper production	Apple production	Kale production	Bean production	Pumpkin production
Maize	Eggplant	Cotton	Pea production	Fine apple

production	production	production		production.
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The same example as shown from the diagram before the table .Each crop plant was grown in that square space it is placed on this table (assume that this is the fragmented farm land for plantation of different multi-cropping system with the intention of intensifications(i.e. more products on small piece of land on each square).

4.16. My Role as a Facilitative Researcher.

Before implementing my idea of multi-cropping system as my action research project, and to achieve my objectives and goal through a better strategic planning , I had kept in mind the idea in the structure below and making sure that I had contacted the Government local authority in the two payams of Nakdiar and Doleep, NPA office (Norwegian People’s Aid in Upper Nile), and other stakeholders in the two payams to participate in the action research project implementations to achieve a better result.

According to James K. Doyle, ‘the current facilitation method for studying mental models is not primarily designed to measure mental model, but to improve them (Pg. 389)’. He pointed out that as soon as the facilitator becomes involved in the measurement process in the community of the local people, and as soon as the members of the group begins to share her/his idea and experience and assumptions, the mental model of the group members may be begins to change(James K. Doyle 1995).

This means that, when the idea is new to the group, it seems difficult for farmers for the first time to adopt the practices, but through time they learn it. Their understandings broaden and improve, and so their knowledge and skills improves as well. Thus, this raises the aspiration of farmers and their confidences in doing practical exercises.

Beginning with the process that immediately starts to change farmers, participants or client’s mental model does not allow the effectiveness of the intervention to be determined, since no pre intervention data are collected page 129 (JAMES K. DOYLE 1995).

Similarly, I wanted the farmers not to discourage their previous knowledge or indigenous practices of mono-cropping system they had, but to convince them and tried to give them technical advice on the new idea.

They have the right to decide whether it is important for them or not. And also whether they are willing to try out new idea of multi-cropping system or not. The major reason behind this is to improve their crop yields and increase food productions in their Payams or communities.

My other role that I also played during my field work.

-As a facilitative researcher for the farmer’s learning and awareness on multi-cropping systems in Nakdiar and Doleep Payams.

-Responsible for farmer’s learning and awareness in Nakdiar and Doleep Payams in the area of multi-cropping system.

- Responsible for an on-farm farmers training in Nakdiar and Doleep payams to learn the advantage of multi-cropping systems over mono-cropping systems.
- Responsible for the observing, understanding, solving farmers' problem during the learning and training sessions.
- Responsible for raising and reporting farmers' problems, demands on seeds provision to NPA and the Ministry of agriculture and forestry –Malakal.
- Encouraged an effective democratic participations and building of a bottom-up approaches with all working partners organizations in this action research project.
- Respect for the values, cultures, norms, religions, and etc., of the farmers and the community.
- To be willing to commit and contribute through my value in the community. For example, I and Professor Johan Houge Thiis contributed 1000 SSP [Johan contributed \$100 which is equivalent to 400 SSP in Malakal and I contributed 600 SSP to buy some vegetable seeds for the farmer and add to what the NPA had provided to buy seeds.
- The seeds requested for such practices are Tomatoes, okra, cucumber, green pepper, guava, cassava, kale, tobacco and maize so as to carry out an on-farm multi-cropping system by the farmers. This was conducted on the demonstration garden by the participants. Every farmer was expected to apply what he learnt from this action research project to his/her farm.
- They followed the use of modern agricultural extension recommended spacing. such spacing were ; 60cm by 40 cm in rows and between crops respectively for vegetable crop plants, while 75cm by30cm spacing for cereal crops, such as maize and sorghum crop variety respectively.

4.17. The Roles of Farmers during Action Research Project.

Willingness to accept and encouraging a participatory action research on multi-cropping systems in their community.

-Ability to contribute organises, mobilise and use their local existing resources necessary for the action research project implementations about multi cropping system.

-Ability to apply good attitudes and co operations towards group team work and learning.

-Respect for each other and build good relationships with the researcher and the entire community.

-Building of strong democratic farmer focus groups in their organizations and the communities as well.

-Sharing of their experiences, challenges, indigenous knowledge, and skills among themselves, with the researcher, other stakeholders and other working/operating organizations in their communities.

-To create awareness and sensitise their communities about the impact of multi-cropping systems

-To be able to contribute and buy seeds on their own if they are to take advantage of the research and continue practising it for their future benefits as they all agreed to continue with this idea of multi-cropping systems.

Table 3. Comparison between Mono-cropping and Multi-cropping system.

Advantages of multi-cropping system	Disadvantages of multi-cropping system.	Remarks
<ul style="list-style-type: none"> • Because of high planting density weeds are suppressed. • With multiple cropping the risk of total loss from drought, pests and diseases is reduced. Some of the crops can survive and produce a yield. • It gives maximum production from small plots. This can help farmers cope with land shortages. • Including legumes in the cropping pattern helps maintain soil fertility by fixing nitrogen in the soil. • Different types of crops can be produced, thereby providing a balanced diet for the family. • Different seasonal crops can be planted. • For example, crops that require a lot of water can be grown in the wet season, intercropped with drought-resistant crops that can be harvested in the following dry season. 	<ul style="list-style-type: none"> • Because of year-long crop some pests can shift from one crop to another. • The large number of different crops in the field makes it difficult to weed. • New technologies such as row planting, modern weeding tools and improved varieties may be difficult to introduce. 	<p>Based on these experiences, I learnt that, the advantage part of multi-cropping system is more than the disadvantageous part.</p> <p>As a result, such study was recommended and adopted for farmers' practices in Upper Nile (Nakdiar and Doleep payams) in particular or Southern Sudan in general.</p>

4.19. The Disadvantage and Advantage of Mono-cropping system.

The Disadvantage of Mono-cropping system.

1. Insect infestations.

Insect infestations can easily destroy the whole crops varieties planted in a single pattern. The reason is that, if it is mixed with other crops, some crops could survive and serve the farmer from going hungry. But if only one type of crop is planted and got affected by insect outbreak or infestation, the farmer would suffer and his /her life could be difficult for him to survive and serve his/her family because the whole farm product have been destroyed by insect infestations.

2. Disease outbreak.

Disease outbreak can also cause loss of crop varieties because if it is not disease resistant crop, it can be severely be affected, but if it is mixed with other crops, some of the crops could survived the disease and produce something for the farmer and his/her family.

3. Effect of ‘Soil acidity or alkalinity’.

Some crops are sensitive to acidic or basic soil to survive. If the farmer grew only one type of crop, and the crop is sensitive to survive in either acidic or alkaline soil, it will likely have to die and there could be no food/product for the farmer to harvest and feed his/her family. Thus, this is also a disadvantage of mono-cropping system (system of growing only one type of crop on the farm/plot of land without mixing it with other crops to earn more income from the farm).

This means that, if crops were mixed on his/her farm during planting time, some of the crops should have been survived in either acidity or alkalinity soil. For these reasons, since the crops are sensitive to survive in either acidity or alkalinity, nothing to be harvested and the farmer could suffer and his/her family might go hungry. For this reason, I decided to encourage farmers to adopt multi-cropping system/practice instead of mono one because of the above mentioned reasons.

4. Effect of fungi and nematode.

The two effects can also affect mono-cropping system in the same way like in the above. But some crops can survive the fungi or nematodes if they were mixed with different crops during plantation period.

But if only one crop is grown and affected by either fungi or nematode, it would die and the farmer could fail to produce food for his/her family and the farmers may suffer. That is why I approached the farmers in my action research project to adopt multi-cropping system in the two Payams (Nakdiar and Doleep) instead of encouraging them to practice mono-cropping system/ practice.

4.20. The Advantage of Mono-cropping systems.

The advantage of mono-cropping system is very less compared to its disadvantageous part. Mono-cropping system is mostly only for consumptions by most farmers in South Sudan. They accept such practice only when there is a special demand from a particular customer. Otherwise commercial values are less. Customers always demand and prefer multi-types of crops (they need more vegetables than cereal crops). This is common in rural areas in South Sudan.

The major reason is that, they are still following traditional way of farming system(mono-cropping system).They have less experiences and idea about modern agricultural extension system. But in modern farming systems, farmers are expected to mix and grow different types of crops on their farms to earn more profits and incomes for their families and be able to send their children to school. Their survival and income based of agricultural produces. This concept is known as banking way of life in agricultural extension knowledge and experiences.

4.16. Summary of Chapter Four.

This chapter deals with the practical methodology part of the research. It talked about how the sample of the farmers was selected for group interviews during research process and what procedures were followed to reach a final interview process.

Advantage and disadvantage of multi-cropping system/practice including that of mono-cropping system are also considered in this chapter.

The effect of acidity, alkalinity or nematodes, are also discussed here in this chapter.

Plantation time, train workshop, my role and the role of farmers were also considered in this chapter four.

5. MAJOR LIMITATIONS ENCOUNTERED DURING THE RESEARCH PROCESS.

5.1. Introduction.

This chapter deal with the major limitations and challenges encountered during action research process. It begins to emphasise and narrate these challenges and limitations encountered starting from permission how the process of obtaining permission letter from relevant authorities to the final evaluation of action research project implementation. Here, I will begin with the Limitations/challenges related to bureaucracy.

5.2. Limitation/ Challenges Related to Bureaucracy.

Difficulty in getting permission letter from the office.

My eagerness in getting permission letter had been delayed on the table by the boss in charge without taking action on it.

Example, I reached Juba on May 31st and started the process of applications to get my permission letter so as to proceed to Upper Nile, where I supposed to conduct my action research project. I was expecting to obtain my permission letter by June 5th, 2011, but it took me a month to receive it. I waited and waited patiently and received my permission letter on June 28th, 2011 and proceeded to Upper Nile Region (where to conduct my action research project).

Lack of smooth communication between boss and me.

The reason is that, the officer who was in charge to solve my problem of getting permission letter to Upper Nile Region, didn't used to feel good whenever I asked him for daily updates and follow up on progress of my case of obtaining permission letter from his office.

Absenteeism from the office by the boss.

Most bosses used to absent themselves from government without keeping the promises he/she gave to the customer. This had also affected me during my process of getting permission letter. My boss used to tell me to come in the following day, but whenever I show up in the next he asked me to come to his office, might not be there for two to three days, even some time a week away from the office. It was a very difficult experience for me and had wasted a lot of my time I planned to proceed to Upper Nile, Malakal.

Use of the language with boss.

Comparing the approaches I used to receive from my professors here at Hiak (Univ.) and that of my boss in South Sudan. At Hiak (Univ.) my professors used to approach me in a very friendly and respectful manner as their student who can produce something good for the country, but in South Sudan, they used to approach me in the opposite manners and I'm their son.

I used to ask myself why the boss was approaching me in a roughly manner?

No body answered me, but I realized that, it was a sign of bureaucracy and this should change in the near future. I will contribute in changing this mood of communication between boss and the society together with my colleagues and other students from other universities in the world. To avert this problem, we have try our best by giving them awareness on how to give a polite approaches with any govern officials in charge of ant office, being boss or participants/customers.

5.3. Limitation/ Challenges Related to Insecurity.

Since April, 2010 general election that was held as a result of 2005 Comprehensive Peace Agreement (CPA) between South Sudan and Khartoum Government, South Sudan has been suffering from another rebel factions. These faction groups are George Athor, who lost the gubernatorial election in Jonglei State to his rival Kuol Manyang Juuk, saying the vote was rigged by SPLM- the current ruling party. Uliny rebel leader was also creating insecurity in Upper Nile Region, Gatluak Gai in Unit (Bentiu) State /Region and Yyaw in Eastern Equatoria Sate, and many other minor rebels in the regions.

And other reason is that In Upper Nile, an on-foot movement from Payam to Payam and from County to County was very difficult for people because of insecurity. People were fearing of rebel attacks, kidnapping, abductions and looting of peoples' properties on the way while in the forest.

Secondly, the tribal conflict between Nakdiar Payam and Baliet County, which is located east of Nakdiar, 20km away from Nakdiar, was a challenge. The inhabitants of this County (Baliet) are Dinka tribe. They wanted Nakdiar Payam to be under their jurisdiction/control, however Nakdiar Payam are Shiluk tribe, and don't want to. Rather they wanted to be under the jurisdiction of Panyikang County under Shiluk kingdom leadership. In November 2010, the Baliet County has been using force on Nakdiar Payam people to be under their control, and as a result, this led to a war between Baliet and Nakdiar neighbours that caused life of more than 30 people from Nakdiar side and 13 people from the attackers, the Baliet people.

For this reason, there is still a conflict between Baliet and Nakdiar people and therefore it was difficult to move around and at night between the two payams, causing a very bad relationship between the two communities.

This relationship also made people to live in fear of attacks and I, also used to fear whenever I was living in the field in Nakdiar Payam from such attack. And I was so thankful to God for completing my action research project safely without the occurrences of such attacks again while being there.

5.4. Limitations/ Challenges related to transportations.

The issue of separation of Sudan caused a lot of problems of concern from the government. The issuance of road -block of the transport of fuel by Northern Sudan government to South Sudan, brought about fuel and other commodities prices inflations in the local markets. This inflation problem in the fuel prices in the market has also caused rise in ticket prices for all passengers travelling to different locations in the country. This is always expensive for me whenever I decided to travel to rural areas (the Nakdiar and Doleep Payams) as I planned.

It (the challenges in transportations) was a challenge to my research in that, it used to affect my field trip plans to rural areas/two payams. During that time, the best way to solve such problem is to firstly secure the availability of boat travelling to rural areas and also I had to book myself beforehand.

Going to field working from the main town of Malakal to farmers' area was a challenge to me because of two reasons;

The first one is because of too much rainfall whenever I was going for field work. There were no land transports to r research area of operation because the road was too muddy to go to Nakdiar and Doleep Payams.

Secondly, I used to travel by boat as the best mean of transport to Nakdiar and Doleep payams, but the challenge is that, on-time availability of the boat for me to travel to the field is still a problem. Getting of boat is very rare to get an on time boat in going to Nakdiar and Doleep Payam research area as I urgently want it to be on time to travel as I planned.

Coming back from the field (Nakdiar and Doleep) to Malakal town, was also a challenge because of the scarcity in the availability of the boat back to Malakal town.

The best way to avert such challenge was to use phone calls to Nasir County from the east of Nakdiar and Doleep Payams, whether there might be a boat coming or not to go back to town (Malakal).

5.5. Limitations/ Challenges related to Communications.

My first planned research location in Upper Nile has been changed when I reached Malakal. This is because I was not informed about how far the distant between Panyikang (the County in which this research was carried out under its administrative jurisdictions) and Fashoda County from the main town (Malakal). But I finally choose to conduct my action research project in Nakdiar and Doleep Payams (under Panyikang County administrations) because of the distance and the easy accessibilities to visit farm locations where I planned to be operating as soon as possible compared to Fashoda County.

The Internet communication problem in Southern Sudan, causes the slowness or on and off communication system and interruptions of internet connectivity. This has affected the smooth communication in general with the colleagues and my supervisors to send my report on time. It also contributed in waste of time and affecting other activities that I am supposed to do that day.

E.g. Lack of enough access to electricity.

There was no enough power sources/supplies power at night completely where I was living in rural area with farmers. Sometime even when I am in Malakal, there was no electricity completely as well.

b. Problem of computer charger.

My computer charger was unable to conduct power to the computer. This happened after heavy uses and accessibility of power supplies from different power sources. E.g. Source can be big, small, medium and public electricity, and this is because all these power suppliers provide different power voltages. As a result, such different voltages harmed and blocked the computer charger. The solution to my computer charger problem was for me to borrow a charger from my colleague who came from Khartoum. I took his charger and gave him some money to purchase for himself in Khartoum because the type of my computer charger was not locally available in Malakal.

During my field work, I also purchased a zain modem (an internet device that can enable me to access internet connection, but with monthly subscription fee).

The monthly subscription fee for zain modem was very expensive (costs about 150 SSP). This sometime helped me to access internet while in rural areas. When the monthly subscription fee got finished, my activities could definitely be interrupted, and so I had to depend on my short note book exercise to keep my daily log records.

Because of scarcity in transportation problems in coming back from rural areas, I used to travel back to town by using a tractor. It was not possible for other cars/minibus to travel on land to and from rural areas because the road was too muddy. This was a very great challenge to me during my field work in Upper Nile South Sudan.

5.6. Limitations/ Challenges related to funding.

Difficulties in getting vegetable seeds for the farmers to practices the idea of multi-cropping system in the two payams was a big challenge during the research process.

The proposed vegetable budget seed to effectively implement the idea of adopting multi-cropping system in the year 2011 is 34, 044SSP. But there was no source of funds to fund this action research project

What I did to avert this problem is that, I told the farmers to try to organize and mobilize resources from their local existing resources in their communities. And also asked NPA, professor Johan and I, to contribute and finally managed to contribute some money to be able to purchase seeds to implement the idea of adopting multi-cropping system/practices. And then implement the idea, and they (the farmers) had to see the advantages and disadvantages of multi-cropping systems after project implementation process.

The fund provided for conducting this action research project, was not enough. Difficulties in getting my school fee from DNB bank account (from Norway) to Southern Sudan KCB bank account in Malakal (South Sudan).

5.7. Limitations/ Challenges related to Accommodations in Rural Area (in the two Payams).

Accommodations in the rural area were very difficult because of poor quality materials the house is made from (made from unorganized hay grasses). During my first time of field trip to Nakdiar and Doleep Payams, we/I slept in a mosquito net which was not properly washed to remove the mosquito repulsive chemical to repel mosquito around the net. This chemical was excessively put, caused a lot of pain/eye etching problem in the eyes of all passengers who were renting and sleeping in that rented house including myself.

It was a must for all of us (We all the passengers) to sleep in that house because we had no choice to go and sleep outside apart from the provided rented house because of insecurity around that area (In Khorpuluth the home land of rebel leader). This was unforgettable and was a remarkable experience for me throughout my action research project process and implementations.

The only way to overcome such challenge was to make myself tolerant and flexible to field work challenges.

5.8. Summary of chapter five.

This chapter deals with major challenges encountered during research process.

The first challenge encountered was the problem of bureaucracy system in South Sudan in obtaining permission letter to cooperate and work with farmers in rural community.

Then, the other challenges ranging from insecurity, communications, transportation and accommodations encountered during the research process.

6. EVALUATION OF THE RESEARCH PROCESS.

6.1. Introduction.

6.2. Evaluation of farmers' knowledge and skills in multi-cropping system/practices.

Before conducting the evaluation, I tried to first understand the term evaluation itself by defining it.

According to Louis Cohen, Lawrence Manion and Keith Marrison in their book titled 'Research methods in education' (page 50), 'Evaluation' is defined as provision of information about specified issues upon which judgements are based and from which decisions for action are taken (LOUIS COHEN 2011).

In relation to my purpose of making evaluation, I had wanted to find out whether farmers could manage to adopt multi-cropping system/practice or not. And also to know whether there is a significant improvement and increases in farmers' production or not after implementing the project and the way forward.

The kind of evaluation I was using is based on Critical –Reflective and Evaluative Research Methods known as 'Triangulation Methods'.

What is Triangulation?

Triangulation is perceived as an advocacy of combinations of research methodologies (i.e. Qualitative and Quantitative evaluations based on the evaluator/facilitator's preference to find an answer to what he/she wants to evaluate the participant for).

For example, participant observations is seen as combining of direct observations (joint observations) and assessments in evaluation process or interviews on final implementation phase of an action research project (NAN 1996).

During my evaluation process, I had to make sure I involved farmers, all invited stakeholders and I to participate in the final evaluation process.

This concept of Idea of making evaluation while involving, others was very significant to me and it is one of my major reasons to conduct a joint evaluation exercises with other parties/stakeholders. During my final action research project evaluation process, I involved my partners such as; NPA staff, Gov. Staff, local Gov. Staff and the farmers themselves in the evaluation process to be more effective, qualitative and timely.

We carried out joint effective observations, and farmers had to perform some practical exercise to show that they are able to grow different types of crops they are to grow. They were expected to grow a particular crop skill fully and with confidence so that the team making the evaluation could observe that, farmer had learnt something and showed improvement in his/her knowledge and skills.

There are no rights or wrong methods of data collection for evaluation, but the goal is to obtain trustworthy, authentic and credible evidences that will be used to judge the quality outcome of research result/finding, as cited by 'Ellen Taylor. Powel (PP.6.(Powel 1996).)

When choosing this method, I thought of:

- a. The purpose of the evaluation. Which method seems most appropriate for my purpose and the evaluation questions I wanted to answer?

E.g. my purpose is for farmers to adopt multi-cropping system so as to adopt modern agricultural knowledge and skills.

- b. What have the beneficiaries learnt from this research approach and method of production?

E.g. they have received on-farm training workshop, learnt how to grow different types of crops practically in front of all farmers, stakeholders and I during evaluation and assessment process about farmers' performance (knowledge and skills).

After the farmer completed the physical tasks, I and invited stakeholders took part in evaluation process. We graded farmers as "Excellent" "Very good" "good" and poor for last scorer's performances.

6.3. Two ways of social scientific methodologies applied during the evaluations process (SSM).

- Quantitative Evaluation.
- Qualitative Evaluation.

A. Quantitative method of data Evaluations.

The Quantitative part of this research report was not that much important in the context of this action research project, rather, it focuses on qualitative aspects of it.

The reason is that, action research project is dealing with the qualitative outcome of the project, not quantity. And rather deals with how much the satisfaction the farmers feel about the idea behind this action research project.

It was interestingly noted that, there were over 45 farmers in Nakdiar out of 50 and, and over 20 out of 25 farmers in Doleep Payams who had accepted the idea of multi-cropping practices. I trained them on multi-cropping system/practice so as to be alert on modern agricultural extension method and system. During this time, since the figure showed that since majority welcomed the idea, it means it was a satisfactory approach to farmers. It is also a qualitative outcome and a good expectation from farmers and me in this action research project. (You will learn more about the result of this action research project in the result part of this report in chapter six).

B. Qualitative evaluation data.

According to Micheal Quinn Patton [PP.8, (Kothari 1985)1987], the validity and reliability of qualitative data depends to a greater extent on the methodological, training, knowledge and skills of the evaluators for quality outcome of learning from the participants.

This means that evaluating of participant performance need a well-qualified evaluator or facilitator of the project/program. It needs more carefulness and does not need biases with participants. Therefore should be done fairly to obtain a qualitative result of participant's exact performance.

During the evaluation process of this action research project, Level of farmers' performance on practical exercise is indicated by grades of scores a 'tick ' based on the join observations done by the NPA staff, Local officers and I.

In the table, you will observe the sample of farmers selected for the practices so as to perform some practical exercise and how they were graded by the team (Invited stakeholders and I) during evaluation of farmers process on how to grow different crop varieties in the farm(in a fragmented farm).

Nakdiar Famers' sample selected for evaluation exercises on how to grow different types of crops practically as a multi-cropping practices.

See the table below.

Table 4. Evaluation of farmers' performance in Nakdiar payam

farmer	Types of crop variety for practical ex.	Good	Very good	Excellent
A.	Tomato, okra, guava, cucumber, maize, sorghum. Cassava, etc.			✓
B.	„			✓
C.	„		✓	

D.	”			✓
E.	”			✓
F.	”			✓
G.	”			✓
H.	”		✓	
I.	”			✓
J.	”			✓
K.	”	✓		

You can easily understand from the table above that, out of ten farmers samples selected for evaluation, only one farmer was scoring ‘good’, two farmers scored ‘very good’ and 7 farmers out of ten scored ‘excellent’ results. ‘**a tick**’ Means the level of grade scored by the farmers after subjecting all of them to similar exercises on how to grow different types of crops (the crops used for this examples are indicated in the tables in the two Payams).

Doleep Payam farmers’ sample selected for evaluation exercise on how to grow different types of crops practically [Multi-cropping practices].

See the table below.

Table 5. Evaluation of farmers' performance in Doleep payam

Farmer	Crop variety	Good	Very good	Excellent
A.	Tomato, okra, guava, cucumber, maize, sorghum. Cassava, etc.			✓
B.	”			✓
C.	”			✓
D.	”		✓	

E	”	✓		
F.	”			✓
G.	”	✓		
H.	”			✓
I.	”			✓
J.	”			✓
K.	”		✓	

You can easily understand from the table above that, out of ten farmers samples, two farmer was scoring” good”, two scored ‘very good’ and 6 farmers out of ten scored excellent results. ‘**a tick**’ Means the level scored by the farmers after exposing all of them to similar exercise is very good and excellent result.

Whose perspective the Evaluation can be seen and observed?

Most data collections methods can be seen from one of the two perspectives.

- a. Initiators (e.g. during the final evaluation process, I was the initiator, together with local officers, one MAF (Min. of Agri. and Forestry) staff and NPA officer in Malakal).
- b. The respondents (i.e. the participants/ farmers) were also observing and evaluation the process by their eyes on each other’s performance during the exercise process. It can easily be seen by all people present in the event on how a selected farmer performs the task given to him on the crops provided to carry out the tasks.

6.4. Collecting Evaluation Data (by Ellen Taylor-Powel, Sara Steele).

According to Ellen Taylor (PP.01 1996) and (NAN 1996), before you start any data collection process for evaluation, ask yourself about what information, what you are investigating to find out and why you are doing so.

Similarly, during evaluation process, I was investigating whether farmers have really learnt something from this action research project on multi-cropping system/practice or not. To know this, I had to expose them to similar practical exercises to grow different types crops varieties and every farmer had to perform the task in front of all audiences and his exercise can be observed by everyone present in that demonstration garden.

The reason for and why assigning such criteria is to acknowledge their performance and skills in practicing multi-cropping system in a correct way I trained them in.

What is the purpose of evaluation?

This means that while evaluating farmers, the answer is to know the performance and knowledge of the farmers about multi-cropping system and practices. The aim is to realize their knowledge and experiences from before and after action research project implementation process.

Who will use the information and how?

In this action research project, the information is needed and used by the farmers, the whole community so as to change their perspectives on mono-cropping to multi-cropping system/practices. On the other hand, the NPA and MAF office in Upper Nile and I interested in it for future planning and decision making for further actions about the farmers' practices.

How the farmers use the information?

They use the information directly or indirectly for making their choices on what types of farming system should benefit them and earn more incomes, and also be able to send their children to school.

Example, the farmers have harvested more crops in the years 2011 than in 2010. Each farmer's group obtained 1,000 SGD to 2,000 SDG in 2010, but in the year 2011 when I asked them to try to adopt multi-cropping system/practices, most farmers groups earned a lot of produces. They earned approximately between 8,000 SSP to 10,000 SPP in the year of 2011.

What do I [they/we] want to know in the evaluation?

We wanted to know whether farmers are interested to continue practicing multi-cropping system or not so as to witness their experiences.

Secondly is to note whether there is a remarkable improvement and increases in their farmer productions or not. And also to note the difference between the crop yields from previous year and current productions (i.e. comparing the amount earned in 2010 and 2011, high or low).

I did it by asking the farmers to show me what they earned from previous year (2010) in their local finance record materials and discuss it in relation to current productions (whether low or high).

6.5. Sources of Evaluation Information Data.

They told me they do not have a proper record, but we recorded them in a local exercise book being kept by their local finance officer. Then I told them that you can give it to me and record down the information in it so that we can compare with the current productions you earned in 2011.

They give it to me and made comparisons between the two physical years (2010 and 2011) and noted the difference between the two years' production figures. During this time, I found that in 2010, the farmers' groups earned in between 1,000 SDG to 2,000 SDG. In 2011 after

harvesting their multiple crops, transported them to Malakal local market and sold them, they have managed to earn amount of 8,000 SSP to 11,000 SSP (in South Sudanese Pounds).

According to him (Taylor, 1996) on the same scenario, a variety of information source exist from which you have together your evaluative data. In a major program evaluation, you may need more than one sources of information. The information source you select will depend up on what is available (previous information).

The most common source of evaluative information falls into three.

- ❖ Existing Information (from before)
- ❖ The people (for now)
- ❖ Pictorial (photographs) records for evidences and Observations made during the process.

6.6. The existing Information.

Before starting to collect data, we check carefully and see what information is ready available and which not.

We described how the evaluation was carried out and how it reached the final steps. And also use project documents, logs, reading books, minutes from meetings, reports, etc.

6.7. Assess the results.

This was done by comparing the result of farmers' performances and also to see who are the most qualified farmers, and whether majority have skillfully done the tasks successfully or not by their hands on the demonstration farm/gardens.

6.8. The people.

People are the most common sources of information for evaluations (as cited by Ellen Taylor, PP.2, 1996).They provide information about the need for the program, its implementations and its outcomes. They do this by their actions, by volunteering comments and testimony, by taking knowledge and skills test responding to their questions.

According to him (the Ellen Taylor on the same page.2. 1996) said, in extension, we often turn to program participants as the main sources of evaluative information.

Many times, participants are the best sources of information, but there may also be other sources better equipped to provide the information we seek. For example, farmers, local chiefs, teachers and parents might be able to report changes in the youth problem solving skills better than the young people themselves.

6.9. Participants /Beneficiaries.

Farmers /participants are those benefiting directly or indirectly from the Action Research project/program (the farmers and other local community members).

A. Identification of participants and their invitations.

In my opinion or may be to any other researcher, identification of one's own participants, is very important and should be the first step to keep in mind.

Secondly, identify relevant problem in that community with the help of the community local leaders and other stakeholders (NGOs, MAF, NPA and World Vision).

B. Inviting the research farmers in focus.

According to Greenwood, 'when a researcher judges that suitable group of people who have been identified, invitations must be made. He also says, the best way to do this, is to combine the invitation and interviews during the process (pg. 165, (Greenwood 1998).

C. Non-Participants.

None participants are those who are proponents and critics to the program implemented.

D. Key Informants.

Anyone who has a particular knowledge about the program and how it should benefits participants. For example, farmers, NGOs, gov't, teachers, parents, religious leaders some time take part in the community development activities.

E. Pictorial records and Observations.

The third major sources of evaluation information is through visual accounts-pictures, photographs and video tapes or direct observations.

According to Michael Quinn Patton (PP.7, 1987), qualitative evaluation data begins as raw, descriptive information about program and the people in programs.

This means that, as an evaluator, I had to visit the project/ program to make firsthand observations of program activities. Sometime even engaging personally in those activities as 'participants observers.' In this action research project, the evaluators/team (such as NPA staff, local government officers and I) discussed with participants and other none project staff about their experiences and perceptions.

The data from those interviews, observations, and documents are then reorganized into major themes of categories to realize the achievement of objectives in this action research project. It also provides an opportunity to plan for further action and predictions about future practices and productions that the farmers will produce if they continued with such practices.

I also asked them about what benefited them in the action research, and the different between previous and current productions. How it benefited them and why it is important to them.

The answers they gave me is that, it was beneficial to them because in 2010, each farmers group produced only from 1,000 to 2,000 SDG (when they were practicing only mono-cropping system on maize or sorghum).

Meanwhile in the year 2011, when they a chance to adopt and practices of multi-cropping system as an action research project, each farmers group earned from 8, 000 to 10,000 SSP in the two Payams (Nakdiar and Doleep).

They were also willing to continue multi-cropping practices on their farms because they had seen the outcome that it was beneficial. The indicators were because of harvesting maize, sorghum, tomato, okra, guava, cucumber, green peffer and tobacco and transported them to local market in Malakal.

Their representatives told me that they earned a lot of money in 2011. When I asked them, they told the reason is because the imported goods and commodities which were always brought from Khartoum were blocked by Khartoum government. And therefore, all people in Malakal (Capital city of Upper Nile) depended on local products produced by these local farmers.

The assessment/ final evaluation of this action research project was done based on what the farmers focus groups were trained on during the training workshop conducted in October 2011. The training work shop was conducted as an ‘on-farm training workshop’ , and this took place on October 17th, this year, 2011. It focused on multi-cropping system/practice, where farmers learnt the advantage and disadvantage of multi-cropping system/practices.

The assessment was also evaluating farmers based on the ability to plant and grow multi-crops with a professional agricultural extension recommended methods of spacing, practically by their hands.

For instant, the recommended spacing for cereal crops used during October training workshop was 70 by 30 cm between crops and 65 to 45cm between rows.

While in vegetable crops, the recommended spacing between crops and rows were 65cm in between rows and 40cm between crops (except climbing vegetable crops of 60cm to 50 cm in both rows and crops respectively).

The result showed that, over 95% of farmers had shown up a very good performances and ability to perform practical exercises in planting and growing of different types of crops.

The final assessment also acknowledged the harvesting of three months crops. These are cereals (maize and sorghum) and two to three months vegetable crops are tomatoes, okra, and eggplant, Cucumber, green pepper, water Mellon, tobacco, kale, etc.

6.8. Means of Packaging Materials from farming communities to Local Market in Malakal.

Most farmers in the two Payams are very poor and live in underdeveloped area compared to main town. Majority of them were using broken gerkans as packaging materials for both storages and transporting mechanism when transporting their products to Malakal local markets.

See the local material used during the action process in Nakdiar Payam by one of the farmers' focus group member.



Figure 13. Example of packaging materials by farmers in research area.

6.9. The Successful Harvested Crops during this action research project.

During our joint effort with all participants and other cooperatives officers from relevant authorities in carrying out the final evaluation and assessment process, we regarded this action research project as a successful one.

We (all the staff involved and I) regarded this as a successful action research project. This is because, having harvested more crop yields from this year (2011) in comparison to previous years (2010), shows that it is successful project. In addition to this, is because, in 2010, each farmer's group earned 1000 to 2000 SDG in the two Payams (Nakdiar and Doleep payams). While in 2011 (the intervention time to introduce and adopt multi-cropping by thee farmers), the farmers groups' incomes increased from 8, 0000 to 11,000 SSP. And this is a sign of a significant improvement and quality achievement by each farmer's group in the two Payams.

6.12. Harvested Vegetable crop varieties (three months crops harvested).

- ❖ Tomatoes
- ❖ Okra
- ❖ Green pepper
- ❖ Cucumber
- ❖ Tobacco
- ❖ Kale

- ❖ Guava.
- ❖ Cassava



Figure 14. Okra productions during harvesting time.



Figure 15. Examples of Harvested tomato, tobacco and guava productions.

6.13. Harvested Cereals crop varieties (three months/warm crops harvested).



Figure 16. Maize and sorghum under ripening stage.

- ❖ Maize
- ❖ Sorghum.

6.9. Means of Transport for Farm produces by farmers.

Most farmers in both the two Payams were using public transport such as mini-bus and lorry to transport the farm produces/commodities to local market in Malakal. However this is very expensive for some farmers to transport their goods to Malakal and couldn't afford to pay transport tax and fee.

Those farmers, who were not able to pay long distant transport to Malakal, resorted to choose to sell their goods at their local market they have in their villages.

Still other farmers have their own private means of transport known as hand rowing boat to Malakal market, where they only had to pay small amount of tax fee to the government. Such activity of rowing boat is mostly often being done by the male famers because South Sudanese or African women are not allowed to row boat to long distance locations.

See the table below is the meant the farmers of Nakdiar and Doleep farmers use when transporting their farm produces and commodities to Malakal local Market.



Figure 17. Means of transport of produces by farmers.

6.10. The progress the Farmers made in this Action Research (in 2011).

According to Micheal Quinn Patton (Pg.8, 1987), "qualitative evaluation data may be presented alone or in combinations with quantitative data. Recent developments in the evaluation professions have led to an increase in the use of "multiple methods including the combination of qualitative and quantitative methods.

To reflect this in my work, you can see from picture in page 88 of this report, the packaging material for transport is a local broken gerkan and plastic materials.

In 2010, majority of the farmers in the two Payams (Nakdiar and Doleep), had only harvested four to five sacks/ of sorghum and maize production. When sold them in the local market, they amount from 1000 SGD to 2000 SDG. But in 2011, the amount gained from the farm produces (after adopting and implementing the idea of multi-cropping system/practices) ranged between 8000 to 11,000 SSP for the groups (Doleep and Nakdiar payams respectively).

This is a very significant progress in adopting multi-cropping system because the two evidence figures from 2010 and 2011 showed the sign of improvement in farm produces and increased food productions for farmers.

You will read more detailed prices of different communities in the result part of this report in chapter eight.

7. REFLECTIONS.

7.1. Introductions.

As early as 1933, (p.597), Dewey defined reflection as “active, persistent and careful consideration of knowledge in the light of the grounds that support it and the further conclusion to which it tends.”

This means that, careful consideration of indigenous knowledge of local people (farmers in the context of this action research) and respect for their cultural is very important for the researcher.

In this Thesis, my first reflection focused on how relevant authorities were cooperating with me before and after the action research project process taken places.

7.2 Reflection during my applying/ permission process with the relevant authorities.

According to three authors (LOUIS COHEN, LAWRENCE MANION AND KEITH MORRISON In their book titled ‘Research Methods in Education page 81’), the relevance of the principles of the informed consent becomes apparent at the initial stage of the research project- that of access to the institution or organization where the research to be conducted, and acceptance by those whose permission one needs before embarking on the task (i.e. the start of the project implementations)(LOUIS COHEN 2011).

Having this concept in my mind, I found it enables me the best opportunity (me the facilitative researcher) to present my credential as a serious investigator and develop my own ethical position with respect to the proposed action research project in the rural community with local people /farmers.

Before I received permission letters from various relevant authorities and to endorse their support for me to be able to carry out action research in the farming areas, there were a lot of challenges. After going through all those long difficult process, I managed finally to obtain the permission letter.

For this reason, I now believed that, patience and persistence is very important and it is a key to every step one wants to achieve in daily life most often. Without patience and persistence, no success in life and this was a very remarkable experience to me in that stage of my action research period.

7.3. Reflection during my communication process with farmers before reaching their communities.

It was very difficult to obtain local chiefs’ address so as to inform them about my coming to their communities. This took me about a week to collect their cell phone numbers. Some of the local chiefs don’t have cell phones, and I had to convey message through people who were going to their community and inform them about my coming. Meanwhile, preparation and informing the participants/farmers a head of time is very important for the researcher before going to conduct research interview process.

7.4. Reflection during my first field trip /journey to farmers' communities/payams.

The most unforgettable experience that I encountered during all my field trips to rural area/farmers' communities, is that the one I was travelling by boat. The boat was loaded with 278 people sitting on 250 sacks of sorghum from Malakal to Nasir County. Because of the heavy load the boat was carrying, we slept on the way before reaching Nakdiar Payam in a place named Khorpluth (the home land of rebel leader, Mr George Athor. He lost his seat on governor ship candidature during 2010 in South Sudan's first National election to his rival Kuol Manyang Juuk because of failure to secure endorsement from SPLM party.

While sleeping there, there was no good accommodations, and we had to sleep in an eye itching mosquito net, which was causing so much pain in the eyes of all of us, the passengers who were travelling in that boat. The chemical is put on the net to repel mosquito, but it was too excessively put by the owner of the resident. He was also expecting us to pay for the night. We had no choice to go and rent from outside as the area was so insecure to sleep outside the provided accommodations.

Due to the fact that there are always various field work challenges or any action research limitations, to me flexibility to accept /tolerate all the challenges is vital.

7.5. Reflections during my consultative meetings with local chiefs and farmers' representatives.

When I reached Nakdiar, I firstly tried to approach community local chiefs as written earlier in the methodology part of this Thesis, to get their support. After meeting them, when they had accepted my idea of adopting multi-cropping system/ practice, they delegated one local community member to introduce me to farmers' representatives and farmers for the plan to go ahead.

During this time, I felt that, to induce change in the rural community, you have to first start from local community leaders before carrying out and implement any thing. After acceptance, everything could be easier. But with failure to win their support, one could not make even a single step to achieve what you want to achieve and the result of doing so, could be distractive.

7.6. Reflection during my dialectical process and discussions with farmers for interviews.

During my dialogue and discussion with farmers (the selected farmers for interview focus/process by the farmers themselves), I learnt that farmers are very clever. They know very well what could benefit them and how to make strong decisions on their choices of productions/situations.

Our dialogue was participatory and interactive because they began to develop interests before we got deeply into details, appreciating the idea of multi-cropping system. They observed the impression that it was going to improve and increase their food production based on how I explained to them.

For this reason, sample groups, dialogue and discussions with people, is very important to cover large number of people with in short period and cost effective. And finally the quality outcome of the work done by the group of farmers/people is more satisfactory than the individual one. Therefore, group work or team work is very important for quality out puts in daily life.

7.7. Reflection during the Implementations of multi-cropping system/practices (i.e. planting time).

During the planting period, the process was very interesting and participatory why because farmers were happy about the anticipation on what they thought was going to be the outcome from their farm if the idea of multi-cropping system /practices is properly conducted. Different crop varieties were grown and farmers were motivated. Collaborative implementation of the idea of multi-cropping system according to the plan with farmers was very interesting and practical experiences to both farmers, stakeholders involved in the process.

According to TeekMan and Karen (in the book titled Reflection and Reflective practice in health professionals page 601), 'Reflective Thinking' is a strategy to make sense of a situation and to develop practical knowledge (Karen Mann 23 November 2007).

During my field work with farmers, I experienced that, learning by doing thing by involving all sense of organs is crucial and skilful to develop both farmers and my practical knowledge in multi-cropping system/practices. Thinking to encourage and involve all participations in action research project process, I thought was a good strategy to achieve a professional and practical knowledge in multi-cropping system/practices.

7.8. Reflection during and after an on- farm training workshop with farmers.

During on-farm workshop training, farmers' centred learning was used as a pedagogical concept from my experiences on vocational pedagogy from Oslo and Akershus University College.

In both during and after on-farm training workshop for farmers, the process was meaningful, participatory and interactive. Moreover, Learning by doing is vital as cited by Rogers (Roger C. Shank 1999).

7.9. Reflection during and after crops harvesting period.

In July, only cereal crops were planted in the first place because it was not the right time for vegetable crops to be grown because of too much rainfall. But later on, they were planted in Sept. 2011 because it a warm month for vegetable crops to survive.

For these reasons (low and high rainfall period), I experienced that it is often important for researcher to plan ahead of time on what activities should be carried out, and in which time frame for convenience research activities operations to take place effectively.

7.10. Reflection during Evaluation process of action research project after implementations.

During final evaluations process, every farmer was expected to perform physical task given to him/her on how to grow a particular crop (how to grow modern crop varieties) correctly and skilfully. Example, some crops used for demonstrating the physical tasks such as how to grow cassava, was tricky one to some farmers to grow it correctly.

I involved all the stakeholders who were cooperating and work collaboratively with me to carefully observe the exercise and participated in grading farmers based on how many crop types the farmer managed to grow knowledgeable and skilfully.

In this stage, I learnt and experienced that, learning by doing, make one to become more skilful, professional, competent and confident to what he/she is doing.

7.11. Reflection on previous and current productions

When making a comparison and analysis between 2010 and 2011 earned incomes from the farms produces made by the farmers, the evidence showed that adoption of multi-cropping system /practices in 2011 improved significantly. This improvement and increases in farmers' production implied that farmers in south Sudan were not just lazy in crop production, but it is due to the fact that they had never been exposed to modern agricultural system.

As a result, the idea of adopting multi-cropping practices over mono-cropping system provides an opportunity for farmers to modify their local knowledge and practices.

It also motivated farmers to be self-reliant from external donors and to be good decision makers on their own problem on productions. This was very important and incredible experiences for me to had a great time to work with local people in rural areas and I hope to continue living and working with them.



Figure 18. Group dialogues, discussions and final reflections.

7.12. Summary of chapter seven.

This chapter deals with the major reflections experienced during and after process of the research study. It focused more preparation about how to get permission letter from relevant authorities, how to meet research participant/farmers, the challenges encountered. It also discussed how the transportations and accommodations were challenges to the researcher (me) during my field work process and activities.

The next chapter will talk about the presentation of result of this action research project. After that, it will be the general discussion of result.

8. PRESENTATIONS OF FINDINGS AND RESEARCH RESULT.

8.1. Introductions.

The result of this action research is based on comparatives analysis and realized based on the tables shown below from previous years during the time only mono-cropping system/practices was the major practices till 2011, the time multi-cropping was adopted as a systematic approach to introduce farmers in to modern farming methods.

8.1. A. Maximum rain fall, maximum yields, Cost of production and Selling Prices of a particular crop in 2010.

Table 6. What Nakdiar farmers earned in 2010.

Cash crop	Optimum rainfall (mm/yr.)	Maximum yield (tons/ha) Or Qt. in Kg.	COST/unit In SDG	Total Amount earned
Maize	1500 mm	5 sacks	100	500SGD
Sorghum	1500 mm	10 sacks	120	1,200 SDG
Grand total				1,700 SDG

Table 7. What Doleep farmers earned in 2010.

Cash crop	Optimum rainfall (mm/yr.)	Maximum yield (tons/ha) Or Qt. in Kg.	COST/unit In SDG	Total Amount earned
Maize	1500 mm	4 sacks	100	4 00SDG
Sorghum	1500 mm	7 sacks	120	840 SDG
Grand Total				1,240SDG

8.1. B. Maximum rain fall, Maximum Yields, Cost of productions and Selling Prices for a particular crop in 2011.

Table 8. What Nakdiar farmers earned in 2011.

Cash crop	Optimum	Maximum yield	COST/unit	Total
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	rainfall (mm/yr.)	(tons/ha)	In SSP	Amount Earned.
Maize	1500 mm	6 sacks	150	900 SSP
Sorghum	1500 mm	9 sacks	250	2,250 SSP
Tomatoes	250 mm	25 gerkans	100	2,500 SSP
Egg-plant	250 mm	10 gerkans	95	950 SSP
Cassava	300 -400 mm	7 sacks	90	630 SSP
Guava	250 mm	10 gerkans	95	950 SSP
Tobacco	250 mm	7 kg	100	700 SSP
Cucumber	250 mm	10 gerkans	85	850 SSP
Okra	250 mm	20 gerkans	100	2,000 SSP
Grand total				11,730 SSP

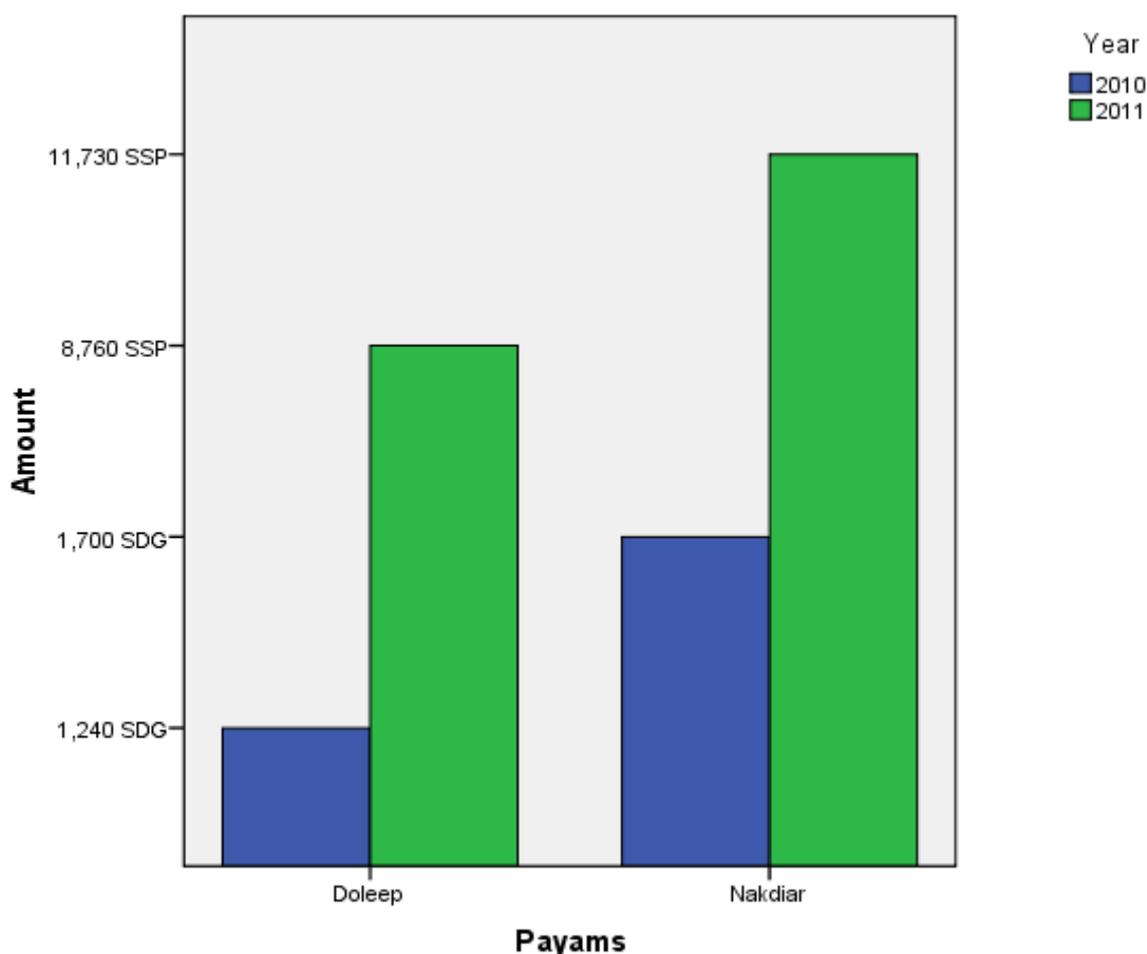
Table 9. What Doleep farmers earned in 2011.

Cash crop	Optimum rainfall (mm/yr.)	Maximum yield (tons/ha)	COST/unit In SSP	Total Amount Earned.
Maize	1500 mm	5 sacks	150 SSP	750 SSP
Sorghum	1500 mm	7 sacks	250 SSP	1,750 SSP
Tomatoes	250 mm	18 gerkans	100	1800 SSP
Egg-plant	250 mm	9 gerkans	95	225 SSP
Cassava	300 -400 mm	6 sacks	90	540 SSP
Guava	250 mm	7 sacks	95	665 SSP
Tobacco	250 mm	6 kg	100	600 SSP
Cucumber	250 mm	8 gerkans	85	680 SSP
Okra	250 mm	17 gerkans	100	1700 SSP
Grand total				8,760 SSP

In a histogram form, see the diagram below showing the amount the payams (small towns) earned in 2010 and 2011. The blue column shows what amount each Payam (Nakdiar and Doleep payams) earned in 2010. The green column shows the amount earned by each Payam in 2011 as a result of action research project intervention in 2011.

Histogram.

Table 10. Histogram showing the result between 2010 and 2011.



Looking at the above tables (from the two payams in 2010 and 2011), there are some reasons for the increases in prices of local agricultural produces and the improvement in farmers' focus groups incomes in between the two physical years.

The major reason for increases in price for farm produces in the year 2011 was due to:

Separation between North and South Sudan resulted in a blocking of imported goods and commodities by Northern Sudan to South Sudan, especially agricultural /food products. This caused a very high inflation in the prices of goods, food and general agricultural produces at the local markets in Upper Nile (Malakal) in particular and across the ten states of South Sudan in general.

In the previous years, farmers have been engaged in mono-cropping practices (growing of only single type of crop in the course of 12 months period (a year), and that was the main cause of low crop yield productivity.

In 2011, I intervened in their communities (the two payams) and facilitate for them on how they could adopt multi-cropping practices over mono-cropping system so as to improve and

increase food production for their families. They were already working in groups and whatever is done was done by the group, and whatever the income is, it was for the group, not for individual farmer (although every farmer has the right to have his private garden/farm).

This practices of adopting of multi-cropping/mixed cropping system, has benefited the farmers greatly both in terms of subsistent and commercial purpose for that year.

Someone may wonder why?

This is because the practices showed the sign of improvement and increases in production, both in terms of **quality** and **quantity**.

- **By Quality:**

The evidence for this, is that large number of farmers have accepted the idea (multi-cropping practices), and tried it by growing different types of crops on the same farm. Over **45** farmers out of **50** farmers have accepted the practices in Nakdiar and about over **20** farmers in Doleep payams out of 25 farmers accepted the idea of multi-cropping system/practice.

This (the idea of adopting multi-cropping system/practice) was the main goal of this action research project to have large number of farmers adopted the practice. This is because the more the bigger numbers of farmers adopt and successfully implemented the idea and earn more productivity, the more the poverty in their communities will be minimized by such practices.

- **By Quantity:**

The evidence is shown in the above tables (making comparisons starting from the year 2010, before adoption of multi-cropping system and 2011).

In 2010, The Nakdiar farmers' focus group earned only about **1,700 SDG**, but in 2011 after adopting multi-cropping system by the farmers, they have earned **11, 730 SSP**. The reason for the increase is because no other imported goods and farm produces from the North. And therefore, the people and whole local market in Malakal have been completely depended on the products produced by these local farmers.

Looking back in 2010, Doleep Farmers' focus groups, earned only about **1,240 SDG**. The reason for that is because farmers were growing mono-cropping system. They did not start adopting multi-cropping practices. But when they adopted multi-cropping practices in 2011, their income improved and increased from 1,240 SDG (for the old Sudan currency unit) to **8,760 SSP** (For South Sudanese Pound currency unit).

For these reasons, a maximum profits and a significant progress was made from these cash crops, especially the vegetable ones in the year 2011.

This was jointly acknowledged and noted during the final evaluations in presences of all farmers' representatives, NPA staff, MAF staff, local government staff and the farmers themselves and myself in the two Payams.

That is what this action research project has managed to achieve as the result and goal of this study in this action research project implementation process through working with farmers in Upper Nile, South Sudan in 2011.

8.2. General Discussion of Result.

What is the problem with previous production (whether high or low)?

After long discussion (by all people involved in the discussion process of research result) with all the farmers, farmers agreed that, previous productions of crop yield, was low. Then, when asking them about the reason why, they told me it was because of heavy practices of mono-cropping system/practices, which is highly dominated by traditional way of farming system/practices. The farmers do not have local records from until 2010 when the NPA organization intervened in their community. NPA used to advise them to keep records of their production result for future used. Before 2010, the production was low, but in 2010, it slightly increased a bit, but still farmers were using mono-cropping system/practices.

What is the current production status (whether high or low)?

The current production is higher than before because farmers have adopted the idea of multi-cropping system/practices in 2011. The improvement and increase came as a result of conducting my Master Dissertation on adoption of multi-cropping system/practices for farmers.

Have the objectives been achieved or not?

Since all the 75 farmers have accepted and adopted the idea of multi-cropping system/practices in the two Payams, the farmers agreed that, they really appreciated the idea of multi-cropping system/practices. This means farmers satisfied with the idea, and that satisfaction of farmers, mean the objectives been achieved. This marked the achievement of my first objective.

Is there any improvement in farmers' practices?

After exposing 20 farmers (10 from each payams) to similar exercise to grow different types of crops varieties during and after the demonstration exercise, only two to three farmers had not shown professional performance. About 17 out of 20 farmers have shown excellent performance. This means that, farmers' performance, knowledge and skills have improved a lot in changing their attitudes toward modern farming system/practices. It also mean that, my second objective (How to improve my and farmers 'practices) has been also achieved.

8.3. The Main Indicators of the Achievement of Objectives and Research Questions.

What are the main indicators for achievement of objectives or Research Questions?

- A. The Group Dialogues and Discussion applied as Qualitative Approach in this Action Research, was successful.
- B. Acceptance and adoption of multi-cropping system/practice by farmers. About over 90 -95% of farmers accepted the idea of multi-cropping system/practice.
- C. Training of 75 farmers in the two Payams on multi-cropping system/practices.

- D. Improvement and increases in farmers' productions. Example, their earned income ranged from 1,000 SDG to 2,000SDG in 2010, but increased and ranged from 8,000-11,000SSP in 2011 as a result of multi-cropping system/practices.
- E. Impressive attitude and participations observed from farmers during and after this action research project implementation process.
- F. Awareness has been created for farmers and among themselves.
- G. Cooperation with Relevant authorities and NGOs for useful information gathering has been also successful during and after research process.

What is the weakness and strength of this approach (qualitative approach/unstructured approach)?

Strength. E.g. Group dialogue and discussions is easier to reach large number of people for opinion gathering. It is easier to get professional work done by the group with high quality and with less costs (efforts)

Weakness. E.g. I firstly planned to use individual approach during my interviews process, but when I asked farmers about which approach to apply, they choose to have dialogue and discussions with me. During this point, I thought in my mind that, individual interviews/approach is better than group dialogue/discussions. But I finally found that individual approach is tedious and time consuming. This means that for action research to be more effective, one has to apply group interviews and dialogues, not necessary to use individual approach/interviews.

What is the way forward (planning for future hope for this research idea)?

After discussing all the important questions with farmers about the project, I finally asked/urged them to suggest about the way forward. On this point, they suggested two ideas.

- a. Agreed to welcome any other improved seeds and practice that could improve and increase their crop yield of production than they currently have adopted in the future.
- b. They said were very much thankful, interested and willing to continue practicing the idea of multi-cropping system/practices for their future benefits.

They also added that, they could even become commercial farmers in the near future if such practice is going to continue producing more and more crop yields of productions for them in the same way, and be able to send their children to schools.



Figure 19. Final group dialogues and discussions of result.

Finally, all the farmers of the two Payams had agreed and committed to continue for long sustainable multi-cropping systems on their own individual respective farms instead of continuing with mono-cropping practices. They realized that, mono-cropping practice has really been the major cause of low crop yields production in South Sudan in general and the two communities in particular.

8.4. Summary of chapter eight.

This chapter is all about presentation of the final finding and the result of research carried out during in Upper Nile South Sudan. It tried to find out whether mono-cropping practice is a problem in South Sudan or not. Finally, this research found out that, mono-cropping has been the major problem causing low crop yield productions and multi-cropping has been applied in this research to try to solve such problem and it was successful. After multi-cropping system/practice idea was adopted by farmers, they found it useful and beneficial for them to continue with such practice.

9. CONCLUSION AND RECOMMENDATIONS.

9.1. Conclusions.

In this action research process, I have observed and experienced that, farmers in Upper Nile Region/State are not just lazy for not having practicing modern farming system/practices, but because they have never been exposed and introduced to modern agricultural practices. I also learnt that, this problem of mono- cropping system/practice is not only a problem for Upper Nile farmers, but also to all South Sudanese farmers across the country.

After conducting this action research project, I found that heavy practices of mono-cropping system/practices dominated by traditional way of farming is the major cause of low crop yield productions in Upper Nile and South Sudan in general. The reason is because, whenever there is effect or too much rainfall, insect infestation, disease outbreak, acidity or alkalinity happened on that single type of crop variety; the whole farm could be destroyed by such effect and therefore, farmers could go hunger.

Lack of researchers and extension experts to create general awareness for farmers in South Sudan is also another major problem in South Sudan to engage and introduce farmers to modern agricultural system/practices. Such problems (problem of having no enough researchers and extension experts in South Sudan) contributed in farmers' backwardness in adopting multi-cropping system/ practices.

Lack of improved seeds and modern farm tools are also challenges that affect farmers' implementation of the new idea. This is because if they do not have improved seeds and modern farm tools, they will not be able to cultivate and plant the crops they require to grow. This happened during action research project process in the two Payams. I had to ask for funds from NGOs and asked the farmers to mobilize their local existing resources to make this research successfully implemented. Without doing so, this research could not have been implemented and researched successfully.

I would also conclude that, any research, often needs researchers' creativity, consistency, flexibility, competence and confidence in what, where and why one's doing. This is because, without all these, the research could not be researchable because there could be a lot of challenges and limitations that would hinder one's objectives and goal.

Bureaucracy, insecurity, accommodations, physical infrastructure and communications were also major challenges to me during and after my action research project implementation process.

Respect for local people s' culture, local chiefs, norms, beliefs, right and resources, is the key to any research success. This is because, without respecting all these elements in rural/local communities, you will never get what you want to research on, and the fore; you could not achieve anything at all.

Adoption of multi-cropping system/practices is one of the better solutions to heavy mono-cropping practices problem to most farmers in South Sudan in order to maximize productivities.

Without a participatory and consistency approach to the local community, action research is impossible to achieve its objectives and goal it might be aiming at.

Level of women participations was higher than expected in Nakdiar and Doleep payam despite of their local community cultural influence over women in decision making in South Sudan.

9.2. Recommendations.

To improve and increase food productions in South Sudan, all farmers should adopt multi-cropping system/practices in their individual respective farms so as to maximize their productivities. This is because, when I tried in this action research, the result showed that; multi-cropping system/practices improved and increased productivities. We did this by comparing the result in 2010 and 2011. You might have learnt this earlier in result part (chapter 6) or if not, have a look back in chapter six in histogram diagram.

To improve and increase more food productions, improved seeds and modern tools are needed for multi-cropping system/practices for farmers to successfully implement the idea of multi-cropping system/practices.

A uses of disease and tolerant crops varieties is very much recommended for higher intensifications system.

The 75 x 30 cm spacing for cereal crops varieties and 65 x 40cm for vegetable crop varieties should be professionally recommended for farmers who are adopting modern agricultural extension crop spacing systems. This is based on our experiences during this action research process in 2011 in the two Payams (Nakdiar and Doleep payams). We tried these spacing systems and it was successful.

Women participation should be encouraged in South Sudan and be given right and a chance to make their own choice of productions on new/modern agricultural practices.

A participatory action research project should be encouraged to be applied by all multi-cropping system/practices facilitative researchers across South Sudan. Such practice could relieve farmers from low yield productions process.

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APPENDIXES.

The Appendix figures.....

The Appendix tables.....

GUIDE LINE QUESTIONS DURING GROUP DIALOGUES AND INTERVIEW PROCESS.

1. What is the current production practice in Upper Nile State?

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2. Do you have any knowledge about multi-cropping system/practice?

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3. What is the level of farm productions? (To investigate whether high or low, but I kept this as confidential in mind b/c it is a leading question).

.....

4. Where do you obtain modern agricultural farming information?

.....

5. Do you work in groups or as individual farmers?

.....

If group, why?.....

If individual, why?.....

6. How do you transport your farm products to market?

.....

7. What is your main packaging material to local market?

.....

8. What is the level of women's participation in modern farming system?

.....

9. What kind of farm tools do you use in your farms in carrying out your farming operations?

.....

10. What will you do if mono-cropping practice still causing low crop yield of productions?

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