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# STUDY OF OYSTER MUSHROOM AND MARKETS IN TANZANIA

## CASE STUDY OF HAI DISTRICT

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**A study of Oyster mushroom and Markets in Hai District**

Thesis is submitted to the Wageningen University and Research Centre in Partial Fulfillment of the Requirements for the Award of Master of Science Degree in Development Rural Innovation (MDR)

By

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UNITS

| | |
|---|---|
| 1 Acre | 0.4 Hectares |
| C | Centigrade degrees |
| Gms | Grammes |
| Kgs | Kilogram's |
| Km2 | Kilometer square |
| M | Meter |
| mm | Millimetre |
| Tshs | Tanzania shillings |
| USD | United states dollar |
| Euro | European currency |

**LIST OF ACRONYMS, ABBREVIATION AND UNITS**

ANT Actor Net work Theory

ITCZ Inter- Tropical convergence Zone

SACCOS Savings and Credit Co-Operative Societies

NGOs Non-Governmental Organizations

AWOMUG Arusha Women Mushroom Growers

PATECARE Promoters of Appropriate Technology and Environmental Care

HACOBAE Hai Community Based Agricultural Extension

T.O.T Trainer of Trainers

SUA Sokoine University of Agriculture

UDI Dar es Salaam University

HORTI Horticultural Research Institute Tengeru

MATF Maendeleo Agricultural Technology Funds

NARIs National Agricultural research Institutes

NZARDI Northern Zone Agricultural research and Development Institutes

## PREFACE AND ACKNOWLEDGEMENTS

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**ABSTRACT**

In rural and urban areas in developing World food access, distribution and availability is chronic problem. Most regions suffer food insecurity and low income levels restrict them to have quality and enough food for life. Depending on income levels of many people, protein sources are becoming more difficult to access in their daily diets. There are more reasons for this, but the major one is the high prices of meat for example to majority of population which make them not to be able to afford.

Some development projects have been introduced both in rural and urban households to contribute to solve such challenges. Some of them include the introduction of Oyster mushroom in Hai District. The main aim of the intervention was to contribute to solve problems of people in Hai. These challenges included improvement of low income levels, improvement of nutrition especially sources of protein in the diets. Importantly to the technology, it is produced in specialized houses which need less water compared to other crops like vegetables, and better still it needs no land for production which is a major challenge facing most people in Hai as majority of them own less than 0.5 acres/household.

The research which was conducted in Hai District used Case study as a methodological tool. Some other tools were also employed that include in-depth interviews, participant observation, focus group discussions, secondary data like project documents, policy statements, to help triangulation of information. The main objectives of the study were to find out why farmers in the area are not taking the opportunity of producing mushroom to satisfy the markets available. At the same time to find out how counter translation in new markets occur side by side with the existing traditional markets.

The study has found that the new market introduced doesn’t resonate well with the existing market norms and culture, as directed and shaped with the aim of modernizing the economy. The contrasting patterns have enabled the study to find out that although the markets for mushroom are available but still farmers are not taking the opportunity to produce to the market as a kind of action/resistance to take the intervention available to them. They have fully utilized their freedom to resist opportunities from vertical communications. Their action call for freedom and respect of equity, equality and democratic market arrangements which acknowledge their embedded knowledge in traditional farming practices.

## CHAPTER ONE: INTRODUCTION:

Mushrooms are fruiting bodies of higher fungi. Fungi are neither plants nor animals and they are now days classified as a distinct kingdom of their own, the Fungi (Härkönen et al. 2003). It has been documented that there are more than 60 edible mushroom species either domesticated or in wilderness which have been identified in Tanzania (Buyck et al. 2000; Tibuhwa 2001; Härkönen et al. 2003). The study also showed that domestic use and improvement of mushroom marketing could contribute to livelihoods and poverty reduction of the communities within the country. Mushrooms are thus considered to be of substantial significance in terms of food security. It appears to be a good cash crop with favourable market prices. In addition, the production of mushroom does not require much land in contrast to annual and perennial crops like maize, bananas and coffee respectively. Moreover, mushrooms do not require as vegetables do lots of water. They are always produced in special houses as seen in this picture.

**Figure 1: Housing and mushroom production**

Source: Field data, (2010)

Oyster mushrooms are produced worldwide. Its production levels have increased by 25% the last 10 years, compared to other mushroom species. China is the leading country in Oyster mushroom production. (www.cals.uidaho.edu.). Oyster mushrooms are found to be very profitable in North Korea, accounting to 65% of the total domestic mushroom production (Chang *et al.* (1989).

The conditions for mushroom to generate development and enhance rural livelihoods in Hai District are favourable. Land is not in abundance and there not many alternatives for classic cash crop production in the region. Hence the introduction of mushrooms had occurred with support from NGO's and backed by general agricultural policies of the Tanzanian government. The expansion of mushroom is part and parcel of Government's policy framework and intentions to support and expand marketable cash crop production. Government policies have for years hinged on finding and introducing new crops that can be of economic value for farmers and the national economy. The construction of an infrastructure networks like markets, roads, improvement of agricultural research Institutions,

encouragement of farmers and private traders to grow and trade new crops had been the core of Tanzania's agricultural policies for decades.

Oyster mmushrooms were introduced in Tanzanian in early 1993, (Buyck et al. 2000; Tibuhwa 2001; Härkönen et al. 2003, Bloeschand Mbago 2006). In Hai District, they were introduced by HORTI Tengeru with financial assistance from Farm Africa. The project aimed at encouraging farmers to produce Oyster mushrooms by promoting the goodness of mushroom production. The project also prepared farmers to access what they named as profitable mushroom markets by small holders in Hai District. The project was named as MATF (i.e. Maendeleo Agricultural technology Funds) Nancy, (2007). MATF means that funds which are available are directed to project that portray promises of development.

The main objective of this research is to understand what happens when new crops like mushroom are introduced in rural settings such as those in Tanzania and Hai District in particular.

The structure of the thesis follows in such that in Chapter 2 I will elaborate my methodological framework for the analysis of the expansion of mushrooms in Hai District. Here I will precisely establish my research problem, research questions and layout my research strategies.

Chapter Three provides a more general background of the research area, population, and general climate of the study area, household livelihoods and agricultural production in the area.

Chapter Four I will present the Problematization and Interessment phases in the District project (MATF). I will also provide more details of the history of mushroom in the world views, the country and how it reached Hai District. One of the foci will examine on how actors formulated problems and set solutions during modernization process and how it will contribute to development in Hai. Also I will explain the way linkages were established through different networks which justified that mushrooms are vehicle to alleviate poverty around Hai District for future development.

Chapter Five deals with the mushroom project pre-scription and through the elaboration of the technical manual for field training, how mushrooms are to be produced, managed and marketed, whereby project dynamics through the enrolment phase is realized.

Chapter six I will describe the market networks that emerged after the introduction of Oyster mushroom in the mobilization process. Here I will focus on how they are organized, how traditional foodstuffs are marketed in Hai and how new net work markets do not resonate with the local cultural and values of marketing in the area.

Chapter seven is the conclusion and recommendations where lessons are drawn from the case study. To sum up the thesis protocol, Chapter 1 Introduction, Chapter 2 Theoretical framework, Chapter 3 Background information and the MATF project, Chapter 4

Problematization and Interessment phases in MATF, Chapter 5 Enrolment phase, Chapter 6 Mobilization phase and Chapter seven is conclusions and lessons from the study.

## CHAPTER TWO: Theoretical considerations for the study of Oyster mushrooms and Markets in Hai District.

### 2.0 Introduction

This chapter elaborates the theoretical and methodological starting point of my study. The focus of this case study is to understand what happens in villages and homesteads when new technologies like mushrooms are introduced. I found inspiration in the translation literature as an analytical perspective to study social and technological changes. A translation perspective allowed me to study and ask questions about Oyster mushrooms from the point of view that its introduction in villages in Hai District has created new opportunities and new actors, but at the same time it has transformed and created new social relationships between and among people. To an extent that new institutions with a distinct cultural repertoire have emerged as a consequence of the introduction of Oyster mushrooms. My field research revealed that the introduction of mushrooms transformed existing markets and has introduced a new market culture that does not resonate well with the local norms and values about marketing. I thus had to come to terms with markets and how to understand markets using economic sociology theory and economies of affection theories.

### 2.1 Assumptions and questions

The main focus of this chapter is to identify the theoretical concepts for how to understand and operationalize new technology like Oyster mushrooms. My starting point for the analysis is that the introduction of mushrooms needs to be understood as part of the ongoing modernization of agriculture in Tanzania and specifically Hai district. Modernization in Tanzania is not from yesterday but has been set in motion long time ago with colonization and the building of modern institutions like the state and commodity markets as historical markers. The introduction of mushrooms is one of the many aspects and more recent manifestation of modernization. Modernization is said to proceed by promoting and applying expert knowledge. Modernization in this way may be conceptualized as a top-down or even authoritarian perspective of achieving social and technical change. The assumption that has shaped the introduction of new technologies and crops is that development by many used as the synonym of modernization – proceeds linearly and progressively and that new technologies and their networks is the vehicle for development. My field data clearly pointed out that with the mushrooms new networks with new sets of actors emerged in Hai district.

In this case I presumed that modernization for development was introduced and took place in a socially, technically and environmentally neutral scene. Differentiation among and between people, the environment is ignored. There are assumptions that the more mushroom are produced in the way experts have prescribed and designed, the more likely it becomes that development proceeds progressively and trickles down to those that participated, even the poorest among them. Modernization thus often came in the form of interventions of development projects and MATF representing a good example in this case. The Oyster

mushroom project I was part of, as an expert presents a good example of such practices and ways of thinking.

My theoretical starting point is in line with Callon (1987, 1995) and Latour (1987) and rests upon the assumption and assertion that modernization processes can be studied from a translation perspective. Because of the emphasis on networks and the new configurations of social relations, translation theory fits very well with my data and enabled me iteratively to (re)formulate my research questions and also to order and interpret the data I have collected while in the field.

According to Callon (1995: 50), *translation* refers to the operations that link technical devices (e.g. mushrooms, prescriptions for use, production and marketing), statements (principles written as policies) and human beings (farmers, traders). The relationship between these different elements is established by means of inscriptions. The Oyster mushroom project documents provide excellent examples of inscriptions which I take as prescriptions for how to use (plant, produce, and market) mushrooms. Translation analysis views technologies as part and parcel of social networks. A network is understood as a set of aligned heterogeneous elements, both human (farmers, traders, experts) and non-human (mushroom, market places), which together perform a specific function (Callon 1987; Latour 1987). The meaning and function of mushrooms, for instance, is shaped by the networks of which they form a part, some of these networks promote and view mushrooms as opportunities, as an indispensable crop which generates cash incomes on the basis of which livelihoods (e.g. food security) will improve in household levels. Other networks will argue for nutritional values of mushrooms hereby emphasizing the importance of the introduction of mushrooms to contribute to boost low levels of CB4 count hence improve immunity status of the people as generally explained by Chang et all, (1989 pp345).

The theoretical and methodological starting point of my study is that Oysters mushrooms are not social, economic and environmentally neutral objects (see also Hebinck 2001; MacKenzie and Wajman 1999). When Oyster mushrooms arrived in Hai District they did not come alone. They came because of certain networks which saw potentials in the expansion of Oyster mushroom production, but these 'Oyster mushroom networks also created new ones that hinge on new social relationships and spaces for negotiations in the markets hence therefore transforming existing social relationships among people. Pre-empting my data analysis already, I would like to argue that the Oyster driven networks produced and resulted in distinct markets being formed; markets whose logic appear to be different from the usual' local, existing or 'traditional markets. Two distinct market(ing) cultures have emerged. One directed and shaped by networks that aim to modernize the economy, a second kind of market that continue to evolve around 'traditional' market(ing) values. ' New 'Oyster' networks and the markets that emerged do not resonate well with local markets and marketing cultures, however, these 'Oyster networks' have not succeeded fully to transform existing 'traditional' markets. The dynamics, the survival of the 'local' or 'traditional' markets may theoretically be labeled as counter translation. The 'local' markets have a substantial body of agency to resists modernization of markets in ways similar to the Oyster mushroom markets that have

emerged and have been formed in the wake of the mushroom projects. For the time being my preliminary conclusion is that Oyster markets co-exist with 'traditional' markets' but hardly interact with the traditional markets. This clearly will affect the future of Oyster mushrooms in Hai district.

In the remaining of the chapter I'll elaborate shortly the 4 phases of translation theory and begin to conceptualize and operationalize markets.

## 2.2 Translation phases

Callon (1986, 196) has identified 4 phases of translation. These 4 phases will be empirically elaborated in chapter 4, 5 and 6. Whereby in chapters 3, I will pay attention to the history and dynamics of the Oyster Mushroom Project (MATF).

*1) Problematization*

*Problematization* of translation may be defined as the method by which actors may identify a particular problem and then set specific strategies to arrive at solutions to the problem. Callon (1986: 196) explained the predetermined strategic solutions as "obligatory passage point "whereby responsible actors are struggling to be indispensable in the course of playing the drummer in the established problem." The acceptance that mushrooms are part of the strategy to bring development is such an obligatory passage point. Problematization therefore demonstrated the conditions for the next phase during translation process. During problematization the need for project interventions are developed and support is sought from a range of actors like (State, NGO's and Churches).

*2) Interessement:*

*Interessement* refers to the ways in which the actors engaged in defining a problem establish linkages with the individuals or populations concerned with that particular problem. In order to obtain economic support for instance, researchers studying the agronomy and economics of mushrooms production continually aim to establish linkages between their studies and various groups or stakeholders who have a vested interest in the outcomes of their studies. Examples included different  the groups and institutions mobilized in the promotion of production of Oyster mushrooms like the Research Institutions, Health practitioners, Ministries, NGOs who are responsible for design and implementation of policies. Interessment is therefore a process that involves range of stakeholders and these as well as their roles need to be identified and interrelated. Interessement thus deals with the intervention, its design and *modus operandum* so to say.

*3) Enrolment:*

Callon, (1995: 211) described it as a kind of internal process that involves coercion and collusion when associated with alliance building. This process of enrolment involves multilateral negotiations testing strength and tricks which will result into project success. Enrolment of actors and the building of alliances are key to the success of newly introduced devices. Enrolment is about how development interventions like the MATF project try to prescribe how mushroom are produced, managed and marketed.

*4) Mobilization:*
According to Callon, (1995), the term involves displacement, making the previous static entities mobile. Through redisignation of farmer representatives and also implementation of number of activities that are of interest to them, actors are first displaced either physically or in terms of roles and then later they are assembled at an appointed place. Mobilisation as I will argue here is about the future dynamics of the markets at large. Will translation succeeds (e.g. the mushroom market culture becomes dominant) or is it more appropriate to speak of co-existing markets and thus that we noticed processes of translation as well as counter-translation at the same time and place?

The study of the processes of translation aim at providing insights into how these translations are designed and in the end get connected in realty. These connections will tells us something about the future of projects like the Oyster mushroom project in Hai District.

### 2.3. How to conceptualize and understand markets

The previous section I hinted already that Hai District is characterized by different, sometime even distinct markets. Two distinct market(ing) cultures have emerged. One that is hypothesised as directed and shaped by networks that aim to modernize the economy, a second kind of market that continues to evolve around 'traditional' market(ing) values. The work of economic sociologist like Granovetter (1985, 1992), Polanyi (1992) provides analytical tools to analyse markets. Markets are governed not just by demand and supply but by normative frameworks (e.g. culture) and shaped by various forms of governance (state policies). Granovetter (1992) proposes to use concepts of embeddedness of action in social network. This will give us I believe a handle on viewing how horizontal and vertical relationships and forms of communication and negotiations that operate in market networks. Polanyi (1992) referred to this as 'double movement' which expresses that in one society there are, or may be distinct organising principles shaped by distinct cultures, institutional aims and carried by different social forces.

I propose to characterise markets as shaped on one hand by vertical or hierarchical social relationships and on the other hand by horizontal relationships. Vertically organised markets are instrumental and above all, less embedded in local cultural repertoires but by distant national and global markets. Price setting is an expression of the demand and supply at levels beyond the immediate family or village. Markets like these are determined by power relations which lead to dominance.

Horizontal or non-hierarchical markets are shaped by what Hyden (1982) has referred to as embedded in 'the economy of affection'. Their foundations lie between elements of trust, solidarity, close kinship ties and various aspects of reciprocity which shape the market culture. Prices and opportunities to fetch prices are determined not solely by demand and supply, but embedded in local cultural repertoires, local practices and regional specificities. Whereby Van der Ploeg et al, (2012) (forthcoming) refer to these markets as 'nested markets'.

With notions like ‘horizontal’ and ‘vertical’ which stands for different, contrasting patterns of embeddedness we will be able to examine and characterise the nature of the Oyster mushroom market in Hai and compare these with ‘local’ markets with regard to dynamics and cultural repertoires and the degrees of economies of affection.

Embeddedness may be defined as the degree of social relationship between producers and the local community (Hinrichs, 2000). It is characterized by bonds of trust, shared values and cooperation between participants. Farmers in the embedded market are better informed of the needs and values of their products Granovetter, (1985). Local networks of farmers practicing direct marketing may be socially embedded with one another, experiencing relationships of trust, cooperation; shared values and knowledge (Hassanein 1999, Stock 2007).As I will show in this thesis that local markets of foodstuffs in Hai created distribution and production with similar characteristics as those identified in economy of affection by Hyden, which are characterized by equity, equality and democratic arrangements for members of the local community. The detailed explanations of the traditional market networks will be covered in chapter six as one of important processes during mobilization phase in reference to MATF project.

### 2.4. Problem statement

Derived from theoretical synthesis I can now formulate my problem statement.

The introduction of Oyster Mushrooms is driven and shaped by actors, whose influence introduced new networks which results into new social relationships, hence transforming (at least attempting) existing marketing networks. Translation and counter-translation occur side by side.

The specific process of translation of mushroom into the local context of Hai district evolved into networks not well connected to existing networks. The specific forms of translation and enrollment in Hai as becomes apparent in the Oyster Mushroom project and which leads to questioning modernization of agriculture through Oyster mushroom as a vehicle for development. Due to lack of agronomic knowledge about the technology and markets we question the modernization as vehicle for development in Hai.

### 2.5 Objective of the study:

The objectives of the study had two folds. First to understand and (re) interpret the Oyster Mushroom project through the lens of translation theory. Secondly find out as to why farmers in Hai District are not taking up the opportunity of producing Oyster mushroom.

### 2.6 Research questions

How has the Oyster Mushroom project been translated to Hai District?

What networks have been created by the mushroom project and to what extent do these resonate with existing markets.

## 2.7 Methodology:

The main methodology involved in this research is the case study. Yin defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidences are used (Yin, 1984, p. 23). The cases provide enough information in it that enable reader to understand what the problem is and after thinking about the proposed solutions by relying on many sources of information's and methods that were used.

The research made use of different data collection strategies. Literature and archival research was done to understand the history of the project. Project documents were consulted for that purpose. During data collection different techniques were also applied in the district (case) for the sake of benefiting from triangulation of methods. I combined participant observation, in-depth interview by use of check list, using of secondary data from the sources and focus group discussions. I interviewed and followed 30 households, particularly those that were involved in mushroom production. I also interviewed households who stopped producing mushrooms. The focus of the interviews was to get the details of when, how and why people found attracted to mushroom production. The insight emerging from this will give us the motivation of farmers who started to produce mushroom and those who stopped on the way.

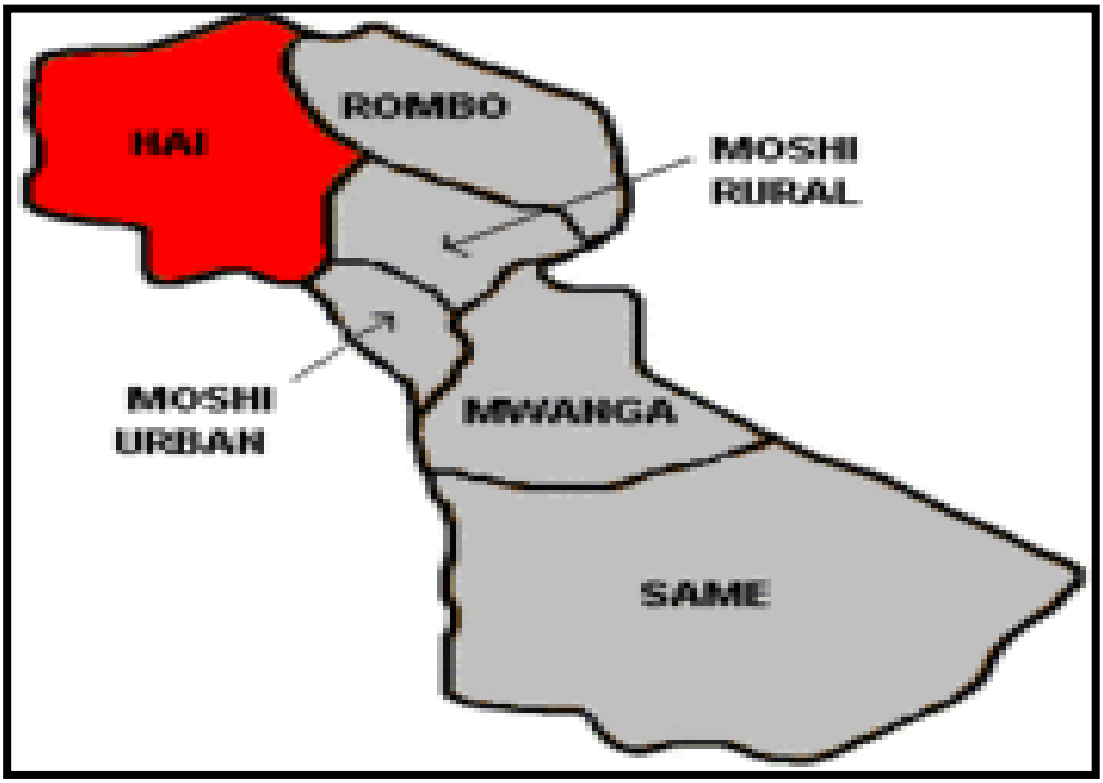
Geographically I focused my data collection in three major areas. This was purposively done to assist more clearance and coherent of data collection. The first part was located in the upland areas of Machame North where large number of farmers are said to be producing mushrooms as set out by the project. The second part was then located at the lowland areas where production seemed to be poor according to the expert opinions. The third area was located in Hai town close to the high way. They were also considered as producers as far as expert claimed during data collection process.

## CHAPTER THREE: Hai District

### 3.1 Introduction and Background of the research area

In this chapter I am going to describe where the case study is located, population and how they are dispersed according to topography (Population density) as well as different climatic conditions which favored the introduced technology. On the other hand we will also show existing agricultural practices that employed people in Hai. Historically how mushroom was introduced in the area with active actors whom joined the project and also how modernization was in line with the Ministry of agriculture policy when we wind up the chapter. So the main idea in this chapter is to show the general over view of the case study which will give some hints about the nature of modernization of agriculture and social transformation in Hai.

*Figure 2: Map of Kilimanjaro region showing Hai District:*




Source. www.Tanzania.go.tz.

Hai district is one of the six districts that are found in Kilimanjaro region. Its administrative boundaries include:

East - Moshi District – Kilimanjaro Region

West - Arumeru District – Arusha Region and Siha – Kilimanjaro Region

South- Simanjiro District – Manyara Region

North- Rombo District – Kilimanjaro Region

The District has several advantages of being along the high- way that connect it to other regions and is also close to the International air port (KIA). Hai district again is the scene of many development projects.

### 3.2 Population

According to the 2002 National Population Census results the District had a total population of 167,097 of which Females were 85,044 and Males 82,053. Using the annual growth rate of 1.9% by projection the district at the end of year 2006 had a population of 183,712. The population density said that 1 $km^2$ has average of 130 people, while in the Upper Zone (Highland Area) the number of persons per $km^2$ exceeds 650. Source: District (data 2009).

### 3.3 Climate

The District is classified as tropical savannah area but due to the influence of Mount Kilimanjaro which is situated on the North – East corner of the District the climate varies considerably. The rainfall is bimodal with two rainy seasons namely:-

*Long rains (Masika)* - caused by the passage of the Inter- tropical Convergence Zone (ITCZ) which starts from March to June. These are the rains upon which farmers depended for annual and perennial production.

*Short rains (Vuli)* caused by the Southward movement of the (ITCZ). The short rains are usually found in the months of November up to December. These are heavier in the middle zone upwards; but very limited in the low- land zone of the District. These types of rain benefit short term crops like vegetable production in rain fed agriculture.

### 3.4 Agriculture production and land distribution

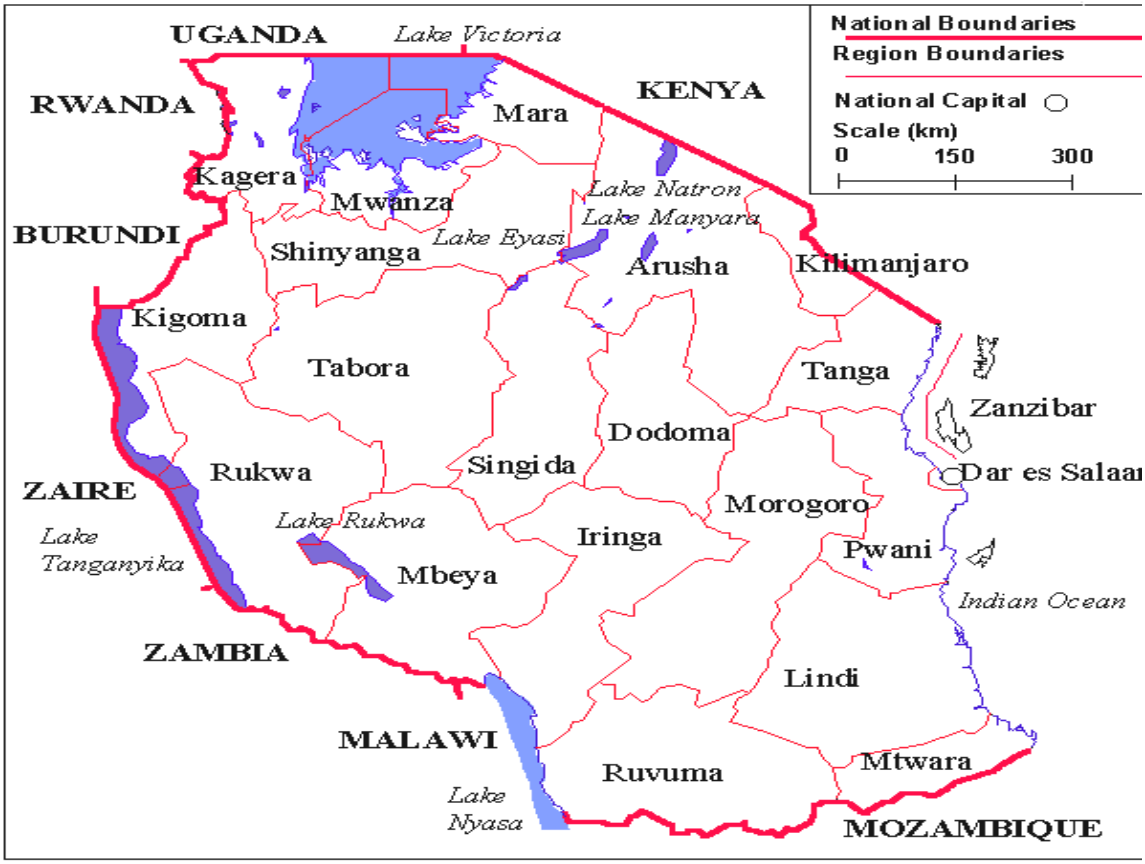
The main agricultural production included food crops like Beans, maize, sunflower, Bananas, paddy while the main cash crop is coffee. The District has estimated arable land to occupy 46% which is about46, 506 hectares, while grazing land occupies about 27% of the District. In this case the District has potentials for livestock production which is about 27, 297hectares but the rest of the natural resources are occupied by the Mount Kilimanjaro and forests which together contribute to about 27%. (District data, 2009).

**Foreseen challenges**: The District suffers from many problems that include small farming area that ranges from 0.25 to 1.0 hectares per household. Countable numbers of farmers are lucky that they own farms larger than 1 ha. Unreliable rainfall pattern which does not support rain fed agriculture. Incomes level of the people are low and continue deteriorate due to coffee fetching fluctuating prices from the World markets. It is now an opportunity for Hai farmers to have income from mushroom production and also to access mushroom in their diets to have balance diets unlike beef and goat meat that are said to be so expensive as majority of families cannot afford. This is an opportunity to be trapped (Golden egg).

### 3.5. Livelihood activities

Other activities which are income generating other than farming and livestock keeping included microenterprises like shops, local brew and grocery centers ,input stockist, milling machines, skilled labor like carpentry, masonry, plumbing and small scale industries/workshops like welding. Some people are also employed in Government, NGOs and many other Institutions which are found in the area. In the case of unskilled labor a good number of people are temporary employed as casual laborers daily working in farms .Another aggregate of people are working as night guards in different security companies. There are also several restaurants which sale food and are known as (Mama Ntilie), whereby 95% of them are owned and managed by women. Small proportion of people are occupied in tourist activities like selling traditional crafts, mountain climbing and tour guiding and is specific for male youths and young adults District (data 2010)

*Figure 3: Map of Tanzania showing administrative boundaries*




Source: www.Tanzania.go.tz

## CHAPTER FOUR: Problematization and Interessment phases

### 4.0 Introduction: How Oyster Mushroom was translated in Hai

In this chapter I focus on how new technology like mushroom was translated when it reached villages and homesteads. We all know that technologies are not neutral when they reach people. They are environmentally, socially and technically not exposed in social vacuum. People's cultural practices and values are important elements which bind them together and define their life style. So translation as theoretical and methodological frame in this case helps us to understand the processes that are involved in creating new opportunities and new network of actors.

Mushroom cultivation was first introduced to Tanzania in 1993 by the Ministry of Agriculture and Cooperatives under the sponsorship of the International Fund for Agricultural Development. The focus was on cultivation of Oyster mushrooms (*Pleurotus* spp.) and the first strains to be cultivated were obtained from Belgium. In the same year, the Applied Microbiology Unit of the University of Dar es Salaam started research on mushroom under the sponsorship of NUFFIC (Dutch government) in 1993-1998 and SIDA/SAREC in 1998-2003.We are therefore witnessing that the idea of modernization of agriculture was influenced externally from Global policies to National local policies. Then it was assumed that there will be a kind of trickledown effect which will then transform farmers and their methods of production to modernization hence development. The only alternative was seen to be through Oyster mushroom production as a new technology and vehicle to development. This phenomenon was seen successful in other parts of the world like China and Korea and therefore similar achievements were expected in Hai.

In Hai District therefore, mushrooms were introduced by the Horticultural research Tengeru 2005 through project called MATF (i.e. Maendeleo Agricultural technology Fund), (Nancy, 2007) sponsored by farm Africa. NARIs in Tanzania has been assigned responsibility of bringing new technologies to the farmers for solving different farming problems. They have the authority and legitimacy by law to do that. They are therefore given financial support either by the Government or by donor agencies to fulfill this duty. The main issues to win funds include the priorities of the Ministry policy and the funding agencies. HORTI- Tengeru as one of the NARs in Northern Tanzania wrote proposal to introduce mushroom in Hai District in phase one and won, later in phase two of the project they wanted to scale up the Oyster mushroom to the high quality markets of oyster mushroom in the District.

Therefore the idea that mushroom may facilitate development was initiated by the Government and then trickle down to the research Institution as technocrats and lastly farmers as beneficiaries.

### 4.1 Problematization:

Is defined as the method by which actors may identify a problem and then set solutions to overcome the situation Callon, (1986:196).The problems which were identified by these

actors included low income levels which will be solved by selling mushroom to the promising markets available in Hai. Why low income levels became apparent, because the only cash crop in the area was coffee and the world prices were fluctuating now and then. While the other sources of income were not promising to development like mushroom did.

They continue to emphasize that because the area encounter land shortage, then mushroom will fit very well as a new technology which needs in-house production techniques. So the issue of small land size is not relevant as it has been solved by in-house kind of production strategy and innovativeness. The use of land will not modernize economy as it too historical in the region and the promising opportunity is through Mushroom production.

Additional advantages included availability of nutritious food as a solution to food insecurity. It was problematized that protein sources especially meat fetched higher prices that majority of population could not afford. All reasons which were structured by the actors by all means proved promising to contribute to development and mushrooms were seen as an alternative and safe vehicle available for that case. As Callon mentioned that they are strategies which are obligatory passage. I mentioned here that Research institutions have been given mandate by law to bring agricultural reforms and development by disseminating its technologies through technology transfer approach to solve problems that are faced by farmers. It is assumed that improvement of farmers' challenges may be reached by having policies that are implemented through technology transfer approach which account for development to the national level. The support to get popularity from the world views on how mushrooms are so important in Hai copying from other countries like China and elsewhere as explained by Kavaisi.

Citing examples of how agricultural development in Tanzania contributed by different research Institutions from the project published by Kavaisi, (2007), reported mushroom production as example of modernization which could influenced development. Another example is this project implemented by MATF which found that Oyster mushrooms have very high nutritive potentials with huge markets, Nancy (2007). So all these visionary solutions will have the same results in Hai as proven elsewhere in the World. Importantly as it has been identified that in Hai there are more opportunities which are supported by availability of more than 65,000 Tons of different crop residues that are produced annually and can be utilized as raw materials during modernization process, Kavaisi and Magingo (1998)

So this modernization was understood by both authorities and experts as an improvement and developmental alternative to the people of Hai District. Up to this point mushroom has been justified by these actors as vehicle for development because the strategies established are relevant and contribute positively for development success.

### 4.2 Mushroom project and policy discourse:

As I have already mentioned before, that National policies are the priority for funding by the Government like the example of the current agricultural policy in Tanzania, which was explained by one actor:

"What makes *Kilimo Kwanza* (Agriculture First) policy different from the two earlier agricultural policies likely to succeed is that the current policy is more than agriculture" major difference lies where more than five Ministries are involved in modernization of agriculture. (www.countrystat.org/country).

The project and policy documents are in evidence line with the main global agenda that mushroom will bring modernization of agriculture as alternative and hence bringing development to the people.

### 4.3 Stakeholders who were involved:

1. Farmer groups: Farmers who joined mushroom production in North Machame for example came from three villages namely Nkwamasi, Kimangolo and Nshara. This ward made a total of 28 members who were involved in mushroom production. Consistent supply will be met only if when calendarized and scheduled production system is in place strategically. Each production group had their own leadership, who were trained in group dynamics and team work strategies so that they can be sustainable. Team work and good leadership was among important issues emphasized during training by making sure that each group formulated and implemented their constitution and bylaws that will govern their group. I was involved in this training as facilitator for leadership skills and entrepreneurship as resource person in the project area. So, my experience represents this kind of linear thinking therefore, as I was part and parcel.

The expert continual to explain the roles of each stakeholder in the project as stipulated from the project document. This was one of the roles of project manager to handle all issues related to job description and management of the project as whole. Roles were stated by the project manager and they were synergistically and strategically linked, to enable the market access by the small holder farmers can be achieved successfully.

2. Researchers: Their synergistic roles were to make technical backstopping to the beneficiaries involved in the project .Specifically they were also responsible for management of all project tasks and they were accountable to the financial management during the project implementation periods.

3. Extension experts: Were specifically responsible for continuous follow up during production so that the aim of consistent production can be achieved. They were responsible for continuous monitoring and evaluation during and after the project had phased out as it was assumed that they were close to the farmers. Among other activities, they also trained farmers in different skills when they were consulted.

4. Input suppliers: They were expected to make quality and enough quantities of spawns to the farmers who were involved in the mushroom production. Importantly here, when spawns of low quality are produced, then quality and quantity of mushroom is difficult to achieve.

5. Traders: To make mushroom marketing channels grow bigger by continuous promotion of mushroom consumption from the households to institutional levels. Unfortunately it was realized later that transporters were not involved as stakeholders during implementation of the project. The roles of transporters were to negotiate logistical and infrastructures of Oyster mushroom to the new markets.

6. SACCOS: Farmers were members and could get loans with low interest rates to advance production of mushrooms. These are small financial institutions that are responsible for providing loans to its members according to their joint constitution. This is also an emerging financial institution which was not in Hai in previous years. It has been Nationally instrumented by financial institutions and the Ministry .The major aim was to facilitate among other things, specifically women to access money as they were not reached in previous years in the local banks because they missed collaterals like land ownership documents.

7. Policy makers: Responsible for promotion of the new technology to beneficiaries specifically in Hai District. To promote vision of the policy and the role of farmers during implementation of activities' also safe guard the interests of the National development strategies.

**4.4 Interessment:**

This is the way in which actors who were involved in defining problem and establish linkages. These strategies can be from individual level like process of marketing mushroom which will bring wealth to the people in Hai. We linked farmers with the new networks to convince them mushrooms are economically potential. Some of the farmers were assigned as middle men to care for the mushrooms which were not in good quantities to be transported to the markets. So they have to be collected and stored to the quantity logical for marketing. Collective problems that touched the whole population like unreliable rainfall patterns were also linked to solutions which favor and sell the modernization, because mushroom needs little water then it will bring development in obvious ways as proved from all other places in the world.

The linkages established may be directly or indirectly concerned with the problem. In either case of economic or legal reasons, they aimed at establishing linkages between their studies and various groups or stakeholders who have a vested interest in the outcomes of the study. As Nancy, (2007) said in MATF project that group of farmers, Institutions like Horticulture research Tengeru, Extension service, NGOs like Farm Africa, World vision and the churches are involved. Each actor is responsible for implementation of different tasks and roles as they all have a common and vested interest. So there are linkage between experts as implementers of policy as a political technology and the actors who are involved. Modernizing agriculture through the vehicle of Oyster mushrooms has been cited as promising projects to development

so Hai District can get similar and good results. These actors included policy makers and several other implementers. When the their roles needed to be established, another problem came up: there was insufficient or no adequate knowledge to implement the modernization process of Mushroom. This necessitated the project to design and implement what I call Black boxing as the directives which are designed by experts about how to produce market and manage mushrooms in Hai. This will be explained in detailed in chapter five, during enrollment phase. But here is an example of how linkages were instituted by the experts of the project as explained during interview:

> *"When we started the project only 25 households were involved but after one year about 1058 households were registered and involved in the project. This is a very good achievement." Source, (Field data 2010)*

Furthermore during explanations she said:

"*People were afraid to use Mushroom in this place as they thought all mushrooms are poisonous, but we managed to promote it and now people are able to produce with good prices available but they cannot meet the demands of the market as the demands are higher than supply, you see!"* Source, (Field data, 2011).

Like what I what was explained by Callon that some stakeholders may come with different arguments like "We want what you want, and therefore abide with us so that you can get what you want", (Callon, 1980; 1995). At this point it's when stakeholders' analysis is done and roles are assigned accordingly. The same applies to the project in Hai different working groups of 22-25 people were responsible to produce mushroom in group manner. But later farmers were not able to be in groups and eventually splitted up so that they can produce individually as explained by one farmer:

> *"My brother I tell you it is very difficult to produce mushroom in groups. You are not here all the time but I tell you we failed. People are not the same, some are not accountable enough to manage mushroom so how can you be together, it's difficult, but when you are alone, then you know this is my project." Source: (Field data, 2011). Although the roles were defined and promoted but during implementation, not everything went well as expected especially the group dynamics were not well supervised.*

Important in this modernization, controversies around shifting of people from their internal production to more of satisfying the markets of the tourists and super markets that did not resonate with the traditions and values of the people as explained in chapter two. This embarked an attitude which clearly depicts means to an end of the Hai agricultural production.

Hence therefore emerging from this is a new window of opportunity that is labeled as vehicle for modernization which will improve and bring new hopes and development now and in the future.

Some of the new institutions that evolved in this modernization include Kilimanjaro Mushroom producers, Bibiana mushroom Company, Hai small business units. During discussions one farmer said:

> *"If you have enough capital, mushroom production is possible because, for example you can dry the mushroom in solar dryer but it needs a lot of money to be purchased. Farther more she was asked how much does it cost. Then she said about 400 euro's. She added that you think that is all, no! you also need your house to have strong fencing like that of bricks because if it is open the solar machine can be stolen as you know it is big and cannot be kept inside the house" (**Field data, 2010).***

Linkages during interessment involved actors like HORTI Tengeru as a leading organization driving all activities that include distribution of Oyster mushroom spawns, publishing the technology and identification of the market channels. While Hai district council was responsible for extension services. Some of the NGOs were involved like World Vision and Community groups (HACOBAE, Arusha women Mushroom growers-(AWOMUG) and promoters of appropriate technology and Environmental Care (PATECARE) who were also responsible for spawn production.

## CHAPTER FIVE: 5.0 Enrollment phase:

In this chapter I will show how the new knowledge of mushroom as technology was disseminated through transfer of technology approach. Furthermore I will also show how the new knowledge was methodologically more theoretical and highly technical that needed precise measurements (level of Sophistication). On the other hand we also have to show what participants are expected to do after the training commenced. This will give us an entry point image of group and project dynamics through enrollment phase. The main focus in this chapter is how the prescriptions were emphasized to participants so that they can modernize their farming .If farmers are not able to acquire the modernization knowledge as prescribed by experts then the journey to development through vehicle of Oyster mushroom cannot be achieved. The starting point rests on the procedures and stages to reach successful production.

### 5.1 Technical procedures: Oyster Mushroom production under field conditions:

The Oyster Project Training manual for farmers specifies a nice set of prescriptions aiming to present translation.

1. Clean and cut at least 4 inches all the raw materials: This will assist in removing all the dirty and soils that may create room for contaminations. Depending on the type of the raw materials, sometimes you need to soak them for 3-12 hrs aiming at softening them, examples of raw materials like wheat and bananas leaves. Hydrogen peroxide is added at least 20 ml /20 gms of powder to reduce the levels of fungus in 20 liters of water. At least one tank can accommodate 3 full bags of raw materials.

2. After filtering all water by using the wire mesh then start mixing with lime and make sure all the raw materials are limed evenly. Prepare the wood 4-6 inches that will separate the raw materials with the water so that steaming of the materials is possible. Arrange all the grasses properly to make sure that water is not in contact with grasses. Cover the tank tightly and start heating the tank until the steam is realized coming out at least 1.5 hrs to 2 hrs time.

3. Unpack the grasses with uncontaminated hands and put them in the wire gauge where it is properly sterilized to save all water and also cooling to take place. The allowed amount of moisture is 60%. This amount of moisture can be estimated by squeezing method which is taught to the farmers during practical's.

4. Start to pack in plastic bags that are new and hygienic:

Materials needed for heat sterilization:

i. Spirit

ii. Lighter

Iii. Wire loop

iv. Spawns

**N.B** Make sure all the time your hands are free from contaminations.

### 5.2 Practical demonstrations

1. Putting the seeds in the bags. Make sure that grasses are fully packed at least 4 cm and put spawns and continue to do so until when the bag is full. At the top put the spawns also and close tightly. Also make sure that you put spawns around the edge also to create uniformity.

2.Labeling: After all the processes make sure that important information like date of planting, variety, expected date for harvesting are marked. In average at least 28-30 days are enough to start harvesting which can last for the duration of up to 4 months, depending on the mushroom variety.

3. In the house: Arrange bricks and wood boards which will protect the bags not to touch the soils so that you can avoid contaminations. Watering the floor is important to make sure availability of moisture is adequate. The room also must be dark enough by covering the windows with curtains at least 2 weeks for facilitating proper growth.

4. Start putting the mark 10 cm long in the bags where mushroom will pass during growth and also the ventilation point. Continuous monitoring is important to make sure that all the growths are given space to emerge out of the plastic bags for higher yields and consistent production. Put mark x under the area where growth point has been observed.

5. Time for harvesting: Make sure that you touch the bottom part of the mushroom so that handling will maintain good shape for the markets value. Make sure also all the harvested quantities are recorded so that at the end, yields may be calculated. The average harvest per bag may range from (50-150) grams at once.

6. Post harvesting: Those mushrooms which missed markets may be prepared in the following way to avoid losses. They can be dried in solar dryers which costs about 400-500 euro or 800,000Tshs -1,000, 000Tshs.Or at times can prepare products like pickles and chilly souse and other products as the customers may prefer.

Due to its high nutritive value a lot of medical and nutritionists are emphasizing the use of mushrooms in daily diets of the sick and healthy people in their households through seminars and public meetings in the District.

### 5.3 Estimated costs of materials:

Table:

| Item | Name | Cost - estimated |
|---|---|---|
| 1 | House | 100 euro-250=200,000-500,000Tshs |

| | | |
|---|---|---|
| 2 | 200 Liters tank | 50 euro=100,000Tshs |
| 3 | Sheaving wire | 30 euro=60,000Tshs |
| 4. | Wood charcoal | 50 euro=100,000Tshs/trip |
| 5 | Packing materials | 30 euro=60,000Tshs |
| 6 | Spawns | 0.75 euro=1500 Tshs |
| 7 | Hydrogen peroxide | 30 euro=6000 Tshs |
| 8 | Lime | 35 euro=7500Tshs |
| 9 | Cotton swab, razor blade and lighter | 2 euro=4000Tshs |

Source: Field, (data 2010)

**5.4 Housing for production:**

During the field work some of the households were visited to find out how they constructed production houses. The findings included that local materials were used to make the production houses though it was difficult to poor resource farmers. The inside out and the architecture differ from one farmer to another. Most farmers were not able to construct production houses as one of the farmer claimed:

"The demonstration house for communal production was formally funded by the project and the costs were estimated to be 250 euro. After the communal production ended only one member managed to have His house and started production afterwards. He said that the house costs about 150 euro's," Source, (Field data 2011)

The training for production is also different from training for house construction. You need expertise personnel to facilitate the construction process and most farmers claimed to be facilitated by the middlemen.

We can learn from this area that although the new technology and available market for mushroom provide good potentials for farmers to be wealthier but on the other hand a lot of farmers are also displaced from this blanket recommendations. As most cultural values and practices this operated against the horizontal networks of knowledge sharing. One of the focus group discussions explained what they faced:

> *"**Too strict forest by laws:** We are not allowed to cut our own tree until we have consulted forest Officers who are far from our village. They also continued to say that when the Forest personnel are available there is no clear way that your requests will be accepted regardless of all the costs that are involved in bringing the expert to your household. So it is complicated to bring forest Officer to give permission of cutting any tree that you need for making fire wood that is very important in the process of boiling raw materials and for the time being there is no available alternatives at all during process of disinfection. The sources of energy are not accessible to people who are interested in mushroom production, and in this case they claimed that such situations create room for corruption.***"** (Source field data, 2010).

### 5.5 Training

It may be interesting to learn from the case study if those who are producing mushroom from Hai area the results of the first of T.OTs training or trained by their fellow farmers' during horizontal communication levels. In the report from (Kivaisi, 1995) about mushroom farming in Tanzania, said that farmers faced a lot of challenges due to training by different people who created confusion. The contradiction resulted from credit hours which the first T.O.Ts was allocated to the resource personnel. The first group spent 14 days and sponsored by project but the next training farmers pay themselves for at least 3 days and training is facilitated by their fellow farmers. On the other hand, how to relate the measurements to local or available measurement levels like amount of moisture without instrument? The knowledge of measuring moisture percentage without instrument may be interesting in the future. It is estimated that in Hai 80% of farmers are female adults who are also having other projects in their households. This means that after the initial training farmers stand without any quality control mechanisms terms of knowledge acquired during theoretical and practical sessions. In short they are missing a guiding hand to acquire experience in the modernization process.

### 5.6 Mode of production

Some farmers in Hai claimed that they were trained in group but at the end they were supposed to produce individually, when they gain competence. They explained during interviews that it is difficult as it is more technical and involve a lot of risks. On the other side some farmers explained about T.O.T as follows:

> *"At the beginning we were facilitated by trainers of the trainers. So after their training commenced they told to start mutual production group of 15 persons as a demonstration production. To date only 10 members are said to be alive/active according to them. Some members went elsewhere to find opportunities and other died from their group. From the demonstration they aimed at producing 436kgs of mushroom from 109 bags with the average production of 4kgs from each farm. Production of mushroom was estimated to last for four months from the first day of harvesting (*Source, field data 2011).

Paredes (2001 and 2010, 39) questioned the issue of acceptance of knowledge from fellow farmers who are less qualified to guide them. Some farmers trust more knowledgeable personnel and regard them to be technocrats. The same was done during MATF project, whereby farmers were trained in the first phase (T.O.Ts) and expected to train their fellow farmers who will be interested later.

According to the group in depth discussions they said:

"We were trained to produce mushroom so that we can alleviate ourselves from poverty because mushroom is an alternative crop that can give us extra income easily. They also narrated that another advantage of producing mushroom is to improve their nutritional status in their meals as meat was said to continue to be expensive that make majority of people not to afford it" **(**Source, Field data 2011).

My objective to this training manual is to reflect back to the general research question in chapter 2, about translation theory involved in modernization as a vehicle for development through introduction of mushroom in Hai District. In this case all the strategies of translation theory worked in favor of the introduced technology (Oyster mushroom) .The strategies were developed from the center/periphery asymmetries and hierarchies based on the division between modernization and the traditional agricultural production. As generally (Law, 1992; 4) explained the effects of material artifacts which changed when they are located in new network of relations. Like mushroom may be seen as a way of modernization to wealth while others may find the technology more important in nutritional status as we have seen during interessment by different actors in chapter four.

**5.7 Enrollment process to access initial capital:**

After the proposal to modernization of agriculture took off, experts from the State institutions started the credit unions known as (SACCOS) to facilitate availability of loans to farmers who changed their identities and now are known as entrepreneurs under the umbrella of small business units which were initiated by experts. When the expert was interviewed she explained:

> *"We have started the credit unions to make sure that farmers have access to the loans with low interest rates, this is among our strategies of supporting the project goals to make sure that it is financially sustainable" Source, (Field notes 2010 ).*
>
> *This is what Callon, (1995) named as alliance building through formation of heterogeneous groups aiming at multilateral negotiations. This insight of revolving funds was viewed differently as explained by one of the farmer here under.*

A farmer from one of the groups explained her experience with these credit unions:

> *"The available money is not for supporting us, because when you take their loan and fail to return with profit then even the small you own with your family will be taken to compensate for the loss even if it was not your fault, we are afraid because we cannot dare to take their money"* Source, (Field notes, 2010).

To summarize what happened including changing of people's low input production to modernization which was facilitated with credit unions. So, during enrollment not only farmers were trained what to do, how to do it and marketing but also they were trained where to access funds and how to use it so that they can graduate to be entrepreneurs. Farmers thereafter were baptized new symbolic names of entrepreneurs who think in business terms by constructing production houses', buying spawns from the Institute and selling mushrooms to the highly profitable markets established by experts, symbolizing modernization of agriculture which represent development.

## CHAPTER SIX: Mobilization

During mobilization process in this chapter I will describe markets as a kind of non neutral devices. We will show how markets create spaces where different power relations exist. Not only that but there is also a knowledge difference not all stakeholders share the same interests which in turn may lead to processes of inclusion and exclusion. We elaborate how in Hai District local markets are embedded in local cultural repertoires and experiences. Representation of markets occurs in terms of horizontal relationships and negotiations which cements society. On the other hand, we shall also see how mushroom markets were introduced by experts' aligned vertically hence become more of authoritative.

### 6.1 Mobilization:

Callon (1995) defined mobilization as the term that involves displacement and making the previous static entities mobile. As for the MATF project, mobilization process was associated with different strategies of implementation of pre determined activities. It also involved representative groups of farmers to carry out project activities like mushroom production, promotions, attending training, and marketing. So different roles assigned to actors are now implemented for the success of the project. Therefore from this chapter we are trying to look how actors were able to institute marketing and promoting new market networks which will bring wealth to beneficiaries but on the other hand we look the existing market networks and how they survived with the newly introduced ones. So we shall see which market network will be recessive and the one which will be dominant in this mobilization phase.

So the solution for people lacking marketing skills for the new market networks will be used as a new concept and now become entrepreneurs. The new network starts to operate target oriented to implement the solution which were proposed by the project. According to Callon, (1995), the term involves displacement, taking the previous static entities mobile. Through redisignation of farmer representatives and also implementation of number of activities that are of interest to them, actors are first displaced either physically or in terms of roles and then later they are assembled at an appointed place. Hence therefore, Callon (1995) also said that the process of translation aims at showing insights on how these translations are actually connected and then how translation network were established. Bearing in mind the importance of the network especially when the network is strong any one questioning the network will be faced by cohesive bodies that support each other Callon (1995).

Moreover the success of a technology networks and its applications depends not only on its technical excellence but also on its social agreeability and adoption. To be more precise it should be combined and well integrated in peoples' lives. Modernization by introduction of mushroom could assist as source of food, improved incomes which will lead to development. One of the areas will involve transformation of knowledge especially in (spawn) production to usage. Another area is the social part that involves coordination of the whole chain of actors in Hai District markets. This new marketing infrastructure in its newness in terms of

organization, evolved institutions, knowledge and social bonding (existing) created a kind of counter-tendency which will be explained better in market networks. During interview one farmer explained to us:

> *"To produce mushroom is very risky business. I tell you when you make a minor mistake in the process then count total loss. If you took loans from the local bank (SACCOS) then you are in for it, not like other projects in our village for example vegetables we have the knowledge to manage."* ***Source: (Field data 2011).***

*Table 2: Production of Oyster Mushroom since 2004-2009*

| Name of ward | Year | Quantity(Kgs) |
|---|---|---|
| Machame N | 2004<br>2007<br>2008<br>2009 | 0<br>100<br>200<br>370 |
| Machame south | 2004<br>2005<br>2006<br>2007<br>2008<br>2009 | 50<br>200<br>320<br>450<br>500<br>780 |
| Machame West | 2004<br>2008<br>2009 | 0<br>120<br>560 |
| Hai town | 2004<br>2008<br>2009 | 0<br>120<br>560 |
| Masama south | 2004<br>2005<br>2006<br>2007<br>2008<br>2009 | 0<br>215<br>258<br>460<br>500<br>580 |
| Masama West | 2004<br>2005<br>2006<br>2007<br>2008<br>2009 | 10<br>200<br>260<br>350<br>440<br>560 |
| Total | | 8,683 |

Source: District data, (2009)

These data showed somewhat kind of improvement in terms of production each year. Although some years have been skipped but the data clearly show that for example 2009 Machame South had the highest production compared to Machame North which produced poorly. May be caused by too many projects which included indoor livestock rearing which make farmers to be occupied throughout the year as observed during field work. Not only that but also during data collection time, the same areas were denoted as high producers while the

lower zones like Masama and part of Hai were seen as poor producers. These are the areas which are less populated 130 people/sqKm while in the upper zone about 650persons/sqKm.

### 6.2 Social meaning of farming as a traditional practice: Perspectives from farming in Hai:

From the personal conversation with one elderly farmer explained something which was interesting as I have documented here under:

Farming in Hai district historically embedded and the knowledge transfer is through daily practices of farming activities. Different crops both annual and perennials are grown in our farms around the households. They serve different roles that include cash incomes and food crops for the households. Cash crops include coffee while food crops include bananas, maize and beans.

Interestingly people commented that in Hai working in the farm and tilling the land manually with a hand hoe has high social status traditionally. It was socially a way to legitimizing marriage between two families and taken as performance appraisal for a hard working person. The good thing with traditional farming needs little inputs and also low financial investments compared to mushroom production.

### 6.3 Traditional farming as Economy of affection

Hyden's work of economy of affection allowed me to focus more on how peasantry and traditional farming meant. The first argument by Hyden (1980: 192) demonstrated that the effects of economies of affection lie not in the hands of political spheres but at the social levels. In other words from this point we are looking on how context may contribute to economy of affection. As for modernization policy, prescription as the way to transfer the knowledge and transform people did not resonate well in mushroom technology in Hai to achieve intended the goal of development.

### 6.4 Relative autonomy of producers:

Farmers enjoy high degree of autonomy and there is no specialization of production. In addition to tilling the land, the necessary knowledge is in the head of producers and is transmitted from one generation to another through apprenticeship rather than formal training. The economy of affection is also denoted by communication, network related by blood, kin, community and other affinities such as religion.

Non market factor are important than market aspects of both production and consumption while household decisions are based on use of values rather than exchange values. There are structural opportunities for development that expand horizontally in familiar networks both economically and socially. As Hyden (1980: 192) explained generally that the most important effect of economy of affection is not at the political but at the social level. Hyden concluded that external technologies that are promoting productivity and strategic marketing tend to fail. Likewise, the MATF project will all the efforts of political and technical will but the end results were not taken as opportunity to farmers but to the experts. Those who were targeted

by the project were not reached but on the other hand those elite farmers who ventured to production did not satisfy the demands from the market either.

### 6.5 Exit strategy:

Farmers have shown that they aim to exercise control their own production and managed to escape state policy and development project which have proved little impact in their frame of reference. The case study of Hai whereby farmers did not take the opportunity of producing mushroom to satisfy the demands of new network markets is a case in point. Training as part of the approach to transfer technology had little influence on the modernization of agriculture in Hai rather demonstrated costly illusion. These examples give us a better insight as to why many policies branded by buzz words like pro- poor, farmers needs, client focused have failed to reach the targeted group and hence therefore MATF may have represented well as a good example in Hai.

In Hai farming is unique task because household members migrate to the urban areas where they are employed and in return they contribute to the family ties which exist. Like one farmer explained:

“In our village young people do not like to join in mushroom production because most of them migrated to the urban areas to search employment. I think you have seen most of us we are adult women thus why mushroom in Hai is seen as a female production role” **Source,** (Field data, 2011).

### 6.6 Diversification:

In this case study we have managed to explain how farmers in Hai had many farming projects in place especially in the Northern part of Machame. In the upper zone they are favored by good weather conditions to have more crops (both annual and perennial). As Hyden explained generally, that the ability of household practice in economy of affection made many development projects and state policies like modernization of agriculture in Hai to contradict with the local practices in farming. The point I ever mentioned in previous chapters that technology and new marketing doesn’t resonate with the cultural values and practices in Hai like land tillage against in- house production system.

From one of our focus group discussions farmers' characterized existing market net works in Hai with the criteria as following here under:

*Table 3: Characterizations of Vertical and Traditional markets in Hai*

| Criteria | Vertical approach | Horizontal approach |
|---|---|---|
| 1.Power | Centralized | Communally and shared |
| 2.Access | Centralized | Open and shared |
| 3. Interests | Very diverse | Communal |
| 4.Ownership | Private | Public |
| 5.Social network | Isolated | Shared and learnt |
| 6. Knowledge ownership | Centralized | Shared and inherited |
| 7. Trust | Negotiated | Embedded |
| 8.Openess | Questionable | Available |
| 9.Calendarization | Top down | Embedded and negotiable |

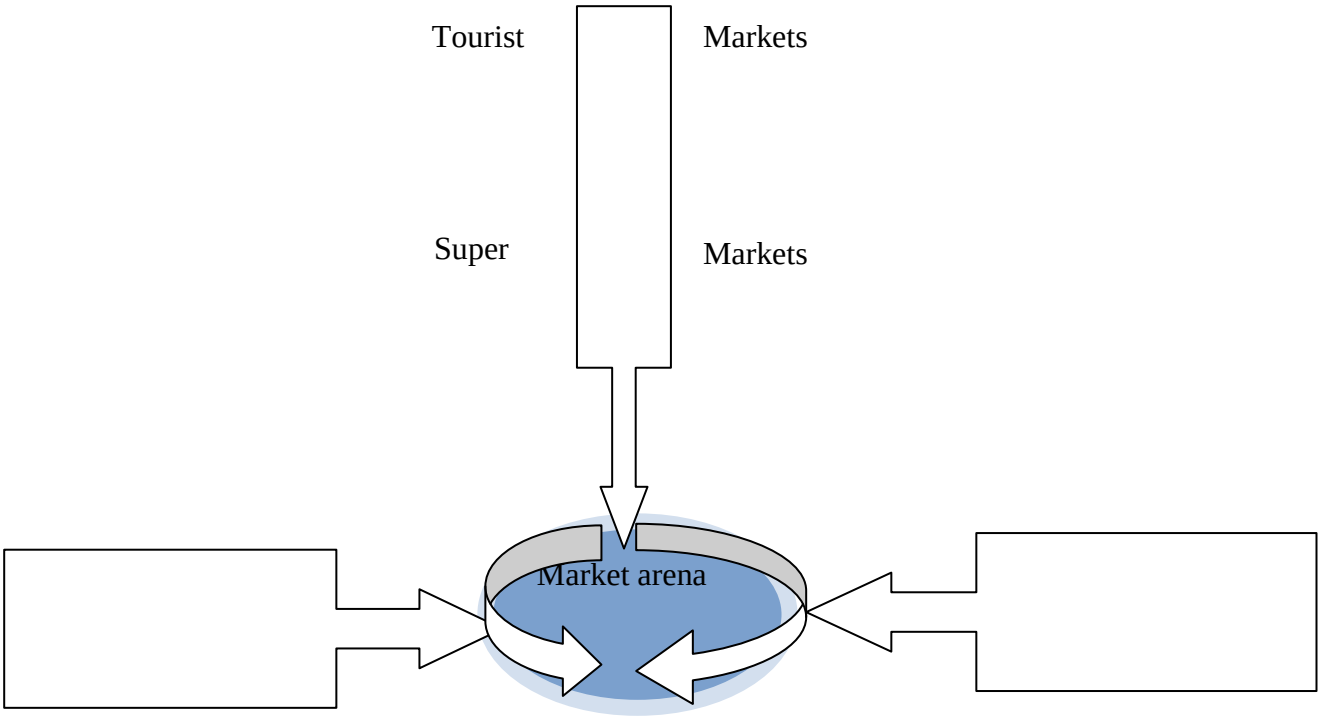
Source: field, (data 2010)

One of the farmers from poor production groups raised concern about markets and said:

> "*The marketing of mushroom is complicated because we are far from the vicinity. You know our local market is known to all of the community and we all go but that of mushroom is not. You need to sell to the middlemen either in cash or most of the time by loan*" (Source, Field notes 2010).

This statement from the farmer influenced the point of concern in this study to re-conceptualize the market by using literatures from social marketing perspectives. One of the useful writers included Granovetter and Polanyi who wrote extensively about how market is dissected by use of many important social elements which are overlooked by many. To clarify this point we shall try to follow marketing during modernization process. The two "Co-Exist" as logical frame of Vertical against Horizontal organizations as theoretical and methodological window of market networks.

**Figure 4: Market illustration**:




Source: Author, (2011)

### 6.7 Discussion of market networks:

The above illustration gives us the first insights about how marketing was shifted from the original form of horizontal negotiations of markets networks to vertical authoritative intervention. Although I wanted to start with the concept of Polanyi and Granovetter but I better start by looking at the existing historical connotations about what is marketing in Hai by listening to the voice of one farmer as she explained:

> *"We always hear from them that Mushroom has a big market price but how do we see the price in village while the market is in the urban and sub urban areas. If you want to know much better ask the middlemen has more information about the prices than the rest of us. The prices are big to them and not meant to us .You know this new industry is very complicated because you cannot understand well how it operates." Source: (Field notes, 2011).*

Price as a major motivation in vertical networks:

This give us a good entry point of our discussions about how vertical networks are not easily negotiated and do not resonate well in the horizontal marketing networks which is a major concern in the main research question. The first concept we obtained from the farmer is about

prices as one of the core elements that were associated with the new marketing which was introduced by experts vertically. So mushroom prices were assumed to be important motivation around modernization and hence boost production for the markets. Our first analysis will be guided by using window frame from Polanyi as to how marketing can be socially dissected by first looking at the overall idea of economic sociology.

The overall argument of this study call for a critical re- evaluation of the market economic perspective from Nancy (2007) and branded as homo economics by (Polanyi, 1957) who viewed demand and supply as narrow spectrum which could stand alone to influence price that will motivate production from Hai district. From this view of conceptualization we try to re-think what are the prices call for in the markets. To have a better dissection of the Hai markets, concepts like emmbeddedness, marketedness are of great importance to help us re-capitulate the notion of markets at a wider scope.

Needless to say that Weber (1978) put this point in another way, that money price are outcome of conflict of interest and compromise. This means that we need to understand prices as the outcome of struggle in the arena of marketing .So actors in the marketing have a social context which is guided by institutional regulations that exist in the market field. (Granovetter and Svedberg 1994) cautioned that although many studies for investigation of prices have been done from social perspectives, we should first view economic actions embedded in ongoing network of personal relationships rather than being carried by atomized actors. As if that was not enough, Bourdieu pressurized more by insisting that those prices do not determine everything but everything determine price. Bourdieu (2005) and Durkheim (1994) said that prices are social facts and we should not forget the classical work of Kangas who commented that it is the market that broke the traditional and social ties regulating economic action, but instead of being embedded in the social relationships the markets began to shape social life actually for its own purpose which resulted to great disruptions of the people (Kangas, (2007).Vertical market networks through authoritative interventions of prices as a motivation for wealthy and modernization of agriculture have contributed inversely to development in Hai District as explained by farmers :

*"You know, we are told to produce mushroom to sell to available markets. When we realized that production in group is difficult then we started producing individually but we have to send our mushroom to Middlemen who know the market. We are not paid on time and sometimes it takes too long to get our little money. May be He is also not paid on time as we are or He is playing us a dirty game, we don't know" Source: (Field notes, 2011).*

These clarify more the central point of his work that markets are socially constructed and governed and not natural given inevitable form Polanyi (1995). To learn from the discussion even further one of the farmers said:

*"We are producing mushroom but we are not interested to have any written contract with the super markets. Even during this time we are talking to you we don't have one.*

*The reason for this is to avoid any legal punishment if you don't meet the agreement".* Source, (Field data, 2011).

Collective market arrangements

Source: Field data, 2011

Paper work is clearly against the repertoire of horizontal market network as self regulating and democratic organ. On another level, confidence of production needs time to have all important and crucial information to take place. Knowledge needs time to be fully utilized by the recipients or in other words that social learning needs time to be utilized to its full potential bearing in mind that farmers have local knowledge for decades about husbandry of other project that are highly sold in their proximity and traditional markets. The point which was also mentioned by Hebinck, (2001) that experience is an important asset which is also determined in terms of time scale. The new markets for the Oyster mushroom also needed time for social learning to take place as Polanyi said in his work that the market is dis-embedded so to speak the point which was emphasized by one of the farmers as explained:

*"Virtual market is complicated: is not easy to access, getting information as to when it is available, how it is conducted and other criterion that are required in the transactions due to their low economic position as compared to other vegetables that require less initial capital. So it is very expensive to produce and to sell mushroom in our area as they need more money to invest as compared to other projects that we own****".( Source:*** *Field data ,2011 )*

Contradicting status core:

Mushroom introduced a new symbolic status core that did not resonate with the horizontal networks involved in traditional food markets. Podolny, (1995 and 2005) comments that

depending on the status differences existing in the markets may actually influence prices. We can define social status as the social stratification that may exist among producers or farmers based on different assessments of the quality of their products. In the course of our field we came to realize that our study is also associated with stratifications basing on the following entry point from District specialist, as explained: In the District there are high producers and low producers.

"*You know some are able to follow the production techniques which we teach them as a result they are performing very well but others are not doing enough I am afraid*". Source (Field data, 2010).

Lack fair environmental competitions in vertical networks

Farmers were also not comfortable with criteria around the new marketing networks and one of them explained:

> *"We are facing a lot of challenges as you have seen yourself. There are some farmers' and business people from neighboring countries who flood our markets and they are paid very well. You see even the Indian man is not looking us at all. They have money so they can afford to pack very well, they produce in lamp sum and they can meet the standards of packaging and labeling. We are not able to do the same because we are financially restricted! They replied"***.** *Source: (Field data, 2010).*
>
> The same idea was established by looking the other angle which was explained by Institution as a challenge. Through individual interview to the Institution, it was explained:
>
> *"You see farmers cannot match with the new ways of packaging"*
>
> *(Source: Field data, 2010).*
>
> Packaging is contrary to the way farmers are used to buy and sell in traditional markets which is symbolized more horizontally, unlike touristic market more of vertical that required predetermined packaging materials which also doesn't sound in the horizontal negotiations. Not only materials but also important items like producers, e mail addresses, brand marks, expiry date, date of production, nutritional details for it to qualify the needs of the customers. In that case it was realized that in the country there was no specialized group involved in that business. Otherwise you needed foreign money to get a company from outside the country to take the assignment forward.

Figure: 5 Fresh mushrooms  Figure: 6 Dried mushrooms

Source: Field data, (2011)

To proceed from the notion of markets as fields of struggle in the critical view of the constitution of prices is useful because power and information asymmetries between social networks can be seen as characteristic of all market relations. Moreover, preferences reflect the valuation of goods and services – based on the cognitive and normative orientations of market actors in the field which at the far end shape and re-shaped to what can be conceived to be valuable and worth value

.Putting it in another way, that institutions are able to influence the market competitions through setting quality standards, packaging criterion and all the public safety regulations that excluded the majority of producers in the markets because they failed to comply, (Troy/Werle, 2008).Importantly looking at price seemed to be an external factor confronting market actors, who are in these sense price takers.

In this study I wanted to show how vertical market network from the above illustration demonstrated opposite expectations from horizontal networks.

Example of new markets

They really forget to remember that in horizontal negotiations, farmers are still healing scars and wounds from the formal cooperative unions which failed many years ago. Still farmers have a good memory about how these cooperatives failed in their minds.

The role of Institutions in the market and power struggle surrounding institutional rules and regulations needed to be questioned. Taking example of cultural elements in market prices that, actors in the market are responsible to evaluate different goods that are supplied to the market. They are also responsible in the whole issue of normative preconditions which make goods objectively legitimate and ready to be assigned prices. So these approaches make it clearer that the issues of pricing have much more than what was expected. As (Mackenzie and Milo, 2003) repeated in their invocation underpinning the influence of social constitution of preference for certain goods, which to them depended on social technologies than others, in the sense of determining their monetary values.

It is from this frame of thinking that for price to be legitimate it must conform to the cultural norms which are not the outcomes of the economic system rather the cultural environments as an important context. Generally explained by (Smith, 1989 and Zuckerman, 1999) from their sociological investigations that cultural frames as important elements as they are, have relevant contribution in establishing price of a product. They continue to insist that in the market it is not necessarily that we follow the world laws and guidelines but we must depend on local culture and collective behavior experienced in the market interaction.

What has been since started the discussions of marketing in this chapter, embeddedness as an important element that make horizontal negotiations fruitful unlike the vertical and dis-embedded elements as mentioned which resulted to action of farmers not taking the opportunity of producing enough to satisfy the demands of the vertical market arena.

## CHAPTER SEVEN: CONCLUSIONS

### 7.0 Introduction:

In this chapter we are going to view and discuss qualitatively the research questions with their results as found from the case study in Hai District. The main issue from the case study was the agricultural policy of modernization of agriculture, whereby mushroom was set as the vehicle which will influence farmers to shift from traditional farming practices. The modernization of agriculture was established as milestone for development in Hai District. The key lesson from the case will assist in development of sustainable policy making in the field of rural development and other related areas of specialization.

### 7.1 Modernization context

Our case study has demonstrated that modernization of agriculture in Hai has created opportunities and contradictions. The available opportunities were for the elite farmers and entrepreneurs who shifted from the traditional ways of farming to modernization. Still we find other work from (Long, 2004, Van de Ploeg 2008, Hebinck, 2008) who demonstrated the same lessons from their general perspectives. Oyster mushroom has also created new Institutions and marketing network that were seen as not to resonate well with the traditional marketing networks. Contradictions were realized from shifting traditional knowledge of farming practices to modernization and new market networks by fortnights training.

In chapter two I used translation theory both as a methodological and a tool to view how Global to National (local) Ministry policies have contributed to modernization of agriculture in Hai District. Modernization of agriculture in the country used mushroom as vehicle to earn wealth by introducing new market networks which could be used as unit measure for development to the people.

Modernization of agriculture therefore promoted new network of experts who rubber stamp the technology like mushroom as source for wealth while others may see it nutritionally important. Importantly that modernization created new network of experts who are symbolized and linked through Institutions like Horti Tengeru, Education centers like University of Dar es Salaam and new market net works.

Also NGOs, farmers groups and financial institutions (SACCOS) which provide credits to farmers were among many actors. The central focus of the network is modernization of agriculture by technology development and transfer for improvement of the traditional practices that seemed to be problem and needed alternative which lie in mushroom.

The strength behind the net work regime is the promotion and publications that farmers are not taking the opportunity of modernization of their agriculture. The markets are available but farmers are not talking the available opportunity. Modernization has been used to critique farmers in Hai that they are not taking the opportunity of selling to high demands of introduced markets. Few farmers who have adopted the technology as explained in Chapter

six for example, still they faced a lot of challenges. The problems which they faced are differing from each zones of the study, namely (Upper zone, Lower zone and the urban area-which is around the high way. This was considered homogeneous by the MATF project.

The former research which was conducted in Hai indicated that farmers were trained in modernization skills by experts so that they can apply them in their new agricultural practices. By so doing they could have fulfilled the demands from the markets of the oyster mushroom requirements, Nancy, (2007). Some farmers were skeptical to venture into modernization as a result they remained in their former production practices and embedded markets which required little input supply and minimum financial requirements.

**7.2 Externality:**

This study also explained that modernization in the ministry policy has encouraged external technologies by improvement of the formulated problems to satisfy objectives which determined development. The insights emerging from externality is the overlooking of embedded knowledge and social values associated with farming in Hai particularly. The negligence of traditional against modernization by instrumentation process is of major concern in this study.

Regardless of being biased to experts ( spawn production, management and markets ) that were designed and implemented to meet objectives which determine solutions to existing problems of lack…….In a nutshell the study has demonstrated worrisome outcomes of the external technology in Hai as to contradict the former traditional production processes and marketing networks. They mean more than wealthy expectations from mushroom that's why farmers are not taking opportunities of available markets.

Importantly this study have found that farmers have used their experience and knowledge to hesitate the technology as it did not resonate well in their original knowledge as explained in chapter six. Some of the farmers also used solar dryers to improve the keeping qualities of the fresh mushrooms. Together with this point the dried mushroom may be kept for longer periods waiting for better prices when the markets are flooded. As (Long and Van de Ploeg 1988: 27) in their work called planned development for the people have several problems. First the considerations of homogeneity in the project area where farmers experienced different circumstances. Modernization as a dominant alternative in Hai District to facilitate development has been questionable.

**7.3. Addressing research questions:**

*A) How has the Oyster Mushroom project been translated to Hai District?*

Modernization in Tanzania is not from yesterday but has been set in motion long time ago with colonization and the building of modern institutions like the state and commodity markets as historical markers. The introduction of mushrooms is one of the many aspects and more recent manifestation of modernization. Modernization is said to proceed by promoting and applying expert knowledge. Modernization in this way may be conceptualized as a top-down or even authoritarian perspective of achieving social and technical change. The

assumption that has shaped the introduction of new technologies is that development - the synonym of modernization – proceeds linearly and progressively and that new technologies and their networks is the vehicle for development. The more mushroom are produced in the way experts have prescribed and designed it, the more likely it becomes that development proceeds progressively and trickles down to those that participated, even the poorest among them.

Translation analysis shows that the MATF project and modernization of agriculture publications are obligatory passage points. In this view through MATF project the first phases were problematization and interessment where actors identified problems and set solutions to the problems. MATF identified such problems like low and unreliable rainfall patterns in Hai to be solved by mushroom production because the technology does not need water like other crops.

The other issue was land shortage which was then solved by mushroom production technology as it only needs specialized in-house production as shown in the first chapter. Even the low income levels contributed by fluctuating prices of coffee in the World markets was then solved by training people how to access the new market networks and high prices available which were calculated by experts. In that case linkages were established to make sure that project success goals are achieved at the end.

Farmers were not knowledgeable about the modernization processes and therefore they underwent training for them to acquire skills and knowledge which at the end they were supposed to train their fellow farmers. This was experienced and implemented during enrollment of the translation phase.

*B). What networks have been created by the mushroom project and to what extend do these resonate with existing markets?*

There are two types of net work to be distinguished from this case study. The first one is the network that was involved in technology development and transfer. These include group of experts and Institutions who implemented the training package to the farmers. To site few examples are the Researchers, (as I was also involved in this process), NGOs, Farmers groups and individuals, community organization groups and Ministry of agriculture. They were all had specific role which was explained in the chapter five as enrollment phase.

The second part network was involved in the marketing and implementation of the promotional strategies. These include business groups, Traders, input suppliers, middlemen and the local financial credit union (SACCOS). They all represent actors who were responsible for prescription and mobilization of activities in chapter five and chapter six.

### 7.4 Market networks:

*Price as a major motivation in vertical networks:*

This give us a good entry point of our discussions of how vertical networks are not easily negotiated and do not resonate well in the horizontal marketing networks which is a major

concern and created failure to negotiate what the traditional markets consider most instead. We calculated prices for mushroom as an important motivation in the modernization uptake of the new technology. The outcome that prices may influence people to produce failed therefore.

Needless to say that new market network was top down and acted authoritatively against democratic negotiations which exist, so there was failure in approach to realise what are the existing arrangement of the markets.

The second opinion from one of the farmers mentioned how authoritative networks reorganized them and transformed them in group basis rather than self- organization in relation to their traditional values, here she explained:

> *"You know, we are told to produce mushroom to sell to available markets. When we realized that production in group is difficult then we started producing individually but we have to send our mushroom to Middlemen who knew markets. We are not paid on time and sometimes it takes too long to get our little money. May be He is also not paid on time as we are or He is playing us a dirty game, we don't know" Source: (**Field notes, 2011**).*

Paper work is clearly against the repertoire of horizontal market network as self regulating and democratic organ. On another level, confidence of production needs time to have all important and crucial information to take place. Knowledge needs time to be fully utilized by the which was not considered by the project

In the District there are high producers and low producers created a kind of segregation to the farmers who were involved in the project (exclusion)

*7.5 Lack fair environmental competitions in vertical networks***,**

Farmers were also not comfortable with criteria around the new marketing. Examples included brand marks, specialized packaging, expiry dates which does not count to traditional markets in Hai.. This is another area which played a big role to exclude the small scale farmers to be reached by mushroom as vehicle to modernization.

Power and information asymmetries between social networks as established by the middlemen that other farmers are not ready to take up the leadership. Very few people are aware of how the new market network operates as they are far away contrary to the traditional markets

**7.6 Marketing of traditional foodstuffs:**

Marketing of local food stuffs is associated with different cultural values like Social embeddedness, Collective market arrangements whereby producers or farmers collectively market and distribute their food produce to the scheduled market. This is clearly known to the people when the market is available and the knowledge of when certain produce is needed

much more in the market. There is clear balance between motivation for production and social cultural values in the marketing. The point of collective marketing for Oyster mushroom is completely missing. Farmers involved in the project have no specific time nor date they are arranged socially to do marketing. There is a big gap between oyster mushroom production and marketing arrangements as compared to traditional foodstuffs in Hai.

*Balancing values, motivation and ultimate goals:*
The range of values and motivations of producers of local foodstuffs in Hai are directly linked to the market considerations. The balance must also be flexible enough to make farmers be able to earn a living from the marketing networks and the technology. Farmers are still skeptical if they can manage to get wealth and earn living by involving themselves in mushroom production. They have rich knowledge on how traditional food marketing provides them with a living.

*Price negotiations are centrally located*
Farmers negotiate prices in the traditional markets fairly. They are also responsible to make struggle for food availability and varieties seasonally. This is another point that made mushroom to be periphery in marketing network fields. The prices ruled by experts that follow demand and supply regime and the centre of motivation to produce to take the opportunity of available markets did not resonate well in Hai marketing networks.

*Level of instrumentalism:*
The levels of instrumentalism are measured in the degree to which economic goals are placed above "family ties, friendship, spiritual considerations or morality. The levels of instrumentalism in Hai is low in the marketing of traditional food stuffs because is more democratic, voluntary in participation. In this case then traditional marketing networks have high levels of embeddedness as compared to mushroom which experience high levels of instrumentality and therefore low levels of embeddedness

**Lessons from the above conclusions:**

Traditional marketing of foodstuffs in Hai give us practical indication of sustainable horizontal network. They are both involved in negotiation of technical adoption of technologies or rejection of new market net works.
Farmers in Hai have demonstrated their knowledge embedded and experience in the projects they are used to carry on and skeptical decisions for the sake of adoption new modernization process through introduction of mushroom as a technology and vehicle for modernization.

It is better to start from what people know then to new and improved technology. Like the case of mushroom, they could have started with wild identification of non poisonous mushrooms that are known to the local people and then invest from there the higher modernized technologies.

The study also demonstrated that most farmers who are high producers are the one who are in the upper zone with good climatic conditions while the poor producers are the one in the

lower areas where the climatic conditions are completely different from the upper zone. They have fewer opportunities in terms of farm projects. They are more involved in vegetable production and small micro enterprises around their households.
During the project operations, most farmers were producing mushrooms in groups and facilitated by the project money. But after the project phased out the same farmers were not able to continue the production due to many problems associated with low income levels and project dependency
The project aimed to facilitate small holder farmers in the project because they found that due to problems encountered by farmers then mushroom was seen as the golden egg and the only vehicle to bring development in the District. Surprisingly, the same farmers who were intended to be reached by the project were left untouched because elite farmers took over the project.
I can conclude that the project failed because of the following reasons:

- Failure to reach small scale farmers who were the main target for the project
- Farmers not producing to satisfy the available markets
- Taking farmers in the project area as homogeneous domain
- Farmers not able to sustain the project and new market networks after the project phased out.

The study has discussed how farmers were excluded during designing the project in Hai. They were involved during the implementation phase where I found contradiction in the level of technological package in one way over looked the criteria of how the technology is either advanced in relation to the existing knowledge and skills (technological knowledge gap) as compared to economies of affection.

Farmers are not able to pack their mushroom and the same point was mentioned by experts as a challenge not to the farmers but to the country.

Modernized markets are not able to dominate the traditional markets because they have failed to transform the existing market net works.

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