INTERACTIVE GOVERNANCE APPROACH IN MARICULTURE ACTIVITIES IN TANZANIA

A Case Study at Mlingotini Village, Bagamoyo

By

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ABBREVIATIONS AND ACRONYMS

Abbreviations

FAST-Faculty of Aquatic Science and Technology

FINCA-Foundation for International Community Assistance

ICM-Integrated Coastal Management

KICAMP-Kinondoni Integrated Coastal Area Project

NEMC-National Environmental Management Council

NGOs-Non-Governmental Organizations

NIC-National Investment Centre

NSGRP-National Strategy for Growth and Reduction of Poverty

SEEGAAD- Smallholder Empowerment and Economic Growth through Agribusiness and Association Development

SEMMA-Sustainable Environmental Management through Mariculture Activities

SDSP-Seaweed Development Strategic Plan

SUA-Sokoine University of Agriculture

SUCCESS- Sustainable Coastal Communities and Ecosystem

SWOT-Strength, Weaknesses, Opportunities and Threats

TAFIRI-Tanzania Fisheries Research Institute

TCMP-Tanzania Coastal Management Partnership

TZS-Tanzanian Shillings

UDSM- University of Dar es Salaam

UNDP-United Nations Development Program

URT-United Republic of Tanzania

WIOMSA-Western Indian Ocean Marine Science Association

Acronyms

MKUKUTA- National Strategy for Growth and Reduction of Poverty
JEBA-Community Development in Bagamoyo

ABSTRACT

Coastal resources are overexploited and thus coastal livelihoods provides very little in terms of micro-economy. Seaweed farming activities have been considered as alternative income generating activities in Tanzanian coastal communities. Nonetheless, the sustainability of seaweed industry is dependent on the nature of interactions between the three orders of governance and the governability depends on how well the governing system matches with the system to be governed. Through fitting primary and secondary data obtained from seaweed farmers in Mlingotini village into governance models and theories, this thesis analyzed the interactions and the roles being played by three governance institutional elements: state, market and civil society as mariculture industry as concerned in Tanzania. In order observe the accomplishment of good governance principles, the system to be governed should understand and differentiate between the needs for local community, the accountability of the governing system as well as capacities available to the governing system. Analyzing social impacts of seaweed farming along the coast of Tanzania provide positive and useful insights on the industry but in addition to that, this study also found that the governance system should consider improving the production chain which seems to be necessary for the seaweed industry along the coast. I therefore concluded that, along with launching SDSP in 2005 in Tanzania the governance instruments should be corresponding to the reality such that the concern should not be only to increase seaweed production, but also to consider missing essential instruments for making seaweed business sustainable including trainings on business skills and planning. Including mariculture related courses in academic institution syllabuses such as FAST-UDSM, (just as aquaculture courses) or under biotechnology courses in Botany department- UDSM or in other Fisheries Institutions will be a great achievement to sustain seaweed industry in Tanzania.

Key words: Tanzania, livelihoods, interactive governance, mariculture activities, seaweed farming.

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CHAPTER 1

1.0. INTRODUCTION

1.1. Introduction

Seaweed farming is an activity that has potential for a significant contribution to Tanzania's economy. Today we have little knowledge about this activity and how it can be developed. In this work I will study practices and governance of seaweed farming in Tanzania and hopefully contribute with insight about seaweed farming that can be useful for further development of this business.

Tanzania is among eastern African countries, with border to Kenya and Uganda on her northern side). She is a coastal tropical country lying between Longitude 29^0 and 41^0 East and Latitude 1^0 and 12^0 South. She covers an area of 945,000 km^2 with a coast line of 1,424 km[1]. According to Population and Housing Census in 2002, the population density in Tanzania is 34.4 millions, with average annual growth rate of 2.9 percent since 1988 (Tanzania-National Population Policy, 2006).

[1] http://www.tanzania.go.tz/

Figure 1.1: Map of Tanzania showing mainland and Zanzibar Islands[2]

Tanzania resulted from the union of two states (Tanganyika and Zanzibar Islands) and hence her official name is commonly known as The United Republic of Tanzania. She possesses a wide range of natural resources such as minerals for instance diamonds and gold mines; others are wildlife and tourism, forestry and beekeeping as well as fishery resources (from both fresh water bodies and marine waters).

Despite the natural resources richness in Tanzania, aquaculture/ mariculture industry is low. This is due to the fact that, these activities lack institutional attention and hence their development remained stagnant for long. However, these activities have been performed for a long time by coastal communities for local consumption; it is very recently, the aquaculture and mariculture activities are being carried out in marine environment, fresh water bodies, lagoons, brackish water as well as in estuaries for commercial purposes and at larger scales.

[2] www.lib.utexas.edu/maps/tanzania.html Tanzania (Small Map) 2008 (26k)

The population density is along the coast of Tanzania is increasing rapidly increasing pressure on coastal resources. Table 1.1 adopted from Bryceson and Francis (2000), present population densities along coastal regions in Tanzania.

Region	Area (km^2)	Population density (persons/km^2)			
		1967	1978	1988	2000 (estimate)
Tanga	26,808	29	39	48	62
Coast	32,407	13	16	20	25
Dar es Salaam	1,393	256	605	977	1,745
Lindi	66,046	6	8	10	12
Mtwara	16,707	37	46	53	61
Zanzibar	2,460	149	201	260	353
TANZANIA	881,300	14	20	26	36

Table1.1: Population density along the Tanzanian coastal regions[3].

Due to high populations along the coast, various researches have been conducted along the coast to pinpoint alternative livelihoods for coastal communities and create some other employment opportunities other than fishing activities. Mariculture, at large scale are limited at Mbegani Fisheries Development Centre for mud crab fattening in cages in open waters, farming of bivalves in Zanzibar Island and seaweed farming on ropes performed along the mainland coast and Zanzibar Islands. However, at present there are several fish ponds and seaweed farms that could be managed and developed in valuable fisheries resources. Due to lack of extension services (for technology transfer to the farmers), the adoption process is delayed. There is some small scale culture of tilapia, but the economic contribution is small.

The mariculture of seaweeds for export make important contributions at coastal community levels, but the practice is not yet very widespread, especially in Tanzania mainland. Generally aquaculture in Tanzania is characterized by culturing different species, these include; Tilapia *(Oreochromis nilioticus, O. mossambicus),* Shrimp *(Penaeus monodon, P. indicus),* Red seaweeds *(Eucheuma, Kappaphycus),* marine and

[3] http://www.cbd.int/doc/case-studies/suse/cs-suse-iucn-marine.pdf

brackish finfish *(Siganus, Chanos, Mugil),* molluscs *(Saccostrea, Anadara, Pinctada),* integrated systems (agri-aqua) e.g. tilapia-ducks integration. Since Tilapia seems to be difficult to culture, due to lack of good quality seeds as well as land and water issues, like water user rights, more emphasis is being put on coastal than inland aquaculture and *Chanos chanos* is currently a popular species being cultured in coastal aquaculture. This species is likely to substitute tilapia especially in coastal regions due to its taste preference to most coastal communities. Apart from coastal aquaculture of *Chanos chanos sp,* seaweed farming seem to grow very fast along the coast of Tanzania and mainly performed by women. The mariculture of seaweeds for export has started to make important contributions at coastal community levels, but the practice is not yet very widespread, especially not on the Tanzania mainland coast. It is, however, not a new activity in Tanzania.

1.2. Origin of Seaweed farming in Tanzania

Zanzibar Islands have exported wild seaweeds since 1940s. The main species to export were *Eucheuma cottonii.* By 1950s the Islands were exporting up to 387 tons of dried wild seaweeds to the main markets in Europe (Sen, 1991). The collection of wild seaweed for export was possible at that time since the population in coastal regions was not large compared to recent population. In order to maintain income generated from seaweed exports, coastal communities engaged in seaweed farming due to the fact that wild collections are not abundant anymore.

Msuya (undated) pointed out that, the successful seaweed industry in Zanzibar Islands involved both men and women. However, the author adds that, men slowly left the industry and currently seaweed farming activities are being performed mostly by women. Additionally, Msuya (undated) pointed out that women who carried on with the activity are able to buy necessary household items such as clothes, school uniforms for their children as well as improving old homes.

Nationally, seaweed farming activities are recognized as forms of mariculture that can be adopted without difficulty by poor coastal communities. Currently, the government of

Tanzania, through the concerned institutions, various stakeholders and government and Non-Government organizations, is facilitating and promoting seaweed farming. The aim is to develop these activities from local to industrial levels of production.

Tanzanian government through her development strategic plans says that, *"Rural growth is critical in reducing poverty in Tanzania, and growth in smallholder agriculture is most critical. Measures are needed to increase smallholders' productivity, to assist in improving the quality of produce and to command higher prices for their produce by moving up the value chain"* (United Republic of Tanzania (URT), 2005).
Most coastal communities are poor and they depend directly on coastal resources for their survival. Their activities include artisanal fishing, smallholder farming activities, salt production, charcoal preparation, seaweed collection (farming) which are at subsistence level. Due to the fact that these activities do provide little in terms of local micro-economy, the larger percent of coastal communities are fishers and this cause the depletion of wild fish stocks. Seaweed farming has been regarded as an alternative activity to fishing, which might give employment opportunities to the fishing population so they fish less, reduce the catch pressure in wild fish stocks

1.3. Objectives of the Study and research questions

The main objective of this study is to describe and analyze the relationships, interactions and conflicts in mariculture in Tanzania. The study is specifically based on seaweed farming as a form of mariculture along the coastal zone of Tanzania. This study also intends to analyze the roles of the state, market and civil society in ensuring the development and success of seaweed farming activities in Tanzania. At the end I discuss some needs, challenges and opportunities to develop a well functioning governance system for mariculture in Tanzania.

There are some variations among the sites of seaweed farming in terms of farming techniques, levels of production as well as the marketing systems. Thus, the case in this study is assumed to be a not necessarily representative for other seaweed farming sites in the country. However, it is my opinion that it contributes with useful insights about the

relationship in terms of the roles to be played by the stakeholders and key institutional elements in seaweed farming activities. However, there are some variations among the sites in terms of farming techniques, levels of production as well as the marketing systems.

1.4. Study Limitations

- The study is limited to the Mlingotini area in Bagamoyo district. Although there are various seaweed farming sites in Bagamoyo district, the study concentrated in one village due to the fact that the nearby proposed study area experienced seaweed die-offs in few last years thus there were no seaweed farming activities by the time the study was conducted.
- Financial limitations: the budget for data collection was limited therefore there was no possibility of visiting other seaweed farming sites in other coastal regions especially those which are more successful in seaweed farming business, for instance, Zanzibar Islands and Tanga region.
- Most artisanal fishers at the study site reported to be employed by boat owners, thus individual catch data were not recorded during the study, and hence there will be no comparative analysis on fishing and seaweed farming activities under this study.

1.5. Thesis Organizational Structure

My thesis is organized into seven chapters such that *Chapter Two* is the theory part of the thesis where various literatures were revised. From literatures, various models and theories were chosen for data analysis qualitatively: these include interactive governance theory, governing as governance model, the fish chain model as well as marketing theory to provide basic marketing aspects in seaweed marketing aspects. *Chapter Three* describes the methodology from how data were collected to how the data are to be analyzed

Chapter Four presents the background information on mariculture activities in general and seaweed farming specifically. Under this chapter the history of mariculture development in Tanzania is presented, the institutional arrangements and legal

framework, farming technology as well as seaweed marketing systems are also put down. Other aspects under this chapter include National Strategy for Growth and Reduction of Poverty (NSGRP) and challenges facing mariculture development in Tanzania. *Chapter Five* describes the study site and its characteristics. Here the main activities in the area were described where seaweed farming and small scale fishing found to be the main activities. The need of seaweed farming in coastal communities in Tanzania along with the interactions of seaweed stakeholders are also pointed out.

Results and discussion condensed in *Chapter Six* where data are fitted into models and theories to reveal the real situation in seaweed farming activities related to governance aspects. Finally, *Chapter Seven* concludes the whole work: ending by pointing out some useful findings for sustainable mariculture development as well as a call for lend a hand for uphold of mariculture activities in Tanzania.

CHAPTER 2

2.0. THEORETICAL FRAMEWORK

2.1. Study into theory

My study is concerned about the interactions between the three governance institutional elements, namely state, market and civil society examining how governance can be improved for the seaweed sector in a way that develops mariculture sector. As fisheries and aquaculture are uncertain and unpredictable, they pose a long list of challenges in such a way that they present the 'hard choices' for fisheries governors. Meeting conflicting objectives such as *"conserving resources, increasing employment opportunities in fisheries, sustaining communities, ensuring the food for the poor, increasing export earnings"*, is not easy and thus these are hard choices to fisheries governors (Bavinck et al, 2005).

Earlier aquaculture believed to be a solution for reversing declining capture fisheries and to meet the increasing demands for fish, but its rapid growth goes along with declining capture fisheries and thus fisheries and aquaculture are in conflict themselves. Bavinck et al, (2005) pointed out that the two systems (fisheries and aquaculture) are difficult areas to deal with as they pose many challenges and concerns, and the author identified some of these challenges. The most relevant challenges to this study include:

- Fisheries resources in the world are overexploited and there are no immediate restorations seem to be put in place.
- There is a lack of fish chain information among stakeholders especially at community level as well as and knowledge on its function which in turn affects the fisheries governance and fisheries management
- The interactions between capture fisheries and aquaculture limit the expansion of aquaculture industry as these two fisheries activities share common ground.
- In choosing which sites may be suitable for certain species to farm has always posed challenges due to the concern of ecosystem health.

All these challenges need to be addressed promptly; therefore actors involved in governing have to well understand them and their characteristics which will help to strengthen the governance systems (Bavinck et al, 2005).

2.2. The governance and good governance concepts

My theoretical framework in this thesis is governance theory. The concept has been defined by the European Commission as, "*… the sum of the many ways individuals and institutions, public and private, manage their common affairs. It is a continuing process through which conflicting or diverse interests may be accommodated and a co-operative action may be taken. It includes formal institutions and regimes empowered to enforce compliance as well as informal arrangements that people and institutions either have agreed to or perceive to be in their interests*" (Be´ne´ and Neiland, 2006).

Bavinck et al, (2005) defined the term 'Governance' as the whole of public and private interactions that are necessary for solving societal problems and creating societal opportunities. Apart from that, Anon (2008) simply put down that governance to be the process of decision-making and the process by which decisions are being implemented. These governance definitions are related to each other and they are relevant to the study as they stroke directly governance issues in daily activities. In general terms, these definitions and the concept of governance provides the arrangements in the relationship among different levels of stakeholders within the community defining institutions and how these institutions relate to each other.

2.2.1. Stakeholders

In governance system, there is a diversity of stakeholders participating partly or fully in day to day governing processes. According to Jentoft and Mikalsen (2001), the term 'stakeholder' means **"***Any group or individual who can affect or who is affected by achievement of a firm's objectives*". This is rather a social concept whereby for any industry to grow, as suggested by authors, business executives should understand and

attend needs and concerns of other stakeholder groups such as suppliers, employees, local communities as well as customers. *Unfortunately, this arrangement seems to be inverted as seaweed business as concerned in Tanzania. This is due to the fact that, business executive's position is filled up by poor farmers who needs attention from other stakeholder groups rather than them attending other stakeholders, for the business to sustain.*

There are various categories of stakeholders; Klarkson (2001) differentiated them as, primary stakeholders and secondary stakeholders. Primary stakeholders are those who are to be included for the business to exist, for instance seaweed farmers, donors for the activities to grow, buyers to link farmers to the market as well as public sector (the government) to formulate policies. It is obvious that these groups of stakeholders depend on each other in one way or another. Additionally, the author defined second category of stakeholders as secondary stakeholders. These are social groups whether they exist or not the business has to go on, their impacts on the business will be felt only when they interfere with the business. Taking example of small scale fishers in coastal areas where seaweed farming activities takes place, here fishers can be considered as secondary stakeholders since the size of seaweed farm to be established will not depend much on the number of fishers in the area. Their impacts will be considered only when they will collide with farmers simply by performing fishing in seaweed farms.

Not only are these but also there many other interested groups such as media, culture, traditions as well as public and private sectors, which can affect seaweed industry in any way. This highlights the facts that, the whole governance system formulate and implement policies in interactive manner. This situation allows the system to accommodate a wide range of groups of stakeholders including those from civil society, market as well as state; which in turn provide more room to exercise good governance principles.

2.2. Good governance

According to United Nations High Commissioner for Human Rights, Governance means the course of action in which public institutions perform public affairs, handle public resources and assurance the attentiveness of human rights (Anon, 2006). The author went further by pointing out that Good governance does this in a manner basically free of neglect and dishonesty, and according to the rule of law. Table 2.1 presents the five principles of good governance put down by United Nations Development Program (UNDP) found in Amos et al, (2003).

Box 1: Five Principles of Good Governance	
The Five Good Governance Principles	**The UNDP Principles and related UNDP text on which they are based**
1. Legitimacy and Voice	**Participation** – all men and women should have a voice in decision-making, either directly or through legitimate intermediate institutions that represent their intention. Such broad participation is built on freedom of association and speech, as well as capacities to participate constructively. **Consensus orientation** – good governance mediates differing interests to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures.
2. Direction	**Strategic vision** – leaders and the public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development. There is also an understanding of the historical, cultural and social complexities in which that perspective is grounded.
3. Performance	**Responsiveness** – institutions and processes try to serve all stakeholders. **Effectiveness and efficiency** – processes and institutions produce results that meet needs while making the best use of resources.
4. Accountability	**Accountability** – decision-makers in government, the private sector and civil society organizations are accountable to the public, as well as to institutional stakeholders. This accountability differs depending on the organizations and whether the decision is internal or external. **Transparency** – transparency is built on the free flow of information. Processes, institutions and information are directly accessible to those concerned with them, and enough information is provided to understand and monitor them.
5. Fairness	**Equity** – all men and women have opportunities to improve or maintain their well-being. **Rule of Law** – legal frameworks should be fair and enforced impartially, particularly the laws on human rights.

Table 2.1: Principles for good governance (source: Amos et al, 2003).

Good governance is about democracy, participation and functionality. Tanzania is known to be a democratic country since after her independency and recently freedom of speech in the country as well as levels of participation into various issues for the citizens is increased. The government is decentralized such that local communities are considered as primary stakeholders to identify their needs unlike previously (1970s) whereby the state was deciding what to provide where and when, even if such a thing is not required to that place or village; this reflected from the Ujamaa Village era.

The public sector, private sectors, NGOs and other seaweed stakeholders in Tanzania jointly facilitates seaweed activities along the coast. The decisions to culture seaweed originate from local communities, and under poverty reduction philosophies in the country these farmers are being helped out with some seed-money or production in puts to sustain their seaweed activities. Normally, seaweed farmers are organized themselves into groups with their leaders who acts as representatives for their groups. These are accountable to other groups of stakeholders as well as within the group such that any leader will decide fairly according to the nature of the group being represented and in most cases leaders are from both genders.

Globally, the decline of total catch in capture fisheries and the rapid growth of aquaculture (due to the use of marine resources in aquaculture production) are of great concern. This is due to the fact that, these systems deal with multiplicity of stakeholders very often with conflicting interests, therefore *"'interactive governance approach' to fisheries is introduced to address diversity through inclusiveness, complexity through rational, holistic, integrative approaches, and dynamics through an interactive and adaptive framework"* (Bavinck et al, 2005), necessary for interaction among various actors in fisheries. Apart from capture fisheries and coastal aquaculture interactions, which present challenges in terms of their development and management, seaweed farming does not conflict much with capture fisheries to the extent of compromising the wild fish stocks as aquaculture does. It is rather affecting the wild stock in a positive way whereby seaweeds used as food for herbivore species and hence benefiting the whole ecosystem. Knowing that herbivore fish specie feeds on seaweeds, artisanal fishers

performs fishing activities in seaweed farms illegally and thus the interactive governance is necessary.

2.3. Interactive governance theory

Interactive governance is described by Edelenbos (2005) as an approach whereby policy-making procedures have became more communicative and more participatory which means that the most people to be affected by the plans are involved in early stages of decision-making. The term also defined by Kooiman (2005) as a form of action, specifically undertaken by actors to tackle obstacles and finding new pathways for better management. In fisheries and coastal governance, the *'interactive governance theory'* implies the inter-relationship between the two systems, the governing system and the system to be governed (Jentoft, 2006). The author also pointed out that the governing system is social-based such that it is made up of institutions and steering mechanisms. The system to be governed is known to be mixed up with natural as well as social aspects. This is due to the fact that, the natural part of this system consists of an ecosystem and the resources found in it together with various resource users and stakeholders who form political coalitions among themselves (Jentoft, 2006). The two governing systems are diverse, complex and dynamic and thus they should be compatible for the governance to work effectively (ibid). There are two sets of governance activities in terms of interactions between governing actors; these are *orders* and *modes* of governing. The governing orders aim at conceptualization of societal activities or social-political governors in terms of their activities while governing modes aim at particular forms of societal interactions in which these activities take place (Kooiman, 1999).

2.4. Orders of governance

There are three kinds of governing orders which have been distinguished by various authors, but the main concern of my study is on the first order of governance since it is at user level. Second order is mainly administrative while the third order of governance deals with ideologies and politics whereby various policies are being formulated and implemented. However, the second and third orders will be included as they shape the

focus of first order of governance. Table 2.2 shows three governing orders as adopted from Bavinck et al, (2005).

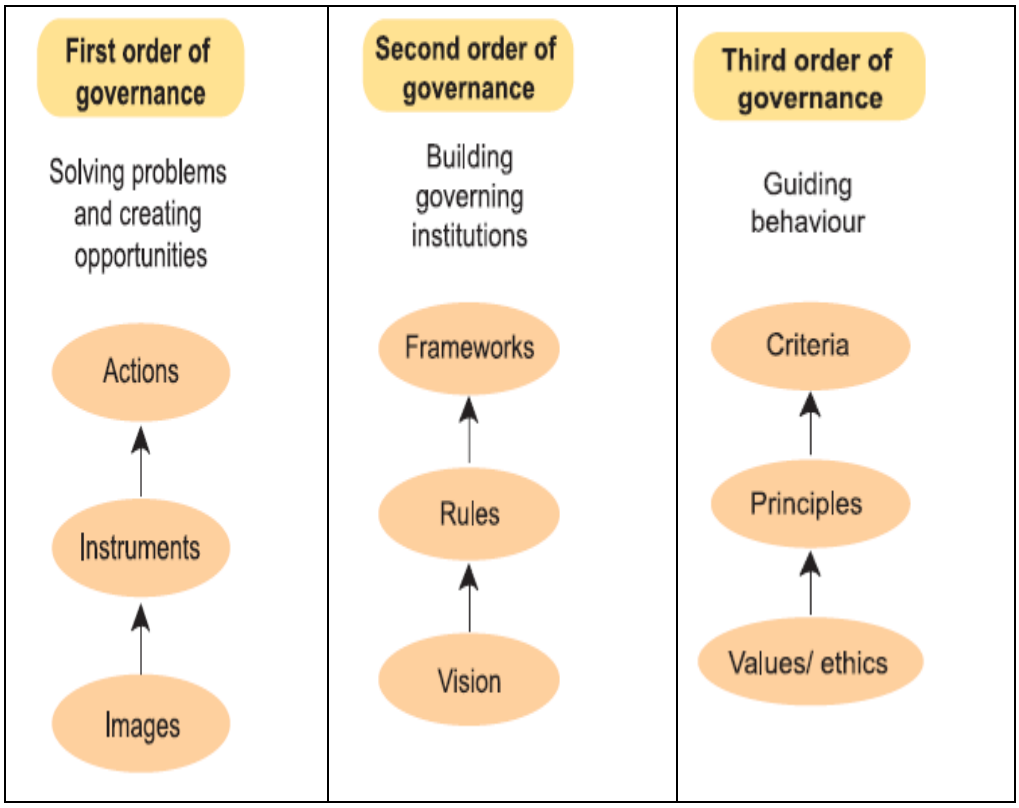

Table 2.2: Three Orders of governance.

2.4.1 First-Order governance

This order of governance is aiming at solving day to day problems and opportunity creation within the society. This is due to the fact that the challenge in modern societies is not only about solving collective problems, but also it is concerned with creating shared opportunities (Kooiman, 1999). Under this governing order, there are day-to-day activities of public and private actors in real governing situations and therefore at this level there is a balancing between problems, opportunities, solutions and strategies (Kooiman, 1999). The author described the interactions (see section 2.5 below) and categorized such interactions in to two main levels; international and structural level. At international level there are three components that can be identified; these are "*images, instruments and action*" while at structural level the components are "*culture, resources*

and power". The three elements, images, instruments and action regarded as conditions for effective governing. Kooiman (1999) insists that, in order to govern, the governor needs to understand where the system to be governed is, where it needs to be and how the actual situation may be moved into the preferred condition. The main concern here is how to move such actual situation to the preferred one; this is due to the fact that under this order of governance there are a lot of issues to be considered which outweighs the capacities of local governance systems at the same time there are no instruments to move such systems into the required actions.

2.4.2 Second-Order governance

According to Bavinck et al, (2005), the second-order governing is mainly concerned with maintenances and designs the institutions needed for problem solving (for first-order governing). The author added that the second-order governing provides the guiding set of laws or the approaches in which things should be done. In addition to that, Kooiman (1999) pointed out that, solving problems as well as creating societal opportunities (first-order governing) takes place theoretically and practically both being rooted in institutional settings measured as frame works *which have to cope with diversity, dynamics and complexity.* Additionally, in the second-order governing there is a balancing process between governing *needs* on one hand, and governing *capacities* on the other (Kooiman, 1999). The governing modes which are self governing, co-governing and hierarchical governing describes what needs and capacities are for effective governance system.

Self governing: this is the concept of self-regulated societal sectors; where most of regulation aspects are delegated to societal sectors themselves and not carried out by public authorities directly.

Co-governing: this also called co- or inter-governance. Kooiman, (1999) pointed out that different forms of partly 'horizontal' and partly 'vertical' in which these relationships are very diversified, and can track each other in the course of time, however, the modes of horizontal structures dominate quite often. There is no vital or dominating governing actor under this mode instead actors communicates sideways.

Hierarchical governing: under this mode, the rights and duties are planned according to super ordinate and subordinate responsibilities (Kooiman, 1999). The interventions are official forms of communications that are characterized by hierarchical structural arrangements and they are accompanied by all kinds of political and juridical guarantees.

Regarding to the modes of governance, in Tanzania all microeconomic activities are concentrated in local communities, Non-Governmental Organizations as well as private sectors. These social sectors plays major roles as development as concerned basing on daily activities, communicating within local systems. For the case of seaweed farming activities, stakeholders are able to decide minimum number of lines should a farmer culture in such a way that there is assurance of a certain weight produced in specific farm sites for specific period of time. In such situations buyers are able to set schedule on when should they collect seaweeds from which sites and this is typical self-regulated mechanism which does not require government intervention. Apart from that, elections of seaweed group leaders are even more local involving only seaweed group members.

Actors shares responsibilities, and according to division of labor though there are responsibilities which are out of their reach and need co-governing. This means that, the needs can not be provided within the existing capacities and thus needs are to be forwarded to the public authorities. For instance, seaweed die-offs being experienced by farmers in Tanzania need to be researched and solutions or alternative farming techniques should be provided. Farmers are not at a position to carry out these researches and therefore public research institutes have to provide that service. Currently, Institute of Marine Science and Tanzania Coastal Management Partnership are the major institutes responsible for seaweed researches. Additionally, promotion of seaweed farming starts at local level through various levels of public authorities and other stakeholders. It is obvious that public authorities are responsible to formulate policies regarding seaweed farming activities as well mechanisms of enforcement such policies. Such capacities are located in top most levels of public authorities as long as the needs are identified from local levels, but this depends on how well did the need presented to these top levels.

2.4.3 Third order governing (Meta-governance)

This addresses the issue of governability in governing system. In first order and second order governing systems "*many clashes, differences, conflicts, risks and uncertainties remain unsolved"*. This is a dilemma belongs to the third-order governing such that it shows how legitimately does problems are handled and also the issue of what kinds of efficiency setting for governance is suitable. Governance is regarded as a self-governing system which yields governability as its outcome (Kooiman, 1999). Under this governing order, there are advanced values, principles and criteria in which governing practices are supposed to be assessed and new ones should be formulated and put in practice (added by Bavinck et al, 2005).

It is obvious that, for any system to be governable there must be some guiding principles which may include traditions, culture as well as norms which differ from one society to another. In many cases it is obvious that politics affects the way business operates. Policy formulation and strategy implementation does too. In order to maintain the value of the society, for the case of Tanzania ethnical and elderly groups in the community plays major role to protect values of their societies, present society's demands to public sector and contribute ethnically and politically to management of resources in their communities. From that context, for the case of mariculture developments, priorities will depend on how stakeholders have been able to promote the industry to be regarded as important issue in the eyes of policy-maker's committees and decision-making councils. For successful community administration, Kooiman (1999) suggested the importance to have a fair representation for effective problem solutions.

2.5. Interactions between state, market and civil society

In these interactions the three orders of governance meets. Interaction described by Kooiman (1999) to be a mutual influencing relationship of two or more entities. Interactions are being distinguished by the author as international and structural levels in such a way that within these levels interactions can be maintained or changed (Kooiman, 1999). From the societal perspective, the author distinguished three kinds of interactions. These are '*interferences*' (regarded as uncoordinated interactions), '*interplays*'

(considered as modes of interactions) and '*interventions*' (these are often based upon rules and regulations with some juridical imprints). As seaweed farming as concerned in Tanzania, interventions and interplays usually dominate within the seaweed industry. However, interferences can be considered as situations when misunderstandings arise between small scale fishers and seaweed farmers who are using the same marine habitat. Figure 2.1 shows the dependency of the three institutional elements in governing system.

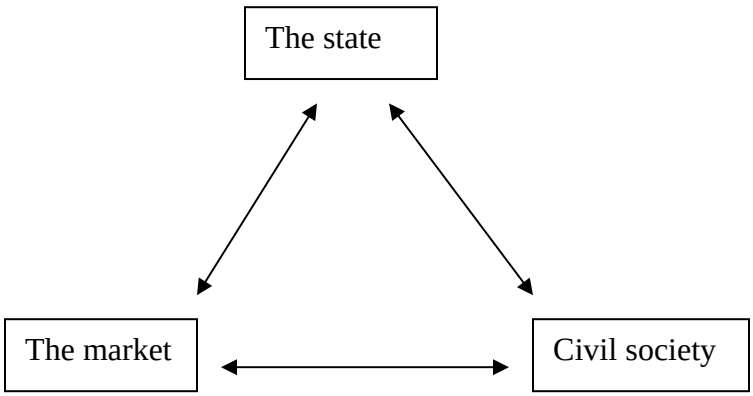

Figure 2.1: The interaction between state, market and civil society.

The relationships between the civil society and government are becoming grave due to the fact that civil society continues to shape world interactions. The civil society is regarded as the third global force along with the state and market (Perlas, undated). The author adds by pointing out that any society has three self-governing realms which are related to each other naturally, and these are economic, political as well as cultural realms. Basing on the interactions between the three institutional elements in governance, the economy is handled by the market due to possession of economic power; the state with political power handles the political issues and the cultural aspects are fitted in civil society.

Other task for civil society is to advocate for real societal restructuring through institutionalization of its cultural advocacy in the realm of economics and political views. In achieving this target, civil society has to border with state and market. The border between these three forces of society can therefore be viewed as a ground of opportunity for all three elements (Perlas, undated). Apart from that, Kooiman (1999) pointed out that

the public sector (state), market and civil society are interdependent to each other in such a way that each of these institutions contributes to societal issues. The author added that the civil society is well placed to handle diversity issues; the market to handle the dynamic aspects and the public sector (state) to confront particular issues of complexity in modern societies, the most important governance task being the organization of three modes of governance (self governing, co-governing and hierarchical governing as described earlier). These governing modes play an important role in understanding what governing needs and capacities are (Kooiman, 1999).

2.6. Governing as governance model

Further in this study I will use the model adapted from Jentoft (2006) whereby fisheries and coastal governance is perceived as an open system: interacting with and independent upon its environment. The system forms diversified networks with political partnerships of various and powerful stakeholder groups who are partially inside and outside of the system. The author pointed out that each of stakeholder groups has goals to pursue, their interests to defend and demands as well as input to make. Governance consists basically of negotiating conflicts among various stakeholders and making compromises, and thus conflicts becomes a unending feature of the governance system that renders it basically dynamic, and hence sometimes not easy to handle it from a governability perception (Jentoft, 2006). "*But these conflicts can be used as integrative, constructive and thus used as element to bring people together and hence move the system forward"* (Jentoft, 2006). The possibility of using conflicts as a constructive element for people can be viewed in terms of the needs for each interacting group since the success of one group also depends on other groups in the processes of their production.

2.7. The production chain

The fisheries and aquaculture deal with multiplicity of stakeholders (from production to consumption processes). The concept of *'fish chain'* introduced by Bavinck et al (2005) highlights the strong relationships of ecosystems, fishing and fish farming, processing,

marketing as well as consumption of fishery products. The author added to that by pointing out that, these components of fish chain are often dealt with separately (due to administrative arrangements), but the connections between these components should be seen as a whole. This is because, although each component has its own characteristics they affect each other and thus they should not be dealt with independently (Bavinck et al, 2005) and since they belong either to the governing system or to the system to be governed as identified by Jentoft (2006).

There are three identified links that they correspond to three stages in the movement of fishery products from ecosystem or farm to consumer. These include the following; "*the aquatic ecosystem, the activity of capture or farming, and the passage of the product from the landing point or farm, through processing and distribution channels, to the consumer"* (Bavinck et al, 2005). Figure 2.2 illustrate different levels of distribution channel of fisheries products.

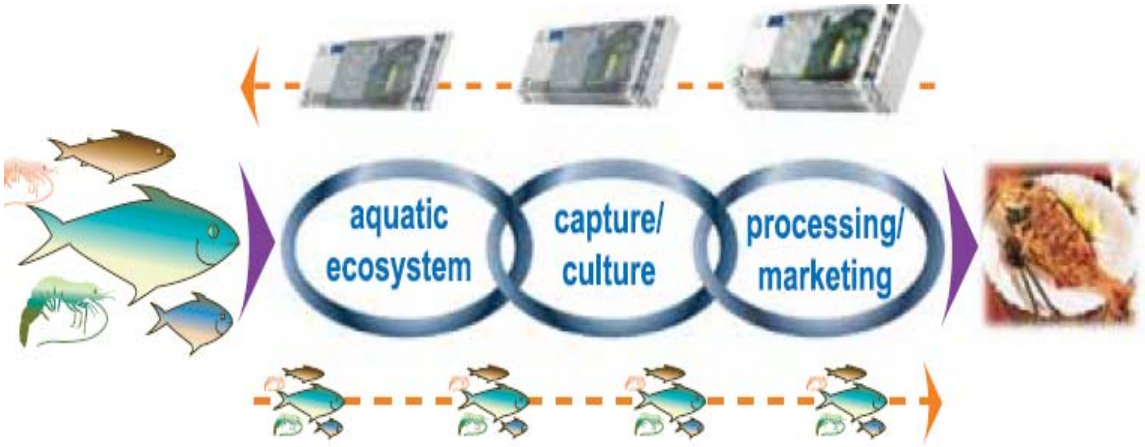

Figure 2.2: three links of fish chain (source: Bavinck et al, 2005).

The movement from one stage to another involves various operating mechanisms and these operations differ in terms of time and scales, meaning that end products of fishery or aquaculture produce are diverse. The figure 2.3 below describes how diverse, dynamic and complicated the system can be when talking about multiplicity of stakeholders in fisheries as well as in aquaculture (or mariculture).

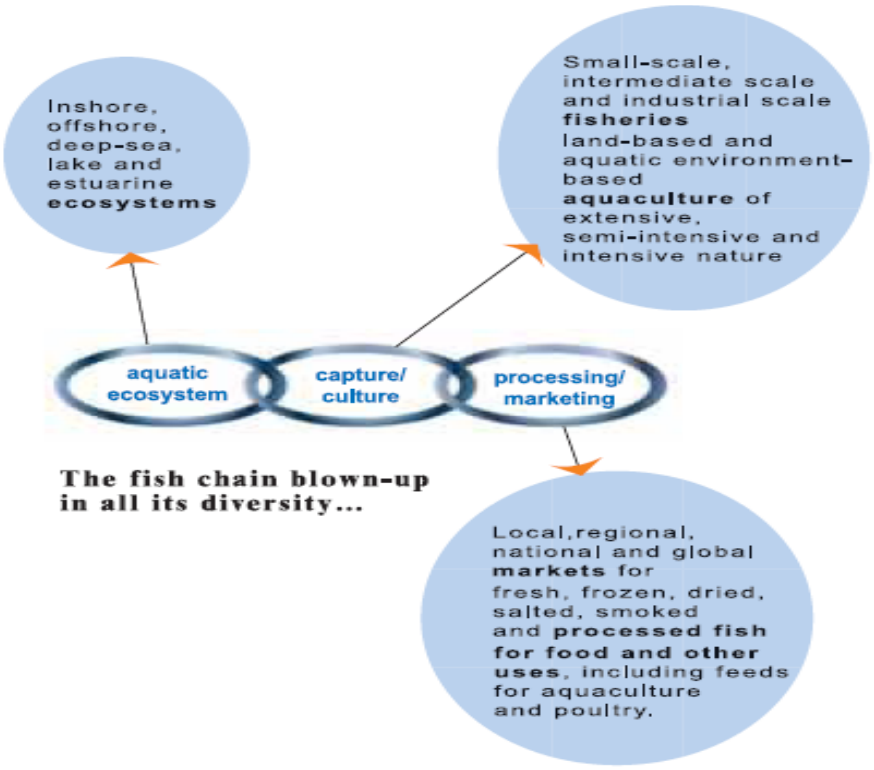

Figure 2.3: diversity and complexity of fish chain (source: Bavinck et al, 2005).

Fishery products pass into various market channels to diversified processing destinations. The illustration above presents also the idea of seaweed chain, that different final products are produced from seaweeds from different processors. These include the pharmaceuticals, laboratories, food industries and many others. Therefore the situations that there are multi-processors of fishery products, distant markets exert influence on the choice of the products for farmers to culture, for instance in Tanzania, cottonii species of seaweed has a high price (TZS[4] 260) compared to spinosum species (TZS 220) and thus each farmer will want to culture cottonii. The situation of globalization has made governance more difficult such that many fish chains now encircle the globe. Apart from that, international agreements limit the options of governments solving the problems at their hand due to incorporation of several other issues especially of management concern, and therefore governance systems are dynamic (Bavinck et al, 2005). However, from the interactive governance perception, the author (also Kooiman, 1999) provided that governing activities are organized in three related categories basing on daily human

[4] TZS means Tanzanian Shillings

activities. These categories are the orders of governance (as described earlier) and these are organized as administrative bodies such that each layer encircling and acting on the layer below.

There are various studies which have been carried out on mariculture activities in Tanzania especially on sociological aspects along the coastal zone. Analyzing social impacts of mariculture particularly seaweed farming activities provide useful insights for the development of such activity in the country. The governance system and the strategies being applied to facilitate and sustain seaweed activities have to consider not only social aspects but also improving the production chain which in turn will improve earnings to the farmers as well as the local community's social well-being. The governance system therefore must be more interactive than before taking into consideration of technological advancement which necessitates the production dynamics. Accommodating wider ranges of groups of stakeholders with conflicting interests, the governance system have to examine carefully the needs of secondary stakeholders while respecting ethics of concerned stakeholder groups.

The analytical part of my thesis, analyze the interactions of various stakeholder groups in terms of roles being played by state, market and civil society in seaweed farming activities in Tanzania. Under this study, these stakeholder groups are clustered as primary stakeholders in seaweed farming activities and are to be analyzed in governing system and the system to be governed perspectives. However, these groups contains many other categories of stakeholders within them, state will be presented as state, market as seaweed local buyers and civil society as seaweed farmers.

CHAPTER 3

3.0. METHODOLOGY

3.1. Data collection

Data for this study is partly secondary data in form of reports, official documents and statistics, and partly qualitative data collected mainly from a single seaweed farming site, Mlingotini village in Bagamoyo District- Coast Region. The village is located 56 km north of Dar es Salaam City and 12 km from Bagamoyo District headquarters (Sesabo and Tol, 2005). During data collection, I conducted individual interviews through questionnaires. Qualitative and quantitative data were obtained from seaweed farmers and only qualitative data were collected from small scale fishers at Mlingotini *Dago*[5].

All seaweed farmers reported to belong in one seaweed farming group known as Msichoke Seaweed Farming Group which officially formed in 2004. The group members of this group had varied occupations before engaging themselves in seaweed farming activities. These include fishing (retired fishers), agriculture, house wives, small scale business and other coastal related activities. Unlike seaweed farmers, small scale fishers reported to have no formal group since they work as employees of boat owners. During field work, Bagamoyo District Fisheries Department was visited to obtain secondary data related to capture fisheries and seaweed production data, which these mainly are annual production statistics. Apart from that some information on seaweed farming obtained from Tanzania Coastal Management Partnership (TCMP)-Dar es Salaam, which deals with Msichoke Seaweed Farming Group specifically.

The field visits took seven days in early August 2007 in Bagamoyo, whereby qualitative and quantitative data obtained from seaweed farmers as well as fisheries department. Official Catch data were on process but an overview of catch trend was provided (from 1994 to 2004) by District Fisheries Department. The specific catch data from small scale

[5] Dago is the traditional name for landing site especially in coastal areas.

fishers in Mlingotini *dago* were not available which in turn limit the comparisons between the two activities (fishing activities and seaweed farming activities).

3.2. Sampling method

The interviews for seaweed farmers were conducted at individual basis and the selection of respondents was not at random, it aimed at interviewing as many seaweed farmers as possible in order to have enlarged sample size. The selection was set to reflect the impacts of seaweed farming (socially and biologically) at the community level and the governance system in mariculture activities (especially in seaweed farming).

Interviewing small scale fishers was at random but individually and after interviews three main categories were identified. These include boat leaders and other fishers who work in boats. The other category of small scale fishers composed of those who hire basket traps from middlemen (*wachuuzi*) and get a share of a catch from the trap owner. Fishing gears are of various types at this *dago*. These include beach seines (*kutanda uduvi*), gill nets, basket traps and long lines and hooks. Unlike seaweed farmers, small scale fishers at this landing site are more aged men with very few young people (only women who buy fish from these fishers are of mid age) while seaweed farmers are mostly of mid age women with few aged men (retired fishers). A total of 53 respondents were interviewed, 28 respondents for seaweed farming activities only, 21 respondents for fishing activities only and only 4 respondents were engaged in both seaweed farming as well as fishing activities.

The questionnaires were designed to obtain information on perception of seaweed farming as income generating alternative in the area (community level) in relation to the impacts of income generated to the daily life, the seaweed market situation and how does the government facilitate and promote seaweed farming activities in this area (governance issues). It was a challenging field experience ever due to the fact that it was the first time to collect data under social science field. Data collection involved personal interviews whereby seaweed farmers and fishers were approached. This methodology was efficient to obtain better quality data as planned. Apart from that, the other challenge

was how to develop questionnaires which would develop interests in respondents for easy delivering the information such as how to develop questions applicable to both groups (seaweed farmers and fishers) This is because fishers have a perception of getting help financially once a researcher appear to interview them and thus explanation on how the gathered information will be used did not seem to be interesting to most of fishers since the objectives of this study did not tailor to their problems directly. However, fisheries staff from Bagamoyo Fisheries Department and a social scientist from TCMP who were assisting me in the field tried their best to make fishers understand the value of their information. From that context, data collection requires skills prior to field survey. This includes training, confidence, good communication skills especially to be able to communicate with the same language (socially) to respondents.

This study is based on evaluation of the social impacts of seaweed farming at the community level, analyzing the situation using governing system and the system to be governed model. More emphasis is put at the interactions of three governance components, which are the civil society, the market and the state (as identified by Jentoft, 2003). This model is chosen due to the fact that the three mentioned institutional elements, their interactions determine the sustainability of seaweed farming activities hence reduction of poverty in the community. There are no catch data on capture fisheries from small scale fishers at Mlingotini *dago*. This missing link present difficulty to argue logically whether biological aspects (such as reducing pressure in wild stocks) should be considered under this study and therefore only sociological aspects are analyzed.

3.3. Data analysis

Data analysis under this study is carried out only qualitatively mainly fitting data collected during field work into reviewed models and theories. These due to the fact that small scale fishers at Mlingotini did not have catches data basing on their own productions and hence these catch data are missing for comparative analysis between seaweed farming activities and fishing activities quantitatively.

CHAPTER 4

4.0. MARICULTURE PRODUCTION AND GOVERNANCE IN TANZANIA

Global challenges today in fisheries sector are the decline of total catch, the increasing number of fishers (in some parts of the world), lack of standard management measures to reverse the catch trend and the globalization situation. The demand for fisheries products is high but global capture fisheries are diminishing. In solving this, the mariculture products are required to fill the gap between the supply and demand of animal protein (Tanzania Mariculture Issue Profile, 1999).

4.1. The system to be governed: An overview of Mariculture and Aquaculture production in Tanzania

The term mariculture defined by Pillay (1990) as a type of aquaculture that involves cultivation of aquatic species in coastal waters while aquaculture means the rearing of aquatic animals in marine and fresh water bodies under human control. The two terms are close to each other and are to be governed under the assumption that they are diverse, complicated and dynamic. This is due to the fact that they compose diversified entities which are fragile (Jentoft, 2006) such that they can be harmed irreversibly or their recovery can take long time. For instance, introducing new species in an area for mariculture and aquaculture can disturb ecological nature of such area, in Tanzania both mariculture and aquaculture activities are managed under Fisheries Sector.

Fisheries development in Tanzania began in mid 1960s (after independence) great concern being on efficient exploitation of major lakes: these were Lake Victoria, Lake Tanganyika and Lake Nyasa as well as marine waters, (Indian Ocean which borders with Tanzania in her east side). Attention to aquaculture (small-scale Tilapia culture) began early 1970s. Awareness in mariculture activities especially seaweed farming began late

1980s whereby the experience learned from Hawaii and the Philippines by Tanzanian Professors (Tanzania Mariculture Issue Profile, 1999). The mariculture activities were initiated in the country to facilitate capture fisheries and currently there are different forms of mariculture activities that are taking place in Tanzania in which seaweed farming is one among many of these mariculture activities. The author provides that during the 1970s Professors Keto Mshigeni and Adelaida Semesi of the University of Dar es Salaam introduced the idea of farming seaweeds into Tanzania. Adelaida Semesi introduced farming techniques among women in villages in eastern Zanzibar Island (Unguja) in 1989**.** In recent times, seaweed farming activities has proved significant benefits for Tanzanian coastal communities and thus it has gained attention from various governmental and private sectors in Tanzania[6]. The attention has been mainly promoted by the establishment of Mariculture Guidelines and Mariculture Investor's Guide (documents) by Tanzania Coastal Management Partnership, which is under National Environmental Management Council. Through TCMP various projects dealing with sustainability of coastal livelihoods have been developed for implementation of the Integrated Coastal Management Strategy (ICM)[7] and National Strategy for Growth and Reduction of Poverty (NSGRP 2005-2010)[8].

Apart from seaweed farming, coastal aquaculture tries to culture various aquatic organisms. These include milk fish *Chanos chanos* in main land and bivalves *Anadara sp* in Zanzibar. This culturing activity shows promising results but it is still at infant stage. Another trial is about Mud-crab fattening carried out by Mbegani Fisheries Development Centre (started in 2005). Apart from these, Mafia Island under World Wildlife Fund Project tried to culture Half Pearl oysters. The trial in oyster farming was successful the problem was the technology on how to process them. The idea of pearl oyster farming was also introduced in Zanzibar and they are on culturing process at the moment (Pers com. 2005). Also trials on shrimp/prawn culturing in Tanzania have been attempted at

[6] http://www.crc.uri.edu/download/1999_5013_TCMP_MaricultureDirMtgPro.pdf -potential and challenges
[7] http://www.ens-newswire.com/ens/apr2003/2003-04-25-02.asp
[8] http://www.tzdpg.or.tz/index.php?id=5

different times. In 1986 an attempt by a Norwegian Company and 1996/1997-1999/2000 by an Irish investor, but both attempts were not successful. Currently, Seaweed farming is the only form of mariculture considered to be successful industry in Tanzania though its development lags behind due to lack of institution attention and low priority in national economic planning (Bryceson, 2002). I will now describe seaweed farming more in detail.

4.2. Seaweed Farming in Tanzania

Two commercial seaweed species of seaweeds have been farmed since 1989 in Zanzibar Islands. Very recently coastal communities in Tanzania mainland have adopted seaweed farming for commercial purposes. The most cultivated seaweed (Rhodophyta) species are *Eucheuma denticulatum* commercially known as 'spinosum' and *Kappaphycus alverezii* commercially known as 'cotonii' (Tanzania Mariculture Issue Profile, 1999). These species are found in abundance in East African marine waters and used to be collected from the wild for export while unprocessed to France and Denmark by coastal communities (Bryceson, 2002). Adding to that, the author provided that these species are found locally though the farmed strains are mainly imported from the Philippines**.**

4.3. Seaweed Farming Technology

There are various techniques for seaweed farming in Tanzania; these include deep water technique where the farm is kept underwater all times. The other one is raft method (floating lines technique) which involves anchors (stones are being used to reduce costs) and buoys to mark the farm, this also performed in high water (not intertidal areas). Apart from those two above peg and line is the common and easiest technique since it is performed in intertidal zone (shallowest areas inside the fringing reefs) and thus most women use this technique for seaweed farming. The later technique is also termed as ***the ie-tie system*** (Bryceson, 2002) or off-bottom technique (Msuya et al, 2007). This technique is common as said before but it is prone to seaweed die-offs and thus the floating line technique is likely to replace it. With this farming technique the fronds

(seeds) of seaweeds are tied to strings stretched between wooden pegs. Seaweeds grow rapidly (up to 12% per day) and are harvested at spring low tides each fortnight.

4.3.1. Site selection

Seaweed farming starts with identifying suitable site for farm establishment. Suitable site for seaweed farm establishment is considered to be a difficult task due to the fact that seaweed plants are very sensitive to environmental changes. However, Juanich (1988) identified some clues on *Eucheuma sp* farm establishment. Some of these guides include the following;

- The *Eucheuma* farm should be located where there is good water movement or where there is rapid but not strong water turnovers such that the farm is not destroyed,
- The farm must be established in sheltered areas,
- The site should be located nearby freshwater runoffs such that the salinity level is maintained: the suitable salinity levels range between 27-35 parts per thousand,
- The site to be selected for farm establishment should have water temperatures ranging between 25-30 ^{0}C,
- The farm should be situated 2 feet deep and 7 feet deep in water during low and high tides respectively, and water should be clear to allow sufficient sunlight to penetrate the water column,
- The substratum should be fixed for stakes to hold,
- The accessibility of the farm also should be considered.

Once the site is identified, the permit should be applied to the local government authorities for the establishment of seaweed farm. Once the permit is obtained the site should be cleared from unwanted weeds in order to reduce ecological competition between seaweeds and other weeds, and other materials such as stones should be removed from the site for easy stakes/pegs fixing on the ground. Additionally, other culture materials should be prepared such as healthy seedlings, nylon ropes as well as tie ties. Others are stakes and materials like knives and shovels.

4.3.2. Constructing the farm

After establishing the farming site the next step is to fix the seedlings to the main ropes using tie ties whereby both main ropes and tie ties are of nylon material. This is because degradable materials can cause detaching of seedlings from the main rope as they degrade faster under water. It follows the process of tying main ropes attached with seeds (lines) to the pegs. Pegs or stakes are sticks necessary for tying lines/main ropes and they are separated by a distance of 1 m from each other: main ropes of 4 mm thick with seedlings tied on them with small ropes (tie ties) become fixed on these pegs.

The length of main ropes varies from one farmer to another and lengths may be between 10 to 20 m and 30 m. Apart from that, the number of lines varies between farmers depending on the abilities/capacities of farm handling but normally men have many and longer lines than females. From that context, the size of the farm depends much on the capability of farmers to handle their farms.

4.3.3. Attending the farm and harvesting seaweeds

Attending the farm is done after every 3 days. This involves the uprooting unwanted weeds and to re-line up some lines that entangled with other lines as well as shaking sands from seaweeds. A farm of 30 lines can be managed by at least 2 people although family members normally do help to attend the seaweed farm. The harvesting procedures are done after the completion of growing cycle of seaweed and this is usually after 40 to 60 days after planted. During the harvesting process, the main ropes detached from the pegs or portions of seaweeds can be cut from grown seaweeds and packed in the sacks commonly known as *viroba*[9] and brought to the shore. The pegs remain in the farm to support the left seaweeds in the farm or for the next farming cycle. The harvesting duties are organized in such a way that most of family members help out whenever harvesting is required. While harvesting, farmers have to transport seaweeds ashore and therefore there are different ways of transporting harvested seaweeds from the farms to the shore. These include the using of boats, carrying on heads or pulling more than one *viroba* to the

[9] Viroba (singular kiroba) are nylon-made sacks

shore. There on shore the seaweeds are washed off the sands and brought home ready for drying. The process of carrying seaweeds from farms is done by farmers themselves or a farmer has no boat and has a lot to carry she/ he can hire a boat from fisher. These methods are used in different parts in Tanzania.

4.3.4. Seaweed drying process

After harvesting seaweeds become dried on mats or racks which can take 3 or more days. Drying process needs carefulness because determines the quality of the seaweed hence the price from buyers. After drying the seaweeds weighed and packed in special bags ready for sale to agents. It is usually that 8 kg of wet seaweeds gives 1 kg of dried seaweeds (Seaweed Development Strategic Plan, 2005). Normally the buying agents follow seaweeds from farming sites and thus farmers pack their produces in sacks for buyers.

4.4. Current Seaweed Production in Tanzania

Over decades Tanzania exported seaweeds mainly from Zanzibar Islands and recently mainland coastal regions too are in a good position to produce a significant amount of seaweed. Figure 4.1 present seaweed production statistics in Tanzania for some years.

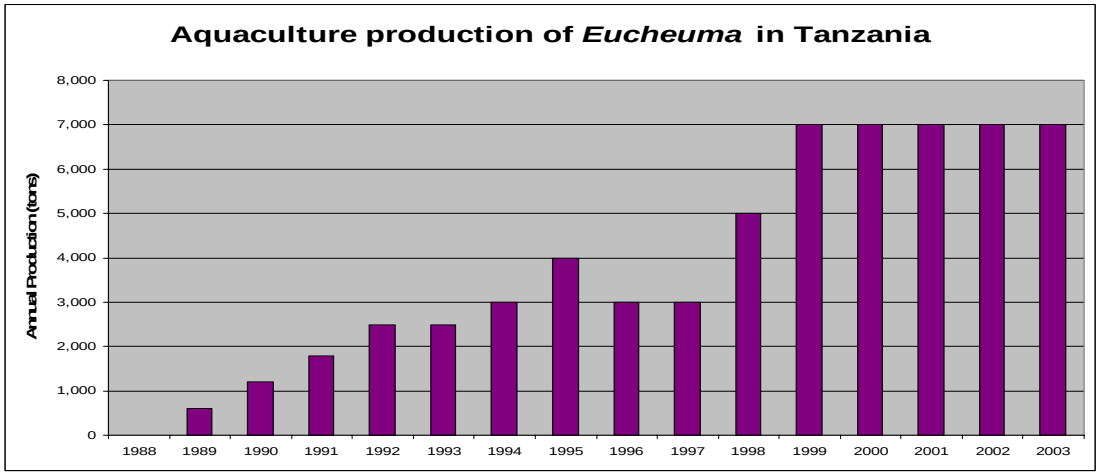

Figure 4.1: Seaweed production in Tanzania (Source: Bryceson, 2005)

The figure above represents combined production (both Tanzania mainland and Zanzibar Islands) but the production is high in Zanzibar Islands. The two species of Kappaphycus and Eucheuma are the only red algae reported to be exported from Tanzania (from both wild and established seaweed farms). These species differs in content of carageenan they contain in their cell wall, therefore this factor make difference in their prices.

4.5. Marketing system and market channels for farmed seaweeds from Tanzania

Seaweed farmers in Tanzania receive production inputs from local buyers. These include ropes and tie-ties in agreement that seaweed farmers are obliged to sell dried seaweeds to the same buyer who provided inputs. In this situation the price per kilo of dried seaweed is therefore predetermined by the buyer and the farmer has nothing to do with selling price. This is because there are no local consumptions of these Rhodophyte species thus farmers have no alternative use of their farmed products. However, in some cases farmers are performing their seaweed activities individually and in other cases they are organized as a group, for instance Msichoke Seaweed group in Mlingotini village.

4.6. Horizontal and vertical interactions in seaweed chain

Seaweeds farmed in Tanzania are mainly gathered from farmers by local seaweed agents for export to USA and Europe (France and Denmark being the major markets). These dried seaweeds are used for extraction of carrageenan polysaccharides as gelling, thickening and emulsifiers in foods, cosmetics and pharmaceuticals. Currently there is another large corporation in USA (FMC-Biopolymer) that developed interests of purchasing farmed seaweed from Tanzania (Bryceson, 2002 and 2005). The local seaweeds agents (buyers) in Tanzania located in Zanzibar Islands are responsible of exportation of the seaweed to abroad. These seaweeds companies include ZASCOL (Eucheuma Resources Ltd), ZANEA Seaweed Company Ltd and C-Weed Corporation (Mwani Mariculture Ltd) (SDSP, 2005). Figure 4.2 present the comparison in price

between Kappaphycus and Eucheuma algae species in Tanzania for seven years of production.

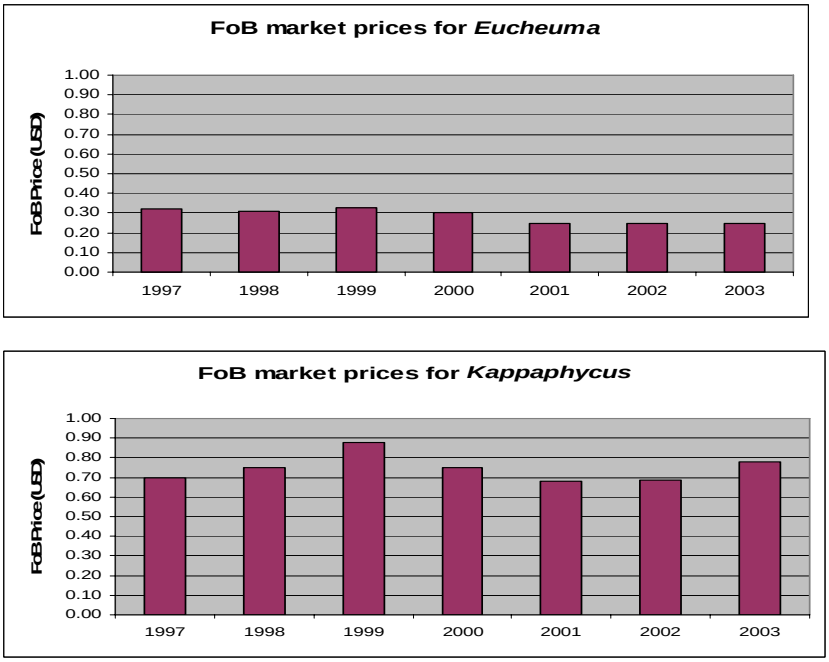

Figure 4.2: Price comparisons between Rhodophyte species (Source: Bryceson, 2005)

Kappaphycus (commercially known as cottonii) contains high quality of carageenan thus it have higher price compared to Eucheuma (*spinosum*) species.

4.7. The governance system: Institutional arrangements and legal framework for mariculture activities in Tanzania

The central government in Tanzania retains the power to formulate policies and regulations although some of the powers are being delegated to local government authorities. For instance, the administrative control and management of aquaculture and mariculture in the country is under Fisheries Division at national level. This division is responsible for formulation and implementation of policy of Fisheries Act (National Aquaculture Sector Overview of Tanzania). In this Sector Overview it is provided that, *"Aquaculture is managed under Fisheries Policy of 1997, the Fisheries Act No. 6 of 1970*

that was amended to Act No. 22 of 2003 and the Principal Fisheries Regulations, 2004". The Fisheries Act is responsible for the enforcement (National Aquaculture Sector Overview of Tanzania) and local government coordinates aquaculture/mariculture extension at local level although the Fisheries Division has been dynamic over years (Tanzania Mariculture Issue Profile, 1999). The regulations are there for environmental protection and insuring minimal negative effects which might be imposed to ecosystem.

This arrangement falls under third order of governance whereby districts and villages governance systems are to conform to regulations set by central government. Additionally, delegating some powers to lower levels of governance highlights the hierarchical mode of governance.

The development of alternative income generating activities especially in coastal communities has become a well known policy in order to improve living standards of small-scale fishers and to reduce fishing pressure on wild stocks (Crawford, 2002*)*. In achieving this, the author provided that, seaweed farming is now being incorporated into many community-based coastal resources management projects and fisheries management initiatives (Crawford, 2002*)*. Following to this, there are various measures which have been adopted to achieve better management in aquaculture/mariculture activities in Tanzania. The awareness of sustainable aquaculture is raised into the communities through seminars, workshops, provision of low interest loans and a three-year tax-free period for investors in commercial aquaculture through the National Investment Centre (NIC) (National Aquaculture Sector Overview of Tanzania). Apart from that, the development initiatives for aquaculture/mariculture activities include the amendments of fisheries documents such as Fisheries Act No. 6 of 1970 into Fisheries Act No. 22 of 2003 as well as Fisheries Regulations of 1997 into Fisheries Regulations of 2004. These have been reviewed and amended such that they encompass mariculture aspects too. The inclusion of Mariculture Guidelines in Fisheries Policy signifies the important step ahead in mariculture developments.

Basing on Fisheries Division in Tanzania, there are no extended administrative bodies at district levels and therefore District Councils as well as fisheries officers are responsible

for mariculture activities. At this level mariculture activities has not been paid attention (Tanzania Mariculture Issue Profile, 1999). But there are various institutions which are responsible for fisheries researches and trainings in Tanzania. These include Tanzania Fisheries Research Institute (TAFIRI), Faculty of Aquatic Science and Technology (FAST) - University of Dar es Salaam and Sokoine University of Agriculture (SUA). Apart from that Mbegani Fisheries Development Centre and Nyegezi Fisheries Institute are involved in trainings and offers certificates on various aspects in fisheries (National Aquaculture Sector Overview of Tanzania). Figure 4.3 shows the organizational structure of fisheries administrative levels.

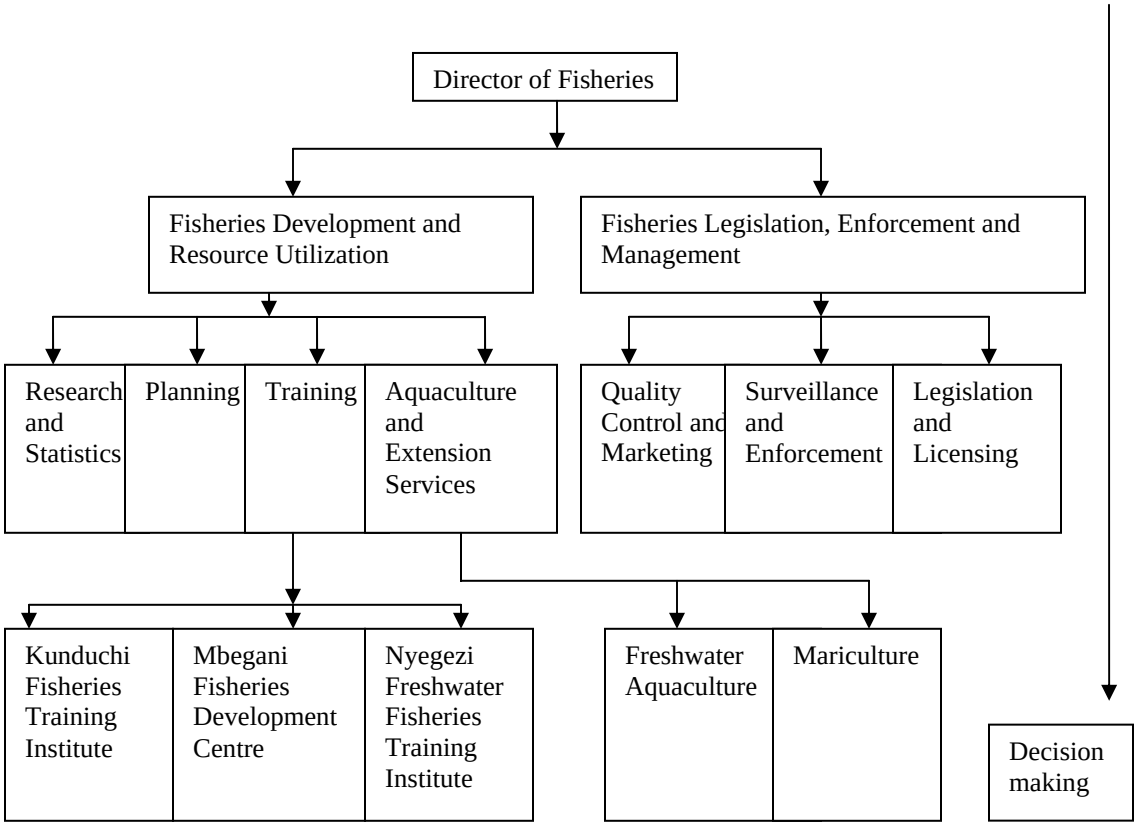

Figure 4.3: Organizational structure of Fisheries administrative levels in Tanzania, the figure is adapted and redrawn from Tanzania Mariculture Issue Profile, (1999).

These research and training institutes are involved in setting research priorities, in funding research and disseminating research findings as well as training of researchers. The institutional framework provides that the non-governmental institutions fund development projects basing on information delivery system. Although there are

institutional arrangements in aquaculture the on-farm participatory approach is not yet practiced due to the fact that aquaculture is still at very low stage (National Aquaculture Sector Overview of Tanzania).The Fisheries Division has developed a strategic plan that subsumes action plan which is reviewed annually. Currently, various studies have been conducted to evaluate the need of expanding aquaculture sub-sector. More emphasis is on the need of diversification of farmed species including seaweed species (National Aquaculture Sector Overview of Tanzania).

Seaweed farming activities are similar to capture fisheries in sense that, in order to establish seaweed farm potential farmers have to obtain the licenses or permits from local government authorities to avoid establishing farms in no-take zones such as Marine Reserves and Marine Protected Areas. In ensuring this, there are various local committees along coastal villages such as Village Councils which run area issues. These local committees can present village by-laws to Village Council for approval (Ellin, et al, 2007). For instance, the authors added that in some coastal villages, the Village Seaweed Committees which works to improve seaweed activities as well as improving community livelihoods perform same functions as Village Environmental Committees.

4.8. Interactions of stakeholders in seaweed developments and MKUKUTA strategy

In developing mariculture activities just like in other projects planning various stakeholder groups are being involved with diversified interests. According to Tanzania Mariculture Issue Profile, (1999) five categories of stakeholders have been identified involved, necessary for mariculture development in Tanzania. These are government institutions, local communities, private sector, NGOs as well as international organizations and institutions; their roles are summarized in the mariculture issue profile table 3.1 in Tanzania Mariculture Issue Profile (1999). All these groups of stakeholders group play its own role necessary for mariculture developments. In order to achieve the proposed objectives in mariculture activities all stakeholders have to corporate (participatory approach) since no independent stakeholder group can achieve those objectives independently especially when mariculture investments are at large scales

(Appendix 1). This kind of interaction is necessary for the sustainability of seaweed farming activities in the area. Figure 4.4 shows the relationships and the interactions among seaweed farming activities in Tanzania.

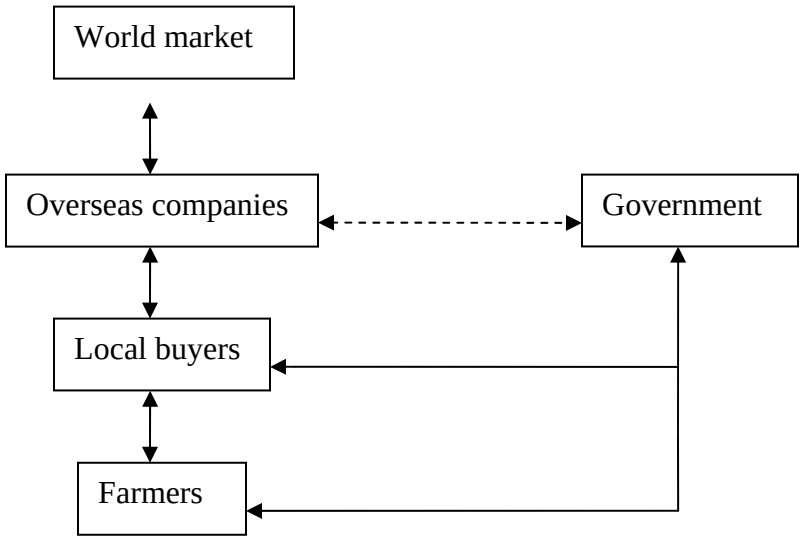

Figure 4.4: Communications between seaweed stakeholders, the figure adopted and redrawn from Msuya, 2005, the dashed line indicate weak relationship among stakeholders.

The above interactions can play a crucial role in reducing poverty in coastal communities involved in seaweed farming especially in Mlingotini village. The concept of interactive governance can work better to improve the seaweed marketing system especially when seaweed farmers are buyer-independent.

Among other objectives in mariculture development plans, the main objective is to improve life quality among coastal communities as well as to reduce income poverty. To achieve such objective it requires well planned strategies and, the feasible way is to corporate between the government and local communities. MKUKUTA is a Swahili acronym for National Strategy for Growth and Reduction of Poverty (NSGRP) mainly aiming at reducing income poverty national wide. Under NSGRP other various strategic plans emerged whereby the Integrated Coastal Management strategy (ICM) is among them which aim at coastal livelihoods sustainability. As pointed earlier that there should be a participatory approach, the government, funding donor agencies, Non-Governmental

Organizations as well as mariculture developers work together to help local communities (seaweed farmers and fish farmers) for their self dependency. Achieving this will improve their life standards, and the advantage of ICM strategy involves small scale fishers in the whole planning process to avoid conflicts between these two groups of resource users (the coastal-shallow areas as common grounds). Although the process is still at initial stages but the progress shows future promises for coastal communities. This is due to the fact that seaweed farming is developing very fast such that coastal people earn income from seaweed farming. Also fish farming (the case of *Chanos chanos* in Bagamoyo Regent Enterprise[10]) encourages a lot for more ponds establishment along the coast.

According to Tanzania Mariculture Issue Profile, (1999), although the technical capacity for mariculture development is not currently sufficient to meet the demand, there are many qualified professionals now working in Tanzania. These professionals include researchers, resource managers, extension agents, development workers and members of the private sector. These provide technical support and involved in planning of development initiatives which is a part of coastal zone management and that require inter sectoral approach to be adopted by the responsible institutions. The author adds that the limited resources available for research, development and extension can be used if coordinated to achieve goals identified under a national mariculture development plan (Tanzania Mariculture Issue Profile, 1999).

4.9. Attempts to develop seaweed farming

Both ICM strategy and NSGRP in Tanzania aims at reducing income poverty and improve the quality of life and social well-being national wide: ICM deals with the coastal resources in particular. Additionally, the main objective of ICM Strategy is to promote alternative income generating activities in order to reduce pressure in wild overexploited fish stocks (where coastal aquaculture and seaweed farming in Tanzania identified to be appropriate alternatives). Although seaweed farming activities are still at low stages, they are recognized as of great importance in near future along Tanzanian

[10] http://www.wiomsa.org/?id=1423

coastal communities. According to Tanzania Mariculture Issue Profile (1999), "*Mariculture is an alternative form of crop production providing cash income and protein sources. Mariculture development may be particularly appropriate for artisanal fishers and agriculturists as it provides a link to traditional activities"*. In recent years (compared with 1970's), Tanzania is aware of aquaculture and mariculture activities, and is ready to improve the national economy and livelihoods especially along the coastal areas where mariculture takes place (Anon, 2002). The awareness can be seen through the governmental initiatives whereby the amended Fisheries Act No. 22 of 2003 included Mariculture Guidelines as well as the establishment of Mariculture Investor's Guide and the Mariculture Source Book by a governmental institution (TCMP in 2001). These documents are there not only to promote and put emphasis on mariculture, but also to provide guidance in enhancing mariculture activities without marginalizing the biological value of the delicate coastal environment (Anon, 2002).

Apart from that, the launching Seaweed Development Strategic Plan (SDSP) in 2005 shows remarkable considerations in mariculture development by the Tanzanian government. Different Governmental and Non-Governmental institutes are also on front line in developing and managing aquaculture and mariculture activities since these activities contribute in economic development and poverty reduction in coastal communities. Among other institutions TCMP, a governmental institution operates under National Environmental Management Council (NEMC) in Tanzania provides essentials for mariculture development in Tanzania. The establishment of projects such as Sustainable Coastal Communities and Ecosystem (SUCCESS), ACDI/VOCA though Sustainable Environmental Management through Mariculture Activities (SEMMA) and Smallholder Empowerment and Economic Growth through Agribusiness and Association Development (SEEGAAD) along the coastal areas shows the awareness on the importance of mariculture activities for the coastal communities. Not only are these but there many others collectively aiming at sustainable mariculture development and poverty reduction in coastal communities.

4.10. Challenges facing mariculture developments in Tanzania

Tanzania is the developing country with high population growth rate and therefore there are many issues to handle at various levels of governance, which in turn many concerns remain un-attended. For example, regardless of its potential, mariculture development lags behind due to lack of institution attention and low priority in national economic planning and thus the industry faces a long list of problems. In good governance perspectives, the nature of the interactions between the governing system and the system to be governed is normally regarded as performance indicator to such system mainly being guided by orders of governance.

Due to some situations such as priorities of political representatives and appearance of these representatives in their local areas only during election campaigns, rural areas remained under developed for many years. This imply the very limited interactions between governing system and the system to be governed and since local communities (at first order of governance) have limited capacities to solve societal problems, it requires support from higher levels of governance especially appropriate instruments at appropriate time. Lack of necessary instruments for instance, inability to access micro-credit services for small scale business hinders rural development in Tanzania. Apart from that, there are a lot of challenges in sustaining the seaweed activities and in mariculture as a whole in the country.

The most challenging situation is to move from policy planning to implementation and connecting the national governance framework to local actions is a real challenge which was identified by TCMP (2005-2006). This seem to be the challenge due to the fact that, most of the projects are in terms of '*pilots*' such that it is very rarely for the pilot projects to take over after the piloting period is over. For that case, it means that policy planners and the whole of policy implementation processes should be monitored by the planners themselves rather than local communities. Additionally, there are scarce resources to be channeled into multiple priorities. It is difficult to satisfy every need in mariculture industry, and therefore smallholder seaweed farmers have to culture seaweeds with any knowledge and information available to push the business on. The question of how to

develop mariculture without reducing the ecological or economic value of critical habitat[11] remains a challenge to governors. It becomes more difficult to establish mariculture sites in intertidal zone where sea grasses used by herbivore fish species as a source food.

Globalization and the prices in international seaweed market challenges mariculture industry in Tanzania. The local seaweed farmers has no idea what looks like in the international markets for their produces, the only rely on the local buyer's information regarding on the production requirements. It is a day dream to have negotiation capacity in the international markets. Apart from that, there are low levels of education in coastal areas (just like other rural areas in Tanzania). This is challenging mariculture developments in Tanzania, and it slows down the development in most cases. This is due to the fact that, people become easily satisfied with little success and see that they are not responsible for their development; the government is responsible to care of everything. Also there are many uncertainties naturally, therefore people finds difficult to concentrate on a single occupation for income generation.

[11] Critical habitat, *"it is a specific geographic area(s) that is essential for the conservation of a threatened species and that may require special management and protection*" (U.S. Fish and Wildlife Services).

CHAPTER 5

5.0. DESCRIPTION OF THE STUDY SITE (*Mlingotini Village)*

Mlingotini is among 9 villages in Bagamoyo District in Coast Region. It is located about 56 km north of Dar es Salaam City. The village is estimated to have 300 households with immigrants from other parts of Tanzanian coastal regions including Tumbatu Island-Zanzibar, Lindi and Mtwara regions (Sesabo, 2007). Mlingotini has a population size of 2,164 with 150 fishers and 58 seaweed farmers, Msichoke Seaweed group (Ellin, et al., 2006).

Figure 5.1: map showing Mlingotini study site: adapted from Ellin, et al., (2006).

5.1. Socio-economic activities in Mlingotini Village

There are various activities in the area including cultural as well as socio-economic activities. These can be grouped into different categories such as fishing activities,

agriculture, seaweed farming as well as some other activities which are performed for daily life sustainability. Sources of income vary from one household to another depending on the size of the land accessed by these households as well as the size of the family (Sesabo, 2007).

5.1.1. Fishing activities

Inhabitants in Mlingotini village are mainly Muslims of mixed tribes but the majorities are of Zaramo tribe. Like other coastal areas in the world, fishing is the main activity in Mlingotini village and has passed through generations and generations. This kind of activity considered as cultural activity thus they need to be inherited by all generations thus preserve their dignity.

Fishing activities are of small scale (artisanal) using traditional fishing techniques and thus provide subsistence incomes for the families through selling fish to local town and not often to nearby regions. The common market for the Mlingotini fish is Bagamoyo Town and Dar es Salaam Ferry. To take fish to Dar es Salaam Ferry depends on whether fish traders came from Dar es Salaam and buy fish directly from fishers since fishers have no means for transport to Dar es Salaam. Apart from that, individual fishers have little to sell into the competitive Dar es Salaam Ferry market thus a buyer from Dar es Salaam will have to buy fish from several different fishers to have sufficient weight to sell in Dar es Salaam markets. Since long time ago their culture allowed men only to participate in fishing activities while women kept indoors performing household activities. It is only recently where women participate in fishing activities mainly as fish vendors. These women buys fish from fishers-fry them and sell to local consumers.

5.1.2. Agricultural activities

In addition to fishing activities, people in Mlingotini perform small holder farming activities. The main crops being farmed are cassava, rice, maize. Alongside with agricultural activities horticulture also exists whereby vegetables, fruits, livestock keeping mainly chicken and ducks, these provide additional income to the villagers

(based on Msichoke seaweed group). Other activities include charcoal preparation and hand works such as bricks preparation and boat building. These are mainly for men since are labor intensive. Not only that but also women engage themselves in small scale business such as small shops establishment, food vendors (commonly called *mama lishe*), making and selling bollers (commonly known as *maandazi*), fried cassava, ice creams and vegetables. Commercial seaweed farming in intertidal zone is a new activity in the area and mostly is being performed by women. This kind of income generating activity seem to grow fast, more details on seaweed farming are described under next sections.

5.2. Seaweed farming in Mlingotini Village

Seaweed farming activities in Mlingotini village were performed since long time ago but the production was very low since farmers performed the activity individually. However, from the year 2004 farmers joined to form a group called Msichoke Seaweed Group whereby until recently they perform their activities as a group and the production level is increased though farmers performs other activities along side with seaweed farming. This means local community diversifies in these multiple occupations and losses concentration in all what is being performed, and therefore all activities remain at subsistence level. The infancy of seaweed farming activities in Mlingotini generally yields low annual seaweed production, therefore, it is difficult to encourage other people from the local community for engaging themselves in seaweed farming while the market is not readily available (due to low production in the area). By low production in the area, seaweed buyers will come to buy just once for a while: increased production in the area requires more people to produce. The other common problems in the area include climate changes which cause seaweed die-offs, low price per kilo (260 TZS equivalent to 0.260 USD) of dried seaweeds and poor infrastructure such that the area looses attraction for potential seaweed investors.

Apart from challenging production situations, seaweed farmers claimed to have some social and economic benefits from seaweed farming although these benefits are not much compared with other seaweed farmers in other coastal regions in Tanzania such as Zanzibar Islands and Tanga regions. Benefits include earning money and this helps them

to improve their lives in one way or another which include using such money to buy new clothes, paying school fees for their children, renovating their old houses and conducting wedding ceremonies for their daughters.

5.3. Seaweed Farming technology and infrastructure in Mlingotini Village

Seaweed farming activities in coastal communities can be reliable income generating activities in very near future. This is due to the fact that, currently scientific researches are being carried out to investigate improved seaweed farming techniques: to move from off-bottom technique to floating line method as reported by Msuya et al, (2007). To improve farming technology will definitely improve production level which in turn will enable farmers to earn money more often. Mlingotini village has no good road despite being located near Dar es Salaam-Bagamoyo road (Sesabo and Tol, 2005). My study considers infrastructure factor as among important determinants of successful seaweed farming activities at Mlingotini. This is because even if production is increased in the area, if there are no good roads for buyers and other potential investors to access the sites it will not help much, and perhaps farmers will have to bear the responsibility of transporting seaweeds to buyers.

Pegs and lines (or off-bottom technique) is the common farming technique which lasted for long time in Mlingotini area, and this is efficient for women as they do not need to go in deep waters. Apart from pegs and line, floating farming technique is on trial. According to Msuya et al, (2007), the floating line technique was introduced in the area in 2004 to combat seaweed die-offs incidents which were mainly due to the use of off-bottom farming technique. However, a cultural behavior in coastal communities challenges this new farming technology because of gender issues in fishing communities. This is due to the fact that coastal traditions are normally believed that males are for fishing activities and females perform household works, this is the common arrangement in day to day life. Therefore when it comes for mariculture activities it seems males in these coastal communities ignore these activities believing that males made to be fishers and they are responsible for passing this knowledge to future generations. This notion

hinders mariculture development because for the case of high water seaweed farming, farmers require boats to attend their farms, such that it would have been easier if these fishers join farming activities and thus available boats for farm inspections.

5.4. Activity organization

In Mlingotini farming site there are 58 seaweed whom are organized as one group known as Msichoke seaweed group. The group comprised of both males and female although females compose the large percent farmers; 47 are women and 11 are men (Msuya et al, 2007). Seaweed farming activities are established individually or family wise and only selling procedures are done group wise. The number and length of lines depend much on the capacity of family members in farm handling or the age of an individual farmer from planting to harvesting. It was observed at Mlingotini that males had longer lines than females although the number of lines did not show to be of gender concern. The common seaweed species currently being farmed at Mlingotini is *Kappaphycus alverezii* commercially known as 'cottonii'.

Msichoke Seaweed Group has a common office which has a store room where they normally keep their dried seaweed while waiting for buyers from Zanzibar Islands. The office building is used also for formal meetings for the group, and is the place where guests or visitors meet seaweed farmers. It is a local office but with a guest book which is always kept in the office, with no much facilities such that there is no special duties in the office and no regular opening hours.

5.5. Interactions between seaweed farming activities and Governance system in Mlingotini Village

Like other villages along the coast, Mlingotini village has various committees in the Village Council. These committees are accountable to Village Council as well as to local community. On the subject of seaweed farming activities in Mlingotini, the Village Government has authoritative power to intrude the establishment of seaweed farms in the

area. For the case of obtaining permits for selling and buying seaweeds, the Village Council forwards the issue to the District governance levels. Co-governance mode seems to dominate this kind of procedure and business agreements between farmers and buyers is organized by the Village Government (Appendix 2). Msichoke Seaweed Group is legally registered in the Village Government whereby its constitution and by-laws comply with local government's regulations. One most common example is to replant mangrove trees near seaweed farms to prevent beach erosion.

Establishing by-laws and the presence of association constitution by seaweed group members is a kind of self- regulated system. The major goal of Msichoke Seaweed group is to improve their living standards. In order to achieve this, they need appropriate instruments to perform production which in turn increase earnings. The immediate soft instruments to Msichoke Seaweed Group include financial aid from USAID to purchase production inputs, permits to establish seaweed farms though most of the cases these farmers had their farms long time ago and setting business agreements between them and buyers. Additionally, seaweed farming activities are being performed in intertidal zones where fishing activities goes on too, many interferences results into conflicts between these two zone-stakeholder groups. Thus the Village Government is responsible for resolving such conflicts.

5.6. MKUKUTA Strategy and Seaweed farming in Mlingotini

During this study, it was reported that, there are no specific funds/grants allocated for fishers, while seaweed farmers receives funds/grants and technical assistance from various sources such as USAID through TCMP which provided them with 12 millions Tanzanian shillings and these were used to buy in put materials including ropes, one boat for the group, tie tie and seeds. Other sources of funds include Western Indian Ocean Marine Science Association through SUCCESS program as well as Action Aid who provided in put materials and computer for Msichoke seaweed farming group for record keeping. Adding to that, the seaweed farming group at Mlingotini reported to have received garden-watering machine from JEBA as a support for their horticulture activities of the group.

To support this group in this way is to build capacity among community members in the village who will later act as catalytic agents for local development. However, it seems to be small portion of the community (58 people out of 2164 in the village)[12], the process act in accordance with MKUKUTA strategy[13], and it is clear that the community will have to be self dependent in terms of production after for sometimes. There are no doubts that if seaweed farmers are well trained in handling their business, from production to marketing processes, income poverty will be reduced at great extent. In order to have self dependence in near future, fishers and seaweed farmers claimed to be supported by the Government to sustain their activities; it was impressing to hear that these farmers and fishers knows exactly that there will be a time for them to sustain their activities. The Government supports them through Bagamoyo District Fisheries Department by providing extension services, training through workshops and seminars for capacity building of these stakeholders. The Government also support through implementation of fisheries policy and laws against illegal fishing. Apart from that it provides security for protection of coastal resources (providing and facilitating boat for patrols). Not only that but also the Village Government sets reconciliation meetings incase of conflicts between individuals together with demarcating specific areas for seaweed farmers and fishers. The government is also in frontline in implementing Integrated Coastal Management (ICM) strategy.

5.7. Business plans and future prospects for farmers

Market does not mean only the place where goods and services are being exchanged but rather it includes changing benefits to changing needs as well as demands of consumers; and therefore marketing procedures should be well coordinated and planned with assistance of skilled managers to guarantee success (Learn Marketing.net, undated). During this study, each respondent has own future prospects regarding the seaweed production and also small scale fishers were included due to the fact that seaweed

[12] http://www.crc.uri.edu/download/Bagamoyo_baseline.pdf (6pp)
[13] http://www.tzonline.org/pdf/mkukuta2005.pdf Sections 4.2.4 and 4.3.1 (iv)

farming activities are intended to attract these fishers into business. These responses were categorized and summarized in the table 5.1 hereunder.

Respondents	**Prospect comments**	**Percentage composition (%)**
6	The activity will be sustainable and profitable if the price increases from the current price of 260 TZS [14]per kilo of dried seaweeds.	11.32
4	The activity will pay more if the farmer can know how to process seaweed into various products.	7.55
10	The most important is to improve daily life in general.	18.87
2	There is a need to establish the seaweed processing plants, this will increase employment opportunities.	3.77
6	Fishing more is required to earn more money for investing in other activities	11.32
5	Forming associations for accessibility of micro credits/loans.	9.43
14	To increase production.	26.42
5	Fishers are not facilitated through education and hence they are not well prepared for sustainable fishing activities.	9.43
1	There is a need of various markets and market products.	1.89
Total: 53	**Categories: 9**	**100%**

Table 5.1: Categorizing future prospect comments regarding the seaweed production at Mlingotini area.

From these responses, it is clear that these farmers are ambitious to have better production and they would feel good to earn more, but the obvious critical problem is the business plan. This is a challenge in many small scale producers in developing countries but it is obvious that it is unlikely for unplanned business to be successful. During this study, basing on the table 5.1 above, the planning capacity is minimal to these local producers (both to seaweed farmers and small scale fishers).

[14] TZS means Tanzanian shillings; 1US$=1240.5 TZS (22 April 2008)

Seaweed farmers at least they document their sells as a group, but fishers reported to have no need for documenting their sells since they were able to earn daily income within local market in Bagamoyo town. Then by having such observation, together with the level of production to be low in the area, my study found a very weak link between the future prospects with the reality; how can be a sustainable business without '*any kind of plan?*' some of the comments were sensible in one way or another by looking on what their needs are, and perhaps on ground training on business planning is highly required. By saying this, I mean, in order to attract fishers in seaweed farming activities such that production is increased and processing plants can be established. This is due to the fact that, it will be difficult to convince any investor in seaweed processing with only limited seaweed supply. The study also observed that, even if there is accessibility of micro credits to these small holder producers, the effects of micro credits will not be felt among them unless there is intense training on the production strategy plan. If not that way, the loans (micro loans) will be burden to these producers.

5.8. Trainings

When interviewed about trainings on their activities they responded that trainings are available for both fishers and seaweed farmers. For seaweed farmers, representatives of the group attend seminars and workshops to learn sustainable farming techniques/methods and then the representatives disseminate the knowledge to the rest of the members of the group. The new farmers learn from old-fellow farmers. It is difficult to have all seaweed farmers in the workshops, but this also have some negative impacts to other seaweed group members. This fact reported by some of Msichoke seaweed farming group that they never happen to attend any workshop or seminars instead they have been represented by representatives. When I asked them why should they doubt on being represented, one responded by pointing out the importance of participating such kind of workshops and/ or seminars. She said, "*in learning every person have own capacity to understand and digest things, so instead of being represented, I would suggest that at least those seaweed expertise should come to teach as a whole here at the site and many of us can participate*". She added that, their fellow aquaculturists are lucky because the fish pond construction is not only in workshops but always done on the

ground. It was found that seaweed farming trainings are provided by TCMP-SUCCESS and Action Aid. For fishers, they reported to have attended seminars on sustainable fishing techniques at Mbegani Fisheries Development Centre, and Bagamoyo District Fisheries Department. However, most of the time there are no formal trainings, young fishers acquire fishing knowledge from senior fishers. Through the reviewed literature and field observations, unlike aquaculture[15] , the study found that there are no mariculture subjects in academic institutions such as university syllabuses and also no certificates or diploma programs in fisheries institutions. This hinders the recognition of importance of mariculture activities, no wonder why seaweed farmers can not plan long term productions.

Concluding governance issues in Mlingotini Village, I would like to say that the current governance system is encouraging though limited instruments are available to speed up seaweed productions in the area. The system however, has to promote cooperative approaches such that coastal stakeholder groups, sometimes with conflicting interests should stick together for development of the area. This will reduce conflict incidences especially those between seaweed farmers and small scale fishers and thus a governable system. To reveal if this is helpful, the next chapter is analyzing governance details.

[15] Here the aquaculture term meant the rearing of fish and aquatic organisms excluding aquatic plants like seaweeds.

CHAPTER 6

6.0. RESULTS AND DISCUSSION

6.1. Interactive governance

Interactive governance builds on the assumption that interaction and degree of participation has increased and breaks some communication barriers between various stakeholders in resource management and livelihood sustainability. It is "*a form of action, specifically undertaken by actors to tackle obstacles and finding new pathways for better management*" (Kooiman, 2005). During the field survey, it was reported that, especially through ICM and MKUKUTA strategies, the local communities are more involved from the initial stages of policy and strategy implementation. There are more interactions between local communities and district government in such a way that seaweed farmers as well as small scale fishers attends district planning workshops and receives trainings on various aspects on coastal zone management.

6.2. Governance system

The governance system in Tanzania involves the governance system and a system to be governed just as put forward by Jentoft (2006). This concept is not very new in any state since there should be should be leaders (few people) and followers (the majority). However, the concept may be perceived differently to different societies. In my study, these systems refers to the state, local government, seaweed buyers and governmental organizations (as subsystems in governing system) while seaweed farmers, small scale fishers and intertidal zone (as subsystems in the system to be governed).

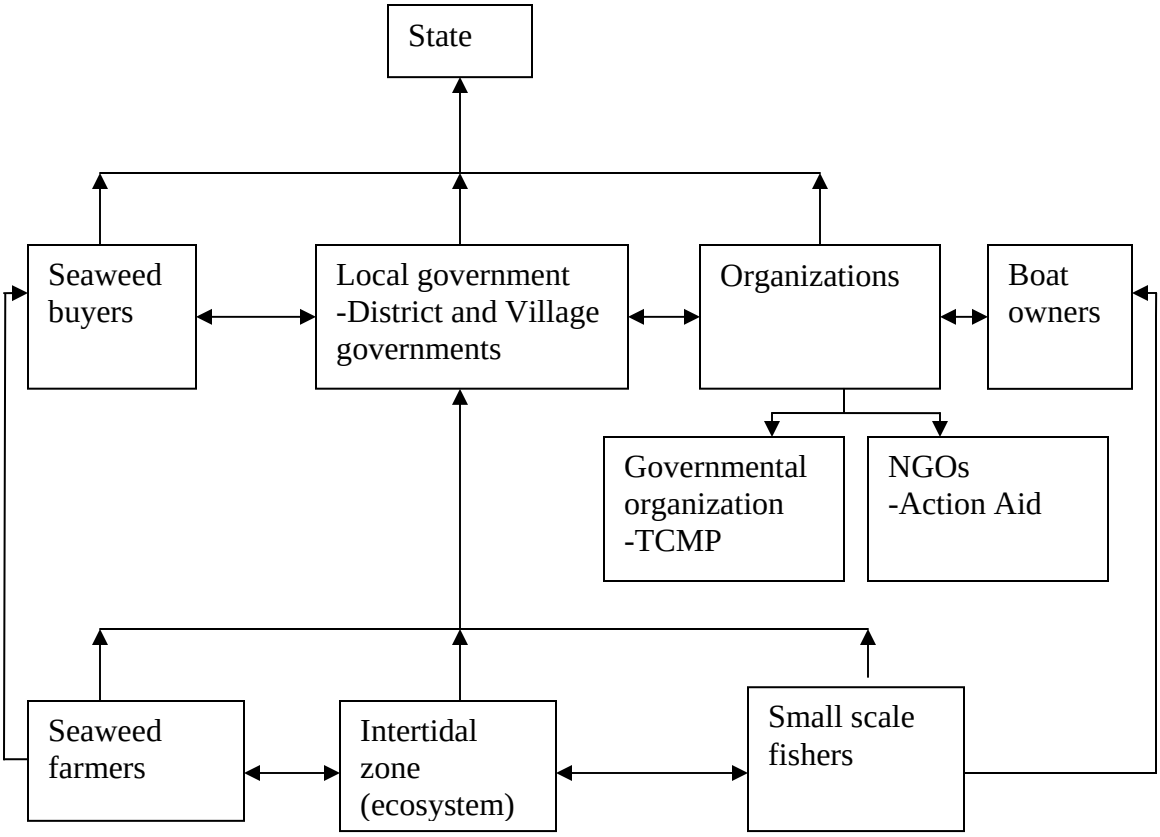

Figure 6.1: Organizational chart showing the governing subsystems and the subsystems to be governed in seaweed farming activities in Mlingotini village.

The success of a governance system depends on the relationships between the governance system and the system to be governed. During the study, it was revealed that, the intertidal zone is the area where seaweed farmers and small scale fishers perform their daily activities and thus collide to one another many times. This is especially when small scale fishers drag their fishing nets through the seaweed farms while aiming to capture some herbivore fish species hence uprooting the stakes. Consequences of this are the loss of ropes of seedlings and total sabotage of seaweed farms. During field work, it was reported by seaweed farmers that, such problem was discussed local government as well as the NGOs who provide funds to seaweed farming activities to have a possibility of providing small scale fishers with boats so that they can fish off-shore and leave intertidal zone for seaweed farmers. Additionally it was reported that, through the village and district governments' initiatives, Kinondoni Integrated Coastal Area Management Project

(KICAMP) provided one boat to fishers but the problem was that every fisher wanted to participate in fishing activities with that new boat. Since it is not possible for that, it created internal conflict among small scale fishers, and thus sometimes conducting fishing activities in seaweed farms purposely during the evening or night periods.

On the upper level, seaweed buyers interact with local governments as well as organizations that support seaweeds activities in various issues including the establishment of contracts between seaweed farmers and those buyers. Also buyers reported to have initiated encouraged farmers to increase production as the current level of production is very low.

6.3. Orders of governance

Orders of governance are referred to groups or categories of human activities basing on daily life. They are purposely for conceptualize and provide guidelines for societal activities including the way of how governors should govern. Three governance orders does exist too in Mlingotini village as daily life as concerned. The study found that, under the First-order of governing, fisheries extension officers from Bagamoyo District Fisheries Department in collaboration with Village government solve societal problems at least to the village level. These problems include conflicts between fishers as well as fishers and seaweed farmers. This is a Self- governance type of mode whereby Village Council with its Village Committees creates some rules and regulations and set fines for those who may violate the rules, though fines are not high.

Apart from that, it has been difficult to create some societal opportunities to this particular village by themselves and thus Co-governing had to be approached. This proved true in view of the fact that the level of development is still low and thus they depend on the Governmental Organizations and NGOs to provide them with, and initiate developmental activities. The Co-governing mode for this case seems to be mixed up with Second Order of governance, seeing as these governmental and non-governmental in collaboration with district fisheries officers have to assist the community to build governing networks and institutions. Seaweed farmers reported to be assisted by USAID

through TCMP, WIOMSA[16] through the SUCCESS project, Action Aid and JEBA[17] from district fisheries department. This has been successful to some extent in terms of organizing seaweed farmers as one group. Although their production of seaweeds is still low, it has been easy to access them as a group. In addition to that, TCMP through SUCCESS project considered as a bridge linking seaweed farmers to central government. This is because TCMP is responsible to NEMC which connect to environmental management bodies at national level organizations. From that context, this is the third-order or Meta governance. Through the ICM strategy set by TCMP, there is ICM facilitator in Bagamoyo District to implement ICM principles while keeping in mind of ethical values of the concerned community.

6.3.1. Images

Images are considered as vision, knowledge, judgment, hypotheses and goals (Bavick et al, 2005). These are elements in day to day life speechless to resource management and production plans. The declining of fish catch is recognized even at local/ community level. Small scale fishers at Mlingotini landing site who were interviewed quoted, "*I am aware of fish decline since I do not catch much compared to 1970s and 1980s. The problem is that, some other fishers do not consider what they will fish the day after tomorrow or what their children will fish in future. I once dive in coral reefs and destroy corals just to have fish for short term, but after attending some seminars concerning environmental conservation I do not dive in coral reefs anymore*" (fisher). This shows that there is certain degree of knowledge on ecosystem, and the ability to judge and measure the importance of the nature to small scale fishers.

For the seaweed case, the seaweed farmers reported to have planted mangrove trees around their farms. The study was keen to find out what were the motives behind re-planting mangrove trees instead of chopping them to make charcoal since they could get instant cash from charcoal. It was discovered that, these seaweed farmers are looking forward to have long term farming activities and their goals are to maximize their

[16] Western Indian Ocean Marine Science Association
[17] Jumuiya Endelevu Bagamoyo (community development in Bagamoyo)

production and since they are aware of mangroves are wind breakers, and therefore they will continue to plant more of these trees. "*Our constitution promotes environmental conservation and we do not allow mangrove clearance because by doing this we will be like fooling our own nests. This is due to the fact that, our farming site will be exposed to wind and strong waves which in turn destroy our farms, hence we will be the losers*" (seaweed farmer at Mlingotini village).

6.3.2. Instruments

These are the means or reasons driving someone to perform a certain action. There is a wide range of governing instruments which can be categorized as soft instruments and hard instruments (Bavinck et al, 2005). In Mlingotini case, the soft instruments can be considered as formation of working groups (for instance Msichoke seaweed farming group). Existence of the formation of this group enabled the group members to receive funds from various sources and also attending seminars on seaweed farming. In addition to that, the other form of soft instrument for this group is to be able to legally register their association. This study also found that, within the group there is some sort of self-governance; generating money to run their association from the fees being charged each time they sell their seaweeds. This is specifically for Mlingotini seaweed farmers which may differ from other seaweed farmers in other farming sites. There was no report of implementing hard instruments to this study site which would involve physical forces to calm or relax the situation. As pointed out by Bavinck et al, (2005) that, plans in fisheries management are powerful instruments to blend the system and allow actors to participate fully in management and thus information sharing and collectively developing these instruments is necessary. This process of involving seaweed farmers in resource management in Bagamoyo District have helped to recognize the responsibilities of party actors.

6.3.3. Actions

Actions are measured as technical arrangements to implement the instruments, and therefore action plan seem to be vital to guide and lead to foreseen targets to achieve. From that context, the enterprise of buyer-seaweed farmers' agreements, such that each

party understands well the responsibility to perform and stick to pre-set rules needs action plan. It was found that, the establishment of Seaweed Development Strategic Plan (2005) has helped farmers and buyers in all coastal seaweed farm sites to reach consensus easily in terms of agreements and contract signatures. Additionally, for the effective buying-selling processes between the parties it needs some intervention or involvement of other actors such as District and Village Governments. These additional actors help to maintain fair business environments.

6.4. Relations between of civil society, state and market for seaweeds

The interactions between the three governance institutional elements under the study are necessary and such interactions will be useful in developing the industry if each entity is accountable effectively to other parties and act legitimately. This is due to the fact that, seaweed farmers will have no reason of producing seaweeds without where to sell them, for that reason the local buyers (from Zanzibar Island) plays an important role in collecting seaweeds from the farmers for export. This proved useful and necessary for the seaweed farmers due to the fact that they are not capable of reaching international markets for their produces. The state intervenes in the process of providing instruments in achieving objectives of the two groups of stakeholders.

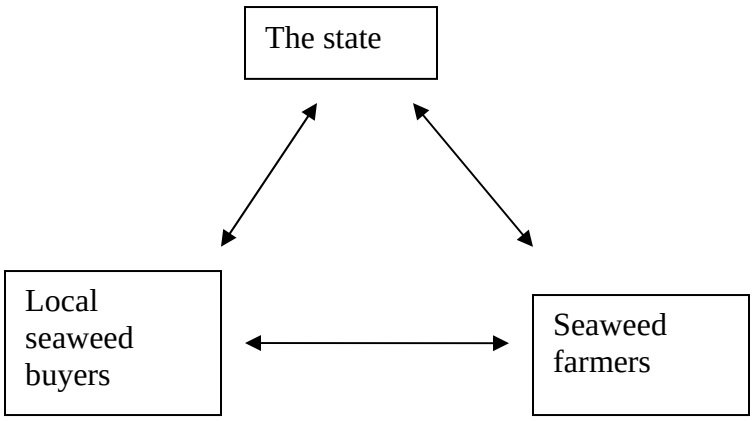

Figure 6.2: Relations between state, local seaweed buyers and farmers at Mlingotini village.

In Tanzania, the central government has the overall governance power, but it delegates some powers to lower levels of governance after the realization that needs at community levels can be well identified and handled by local governments. The governance mode is Hierarchical in such a way that even at first order of governance complies with third order governance's guidelines. However, delegating some powers to user-level governance improved communications between groups within the three orders of governance and thus in seaweed farming activities each of governance institution elements has differentiated responsibilities.

6.4.1. The role of seaweed farmers

Seaweed farmers are considered to be the basic and very key instrument as local development as concerned. This group of stakeholders plays a role of civil society in that particular area, thus they are representatives and they determines the how often the buyer would come to collect dried seaweeds from that particular area and hence increased earnings in the village. As described earlier in theory, seaweed farmers belongs to the category of the system to be governed and their roles basing on the study can be summarized as follows;

- *Being updated is essential*: the tendency of seeking information related to seaweed farming is their responsibility, and they are aware to that. The study was enlightened that seaweed farmers from Mlingotini have links to other seaweed farmers in other parts of coastal regions where seaweed farming takes place. They reported to have met with other farmers during attending seminars and workshops related to their activities. *But what does this imply?* Through these interactions, the seaweed farmers get to know each other, including what species do they farm, how do they manage their farms, how much to sell a kilo of dried seaweed perhaps to the same buyer, "*it is easy to compare ourselves what we get from these activities with closely related producers, such that we can modify our farming methodology or species to culture, or to change the production cycles if found necessary*" (farmer).
- *Ready to change*: During the rainy seasons marine environment become diluted with inflow fresh water from terrestrial, and this has caused seaweed die-offs to

cottonii species (Msuya et al, 2007): due to wide range of salinity fluctuations. Due to mortality incidents of seaweed die-offs, SUCCESS Project introduced new farming technique '*floating line method'* in deep water to battle the incidents. During my study visit, farmers showed positive response to that new farming technology since they believe there will be no die-offs of seaweeds anymore and at the same time they will have much produces. "*Initially we were worried on boat hiring expenses to go in the farms, but we are too lucky to have received a grant from USAID through the help of Dr. Msuya*" (farmer). The money they received from the grant used to buy production inputs like the boat for the group (the other farmer added).

- *Strategies and creativeness*: In any successful business people should learn and adapt various strategies, either by creating them or adapting them from other parts, in order to make the best from their activities. Mlingotini seaweed farmers reported to farm only *Cottonii* species. This was due to the fact that, when this species farmed together with *Spinosum sp*, the *Cottonii sp* did not prosper. The farmers decided to opt for culturing *Cottonii sp* with high price compared to the *Spinosum sp,* though *Cottonii sp* is very sensitive to environmental changes. The farmers considered farming *Cottonii sp* was the best option bearing in their minds that the floating method introduce to them will produce best results. In reducing costs in buying buoys (floats) and sinkers (anchors), the seaweed farms are marked by floating (plastic) empty bottles (normally picked from the bins or dumping site) and heavy stones are used as anchors. Bamboos were tested as rafts in other farming site along the coast but found that they are short-lived and hence need to be replaced more often during production cycles instead in Mlingotini seaweed farming site, the floating method is being tested buy using nylon ropes (Msuya et al, 2007). The author added that, using nylon ropes is cheaper than using bamboos as these trees are not readily available along the coast and also it is cheaper to expand the farm when using nylon ropes as rafts.
- *Formation of seaweed association*: The action of acting as a single seaweed farming group, Msichoke Seaweed Farming Group benefited from being assisted technically as well as financially by funding institutions. By referring to the case

of grant access from USAID agency, it was easy to recognize the need of such seaweed farming group than it would be individually. Seaweed farmers pointed out that, since they are already in a group they are looking forward to acquire micro-credit loans from Foundation for International Community Assistance (FINCA) by the help of TCMP for increasing seaweed production. This will be very helpful for them to expand their farms and especially performing the floating farming technique. I personally, I was impressed by the farming technology when I visited their demonstration farm in 2005 while attending one of the mariculture workshop in Bagamoyo. If successful, it is very positive to move these farmers from small-holder farming to semi-intensive or even extensive farming scales.

- *Consistent in production*: In order to have stable business there should be a constant production cycles. This factor will strengthen the bond between buyers and farmers since the parties are held responsible for their roles to play. As pointed out earlier that the only species (currently) being farmed at Mlingotini is *Cottonii sp,* it was generally observed that most farmers have 10-30 ropes of few farmers with 40-50 ropes and few with only 10 ropes. The most interviewed farmers reported that their ropes varies from 8-12 m in length (these were mostly women) while for the men their ropes may have up to 20 m in length. This is because women are not masculine comparing to men when it come to seaweed harvesting, and thus women prefer shorter ropes to easy harvesting processes. It was reported that the farmers can harvest up to 6 times annually if the weather is not bad. The farmers would like to have constant production cycles for constant supply of seaweed to buyers, but most of these farmers harvests only 2-3 times due to the fact that the weather changes affected their production: the die-offs of seaweed made them to start producing seeds instead of farming for business. This could have been probably affecting the relationship between farmers and buyers, and the possibility of these local buyers to initiate business partnership with other seaweed farmers in other coastal farming sites. However, this is not a major problem as the seaweed production of seaweeds in Tanzania is still low.

6.4.2. The role of seaweed buyers

Local seaweed buyers from Zanzibar Islands are potential and very useful link between the seaweed producers to international markets. Previously, the buyers were providing production inputs under the agreement that the farmers are obliged to sell the produce to the input provider. According to Msuya et al (2007), when buyers provide production inputs the farmer receives less money per each kilo of dried seaweed, but Msichoke seaweed farming group are buyer independent in sense that they purchase their own inputs and hence can sell their seaweeds to any buyer. Although these farmers are buyer independent, the buyers are the same so the changes only occurred in terms and references, however, the roles for seaweed buyers include;

- *Collection of seaweeds from farmers*: this is done by the local buyers in Tanzania. This is because the farmers are unable to transport their produces to these buyers; they are located in Zanzibar Islands and include Zanzibar Agro-Seaweed Company Limited (ZASCOL), Zanzibar East Africa (ZANEA), C-Weed and Birr. For time being, these companies assumes the role of collection of seaweed from different farmers along the coast, and off course this affects the net price of each kilo of dried seaweed from the farmers.
- *Assurance of buying the seaweed from farmers*: Although Mlingotini seaweed farmers are buyer independent, they need the assurance of market for their produces, and thus they are very much dependent on availability of buyers. From this study, farmers from Mlingotini village reported to be under industrious and believe that the buyers are requiring much more of the produces from them than what they currently supply and from this mind set, they reported to be looking forward to produce more if weather conditions allows.
- *Information on highly valuable seaweed species in international markets:* Local farmers in Tanzania are located in remote areas such that sometimes they do not have many options on what to produce, when to produce it and how to produce it. The case of what is the seaweed species have high market demand will always remain mysterious to them, and therefore the buyers are the only ones who can pass or link this information to these farmers.

- *Post-harvest handling:* Linking the information of highly valuable species in the market, the post-handling processes are critical to farmers. But, since the buyers knows well what quality is required in the market, then it easy for these buyers to advice the way the produces should be handled from harvesting, sand clearance, drying processes and packing the cargo to export**.** Mlingotini seaweed farmers use drying racks to dry their seaweeds, if there are better ways to dry seaweed for improved quality the buyers are to advice farmers.

6.4.3. The role of state through local government authorities, Governmental and Non-Governmental Organizations

The government has very diversified roles to play it comes to sustain the livelihoods of her citizens. During my study, from those who were interviewed, they showed positive responses on the support from the government regarding the sustainability of their daily livelihoods. This was from both two respondent categories, seaweed farmers and small scale fishers. For the fishers, since the majorities are being hired by boat in-charge they could only feel the support of their government through the accessibility of fishing rights and especially obtaining the fishing licenses. For boat leaders (boat in-charge) and experienced fishers, these are a little bit advanced on this, they reported to attend some various seminars and workshops concerning the sustainable fishing techniques (conducted at District Level) and become aware of environmental protection. They also reported to have attended the conflict resolution meetings in Mlingotini village council. According to the available data from the field, the roles of the state were put in to various categories described hereunder.

- *Area zoning and conflicts resolution:* Fisheries and aquaculture are diverse and involves diversified stakeholders. Conflicts especially between small scale fishers and seaweed farmers are obvious in a process of maximizing coastal resource use in coastal communities; also the same area may be allocated for scientific researches. Along side with that, these conflicts takes place in natural habitats where the nature (flora and fauna) also become involved and hence the existence of three categories of stakeholders in that specific area. During the study it was found that, the coral reefs in that area were damaged at greater extent due to

illegal fishing in previous years. The government through the District Fisheries Department in collaboration with environmental agencies and research institutions took initiatives to recover coral reef habitats along the coastal zone including Mlingotini area. To rehabilitate this area of ecosystem, these environmentalists introduced the zoning process in the area which was in process during the study and perhaps it became effective early 2008. Since this action takes place within the coastal area, it automatically become interfering with fishing and seaweed farming activities in the area: it compressed area of performing these activities in such a way that farmers and fishers collide even more frequently than before. This happened in Mlingotini area, *but how did the government resolve this kind of conflict?* As pointed earlier that, through the KICAMP project, the village council received one boat for the fishers so that they can fish off-shore and leave intertidal areas for seaweed farmers. Yes, it helped to some extent regarding the collisions between fishers and farmers; however, one boat was not enough for the fishers.

- *Technical assistance and trainings to farmers*: Through research and academic institutions, the readily available mariculture experts will accelerate mariculture development in the country. Seaweed farming activities found to be assisted by TCMP through SUCCESS Program in implementing ICM strategies. These include technical assistance in field and various trainings through attending seminars and workshops. According to TCMP (2005-2006) it was identified that, through SUCCESS Program, technical assistance on mariculture activities include post-harvest handling as well as mariculture technological issues.
- *Conducting researches on seaweed farming activities:* Identifying various aspects on mariculture development in the country is necessary for better and improved productions. This may include Strength, Weaknesses, Opportunities and Threats (SWOT) analysis in seaweed farming activities such that the farmers are aware of what is going on in their activities and for them to be able to weight the progress in farming realizing the opportunities they have and if there are any threats in confronting seaweed farming activities. Apart from SWOT Analysis, researches on suitable farming sites and improved farming technology are fundamental aspects. As identified earlier (from Msuya et al, 2007), the floating farming

technique at Mlingotini over off-bottom farming technique, researched and through SUCCESS Program it was introduced to improve production as well to fight the die-offs incidents. The research institutes are responsible for finding out the answer or treatment in case of disease outbreak and propose and advise for improvement of the situation.

- *Policy formulation and implementation*: This is a central role assumed by the government through the local authorities, governmental organizations and also private sectors who actively interact in seaweed business. The launching of Seaweed Development Strategic Plan document in 2005 was a considerable progress of the government promoting seaweed farming activities in the country. The main objective of this action was to familiarize the document's contents to key stakeholders and the importance of implementing it guidelines (TCMP, 2005-2006). In this document the seaweed activities are intended to be expanded and help to reduce poverty among coastal communities, *"…to provide a framework in which the seaweed industry in Tanzania can expand and prosper in a way that is significantly, socially and environmentally sustainable*" (SDSP, 2005). Through this strategic statement the seaweed farming activities in Tanzania became more institutionalized and much more recognized as important instrument to achieve MKUKUTA objectives. Apart from that, at the end of this document, the issues of contract signing and agreements as well as responsibilities of various stakeholders were identified and can be found in this document (pages 44-47).
- *Government as moderator in seaweed business*: This means the government comes between the buyers and seaweed farmers. This is necessary due to the fact that, the existence of the third party in business will ensure the favorable business environments and legitimacy to the two business parties. Olomi (2006) defined the *enterprise development* as an act of supporting the establishment or improvement of business activities. The intervention act of the government, apart from ensuring favorable and fair business environment, it also facilitate the *built-in* capacity and interests among seaweed farmers in such a way that, these seaweed farmers sees the activity profitable. During my study, seaweed farmers at Mlingotini area have shown growing interests in seaweed farming business. In

addition to this, the government has a role of formalizing seaweed activities (business) so as to attract potential investors in this kind of activities.

6.5. Seaweed marketing system

At Mlingotini area previously, the buyer would have provided the production in puts to farmers (just as other farming sites along the coast of Tanzania), but currently Msichoke seaweed farming group are buyer independent such that they can sell their produces to any buyer (Msuya et al, 2007). The concept of fish chain by Bavinck et al, (2005) highlighted to indicate the strong relationship between the production processes at various levels of production. Similarly, for seaweed farming and the whole process of production follow the fish chain trend and figure 6.3 summarize this kind of trend.

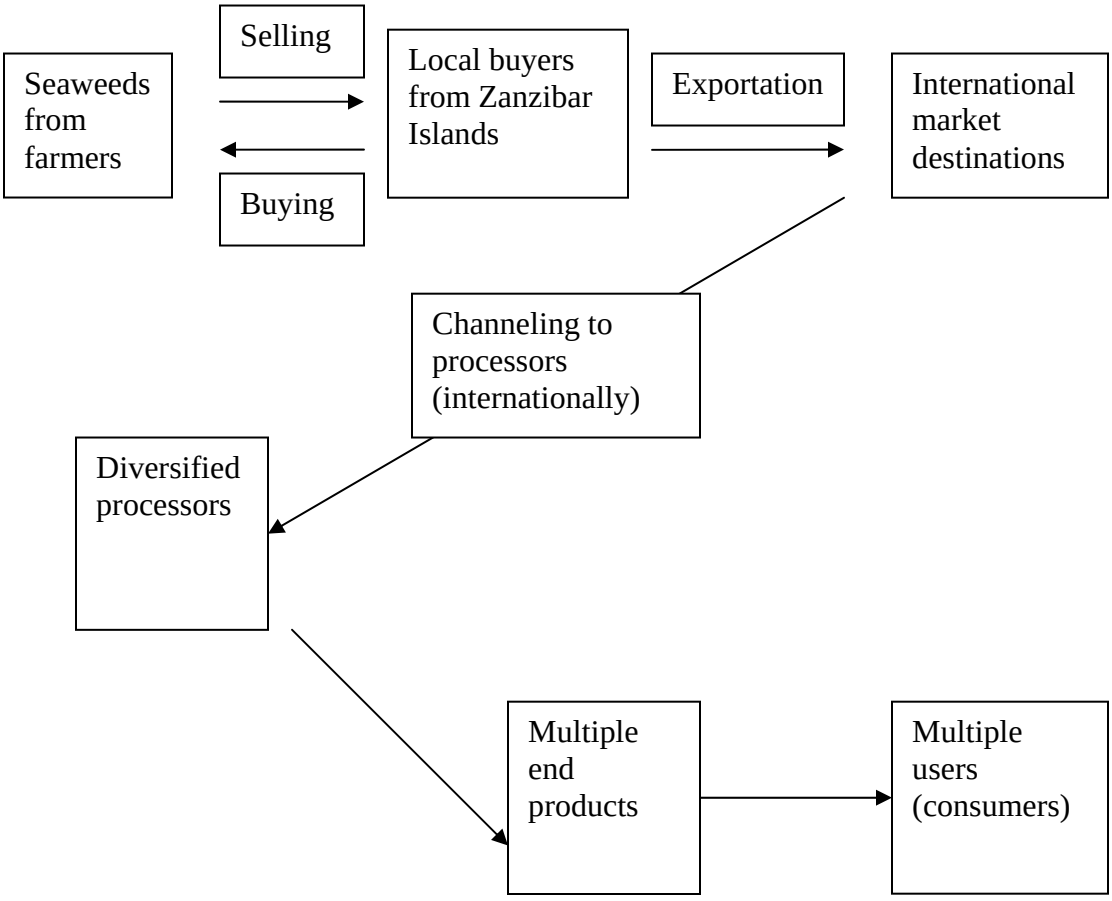

Figure 6.3: Seaweed chains from the concept of fish chain

After harvesting and drying processes, the farmers sell their produces to local seaweed agents from Zanzibar Island. According to the farmers who responded reported to sell their seaweeds to BIRR Company Limited, whereby the agent exports the seaweed abroad[18]as international markets. While in these countries, there are wide ranges of processing industries such as pharmaceutical, food industries and chemical industries. These industries produce varieties of end products;

- Pharmaceutical industries uses seaweeds to extract alga solution which is used in medical and microbiology laboratories as bacterial culturing medium. Also alga is used to make shields of capsule tablets such as antibiotics like Tetracycline. In addition to that, seaweeds contain iodine ions and therefore, iodine is extracted for goiter treatment. Coastal communities believe that consuming some species of seaweeds cures some chronic diseases as they have limited financial capacities to go to the hospitals.
- Food industries prepare chewing gums and food emulsifiers from seaweed extracts. During this study, one of the seaweed farmers pointed out that, they can be able make cakes and soaps from seaweeds.
- Chemical industries uses seaweed extracts to make cosmetics and other products such as toothpaste.

From farming- processing-producing various end products- used by diverse users, it is obvious that seaweed business is a diverse, complicated and dynamic business just like capture fisheries or aquaculture. This long chain of seaweed needs to have a full-bodied system to accommodate the dynamics and complexity therefore there should the flexibility in terms of governance and management strategies as pointed out by Kooiman, (2005). Adding to that, in order to achieve good governance, the whole system should be seen as a web (figure 6.4) such that more room for transparency to reduce conflicts, strengthening collaboration and sharing of responsibilities.

[18] International markets include those in Denmark, USA and France

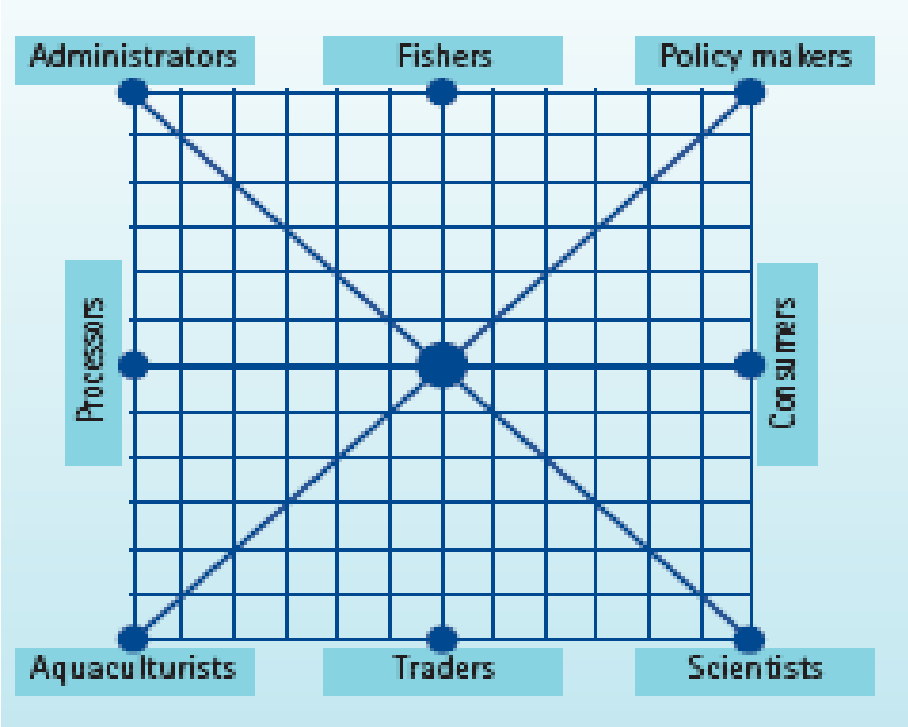

Figure 6.4: Good governance as a web allowing interactions with stakeholders at various levels, adapted from MARE/Fish Gov[19].

6.6. Policy Implications

Mariculture development recognized as an important part in fisheries sector by Tanzanian government; thus the government continues to design and implement various policies supporting the development of mariculture activities in general. Poverty reduction in the country has become a common agenda in policy formulation and implementation in Tanzania[20]. During the multiparty era in Tanzania, stakeholders participation in various sectors have been broadened day after day, such that there is more room for civil society, private sectors and individuals to participate in development initiatives (Olomi, 2006). This is due to the fact that, mariculture development involves diversified stakeholders with diverse interests and political implications; this calls for collaborative approach in

[19] http://www.fishgovnet.org/downloads/documents/flyer_fishforlife.pdf

[20] http://www.tanzania.go.tz/pdf/Idadi%20Eng.pdf Subsection 3.3.1

resource management and poverty reduction in coastal communities. Figure 6.5 describe the causal effects due to lack of mariculture institutional attention in the country.

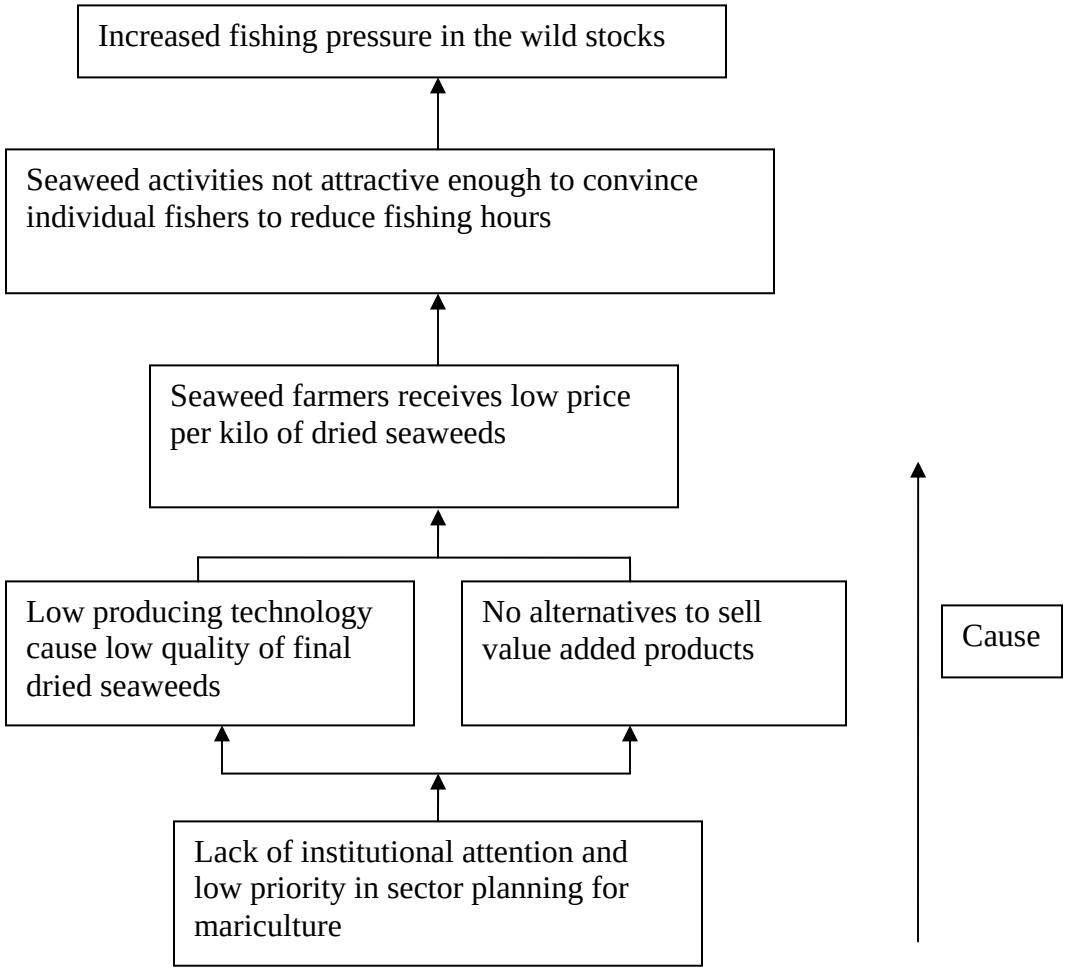

Figure 6.5: Causal effects due to lack of mariculture institutional attention in Tanzania

6.7. Governability and response from community on development initiatives through mariculture activities

The concept of governability originated from the United States and Europe in 1970s. The term was used in expressing the difficulties in governing related issues (Anon, undated). The author identified two basic governability elements: these are, "*the ability of governments to respond efficiently and legitimately to the interests of the majority, and the fact that societies have self-organizing capabilities that further their cohesion*". These

two elements are essential for sustainable development in any sense. It is well known that it is difficult to support individuals; instead organizing various groups and associations is preferred by facilitators, as the most efficient way to provide support. Seaweed farmers at Mlingotini area reported to have association with its constitution and registered with Registration Number CR 500. This is essential for the seaweed farming activities developments since they can be recognizes at various administration levels such that;

- Study tours are being organized to other successful projects, for example the Msichoke seaweed farmers visited Zanzibar Island to learn sustainable seaweed farming techniques).
- Seminars and trainings have been conducted to create people's awareness on coastal resources management and the importance of having alternatives income generating activities in the area although only few seaweed farmers in the group were fishers. However, sensitizing portion of the community on alternative income generating opportunities is a catalytic action in such a way that the other potion of the community will be contaminated through seaweed farmers.

In contrast to this, fishers at Mlingotini area found to have no any formal association and thus operate their fishing activities individually. One of the respondent reported that, the area is very much dynamic in terms of fisher's composition. The area regarded as a landing site for many strange fishers from various coastal regions and thus it would be difficult to organize a formal association similar to seaweed farmers. But in interviewing some other fishers, they responded in the same way but adding they are more that 20 permanent fishers in the area but they did not consider forming and legalize association to be an important issue. Currently, they have informal associations which do not enable them to access loans since they are not registered. The question of how do fishers observe the seaweed activities in the area, and if they would like to come into the activities; their responses were broad in sense that with available financial support to start the business, they are willingly to join the seaweed production. The study also asked further question that these fishers have some money from fishing activities, why do not them use such money to start the business (buying production in puts)? They responded by doubting the wastage of their time since they are not sure of the market and said perhaps in future someone can think of seaweed farming.

6.8. The need for seaweed farming in coastal communities in Tanzania

Different literatures documented positive effects of seaweed farming in different parts of the world on social and economic aspects. These include earning money which in turn improves standards of living (especially along the coastal villages). Seaweed farming represents an earning of foreign exchange for the countries of eastern Africa. It is now clear that emphasis on seaweed farming can generate potential earnings in eastern Africa (Bryceson, 2002).

The coastal population in Tanzania is growing at a rate of 2.8 to 6 percent annually. In Tanzania just like in other parts of the world coastal populations increase very rapidly at the same time living conditions are very poor (especially in rural areas). The inhabitants of these areas are poor and isolated from social services in many cases. Poor infrastructures and low education hinders developments and limit income generating alternatives in these areas. This situation has accelerated poverty in these communities whereby in coastal rural areas the poverty has caused the high rates of coastal resources depletion. Mariculture activities offer an alternative for coastal communities a stable, profitable and productive industry without increasing pressure on the fisheries wild stocks (Tanzania Mariculture Issue Profile, 1999).

From the context of poor living standards and coastal resources depletion, seaweed farming is becoming an important income generating activity along Tanzanian coast. Therefore, seaweed farming (and mariculture activities in general) development initiatives were established to relax the situation (Tanzania Mariculture Issue Profile, 1999). Social and economical benefits from the farming of seaweeds initially represented an opportunity for coastal villagers. These have been witnessed especially among women earning money and as a consequence standards of living in the villages were improved during the first decade of production (Bryceson, 2002). These are real examples in Zanzibar Islands, Mlingotini village and other coastal regions in Tanzania.

6.9. Hard choices facing governors and seaweed stakeholders in general

Regarding the scarcity of resources in management and livelihoods sustainability along the coast, managers and governors for coastal resources are being faced by hard choices. These are decisions to make in corners just like fighting between life and death: one should be chosen. This is because, choosing between two prevailing activities is not the matter of priority, and both are required to be accomplished at the same time. Hard choices also face other stakeholders other than governors and managers: for instance, investors. In the context of seaweed farming activities at Mlingotini area, the study identified three areas presenting hard choices;

- *Ecosystem health:* The ecosystem health is among the global concerns which require attention in management programs. For seaweed farming in Tanzania, selecting suitable farming sites involves the interference of some ecosystems such as coral reefs and sea grasses. It is a hard choice confronting the governors since one activity has to be sacrificed in establishment of the other: for instance, if to rehabilitate coral reef ecosystem or establish seaweed farm. For this case, both activities are required and priority does not matter.
- *Abandoning fishing for seaweed activities:* Seaweed farming shows positive impacts in coastal communities to the extent that some other fishers are now convinced to join the activities. Deciding whether to enter the business is still doubtable to them, the question of what will happen if the business does not succeed is obvious. The fear of wasting time in such small activity needs guts: it is not thinkable for experienced fishers despite of declining wild catch.

- *Investing fishing money in seaweed farming activities:* This confronts fishers as stakeholders in seaweed farming activities. Seaweed farming activities requires low capital when compared to fishing activities. Productions in puts as well as labor are cheap that it would not be a problem for fishers to invest fishing money in to seaweed activities; the same reason applies that, what if the business is not sustainable?

CHAPTER 7

7.0. CONCLUSION

7.1. Towards Good Governance Approach in Mariculture Activities in Tanzania

The study aimed at using interactive governance perspectives to analyze the interactions between the three institutional elements namely state, market and civil society as seaweed activities as concerned in Tanzania. Most coastal communities are poor and depend directly on coastal resources for their daily needs. Due to the fact that coastal livelihoods provide little in terms of local micro-economy, larger percent of coastal residents are fishers which in turn deplete wild fish stocks. Seaweed farming activities have been considered to be the alternative income generating activity in these communities. However, the sustainability of seaweed farming activities will depend much on the nature of interactions between the governing system and the system to be governed. The question of governability depends on to what extent does these two systems matches to each other. As pointed by Bavinck et al (2005) that governability is all about properties that should enable good governance, in order to have successful governance system there should be some degree of links between third order governance (that formulates policies) and first order governance (that have to comply with formulated policies).

7.1.1. Characteristics of Governing Modes in First Order and Third Order Governances; the link between them

The first order of governance is characterized by self- and co-governance modes with very limited capacities to handle some societal issues in marginal areas. On the other hand, the third order governance mostly runs hierarchically by formulating policies and strategies for implementation. With no link between these two orders of governance there will be very minimal success to such governance systems; this means the third order governance has to understand the needs of first order governance system so that the formulated policies relate to these needs. Tanzania is a democratic country and there are

strong relationships between the first order and third order governance systems, NSGRP Strategy highlights this relations. However, the Self- and Co-governing modes which exist at first order governance system should not be considered as satisfactory conditions for developing seaweed industry in the coastal area instead, more interactions are necessary between stakeholder groups to improve production chain of their produces. Bonds between stakeholder groups regardless of primary or secondary stakeholder categories, should be strengthened to minimize interferences, this will entertain interplays as well as interventions among stakeholder groups. It might be seen difficult to improve seaweed chain in the area since seaweeds are for exports and no local uses for seaweeds; to tackle this problem higher levels of governance systems should identify and accept the need of seaweed farming activities to coastal communities, and therefore to promote and advertise the industry to various potential investors. *This is a required need which the local farmers and first order governance system have no capacity of.*

7.2. Traditions versus Science and Technology

To have governable system, culture, traditions and norms should be respected but not to be entertained at all times. This is due to the fact that, globalization had made things change and thus science and technologies are there to improve daily lives. Weather changed in most places world wide, some norms and cultural altitudes have no rooms any more in modern societies. The notion of coastal men that they were made to be fishers has to be reconsidered by coastal communities. For the sake of development along the coastal areas in Tanzania, coastal communities have to easy the governability situation. A strong relationship between the three orders of governance and participatory approach should be encouraged such that the first order of governance becomes accountable for local development.

The floating line seaweed farming technique introduced in Mlingotini village could be more appropriate for men since it requires boats to farm in higher waters. The governance has to promote cooperative approaches that make coastal stakeholder groups and both men and women work together to solve societal problems while creating societal opportunities in their area.

7.3. Governance Instruments that corresponds to the reality

Good governance has various characteristics including those summarized in Chapter 2 table 2.1, but in order monitor the fulfilment of such characters the system to be governed should understand and distinguish between the needs for local community, the accountability of the governing system as well as capacities available to the governing system. To examine the exercise of good governance, the whole governance system therefore should formulate and implement policies in an interactive and collaborative manner such that wider ranges of stakeholder opinions are accommodated and thus wider chances to exercise good governance principles. Analyzing social impacts of seaweed farming along the coast of Tanzania provide positive and useful insights on the industry but in addition to that the governance system should also consider improving the production chain which seems to be necessary for the seaweed industry along the coast.

Some fishers are willingly to join the seaweed activities in Mlingotini village but hard choices confronting them make seaweed activities not to be their option. There should be instruments available to these fishers (example, real possible benefits from seaweed activities should well known to them) to encourage them to enter the seaweed industry. To adapt into this will take time but hopefully slowly they will cope into business and thus increased production in the area. Farmers are ambitious to have better production levels and earn more money, but business skills and planning are lacking. Thus, there is a weak link between seaweed farmers' future prospects and the reality.

Launching SDSP in 2005 was a necessary instrument in seaweed industry in Tanzania, but this alone would not push far this industry; low level of education along the coast will always be a problem. In seaweed activities, business skills and planning are not considered as important aspects. Furthermore essential instruments for making seaweed business sustainable are missing this is because the only concern seems to be to increase production, even though it is obvious that it is unlikely that an unplanned business in the long run will be successful. There can for example be area and user conflicts in the coastal zone that have to be solved through planning. For the case of multiple occupations in Mlingotini village, it might be helpful for the farmers to have instruments

which will enable them to have strategies of concentrating on single major activity to produce intensively and earn more money. Trainings on business will be immediate and appropriate instrument for these farmers. Currently, there are no specific mariculture courses in academic institutions, for instance certificates or diploma programs or including this course at first degree level, in near future it would be better to include mariculture aspects in marine resources (FAST-UDSM, just as aquaculture courses) or in biotechnology courses (Botany department- UDSM). Including mariculture related courses will be a great achievement since mariculture workforce will be enhanced in the country and will increase on-field trainings. This is because, participating in seminars and workshops for all farmers at once is not possible and it is even difficult to have new participants in each serial seminar or workshops and therefore on-field seminars and workshops would improve production faster than workshops with only group representatives. This is due to the fact that, on-field activities enable all seaweed farmers to participate. Additionally, communications between seaweed stakeholders will be improved such that, the state will not depend to get information on seaweed market through local buyers. Figure 4.4 should have no dashed line meaning that the government will be accountable to civil society concerning overseas seaweed companies.

In conclusion, seaweed farming activities in Tanzania are still at a very low developmental level, but are a promising industry with needs for collective action from various stakeholder groups. This does not call for only those who are in Tanzania or who are already engaged with seaweed activities in Tanzania alone, but this call concerns any stakeholder group world wide ranging from coastal resources management, poverty reduction and many more which are related to coastal livelihood sustainability. Appendix 4 provides the contacts for the institutions responsible for mariculture (seaweed farming) activities in Tanzania for any stakeholder who might have a position to lift up mariculture industry in the country.

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APPENDICES

APPENDIX 1

Table 3.1

Mariculture Stakeholders

Stakeholders	Mode of Participation	Direct Benefits
Government Institutions Ministries Research/ Training Institutions Parastatal Organizations Sectors/ Departments	• Training and research coordination • Conservation of resource base • Development of sectoral plans • Revenue collection • Oversight of rational use of natural resources • Provision of infrastructure • Creation of policy, guidelines and regulations for resource use • Monitoring and auditing • Licensing • Enforcement • Legislation • Extension services • Manpower planning and human resources development • Coordination of other stakeholders • Support of information systems • International networking • Land use monitoring and evaluation	• Tax revenues • Rational utilization of resources • National development • Institution strengthening • Community development • Improved information and decisionmaking
Local Communities and Community Members	• Sustainable resource use • Economic development • Conduct initial stages of site allocation procedures • Environmental protection • Project implementation	• Employment and income • Social services • Government revenue • Healthy ecosystem
Private Sector	• Investment and private enterprise • Harvesting and utilization of resource base • Testing and adoption of technology • Compliance with government regulation, guidelines, environmental protection standards, etc.	• Sales and profits • Long-term economic growth • Access to markets • Reliable source of inputs (materials, staff) • Security of investment
NGOs	• Sustainable production and environmental conservation • Education and awareness raising • Stakeholder participation and collaboration	• Community development • Enhanced planning, participation and awareness • Protection of the environment
International Community	• Capacity building through technical assistance, training and transfer of technology • Partners in sustainable development • Financial assistance • Compliance with international agreements and responsibilities • Development planning	• Globalization/ technical dissemination • Economic development • Equity • Environmental protection • Moral and social fulfillment • Market creation for exports

Mariculture stakeholders (Source: Tanzania Mariculture Issue Profile, 1999).

APPENDIX 2

SAMPLE FARMING AGREEMENT FOR DEVELOPMENT OF SEAWEED FARMING

This agreement is made this ..... day of 2005

BETWEEN

_____ VILLAGE GOVERNMENT of P. O. Box _____ (hereinafter called the VILLAGE GOVERNMENT) of the one part.

AND

.....
.....
.....

of P.O. Box ..... (hereinafter called the DEVELOPER) of the other party.

WHEREAS the VILLAGE GOVERNMENT is desirous of being supplied with inputs to grow cottonii/spinosum by the DEVELOPER and of being provided with a market for the same, and;

WHEREAS the DEVELOPER is willing to supply the said inputs and market.

NOW THIS AGREEMENT witnesses and the VILLAGE Government and DEVELOPER agree as follows:

1. That the VILLAGE Government (being the governing body) will use its authority to ensure that its farmers will keep the same for their intended purposes.
2. That the village Government will represent all the seaweed farmers in anything pertaining to the growing of *cottonii/spinosum.*
3. That the DEVELOPER will be the sole purchaser of seaweed from producers.
4. That the DEVELOPER will pay a price commensurate with the beach price of dried seaweed in the world market taking into consideration the cost of inputs given to the farmers for producing the seaweed and also will assist the VILLAGE GOVERNMENT in making sure that the farmers multiply their seed stock by being provided with additional materials and extension advise as elaborated in appendix 'A'.

5. That the VILLAGE will assist the DEVELOPER in insuring that the farmers they represent in this agreement understand the aim and contents of the contract and that they accept and participate with honesty and diligence in progress that will come out of this agreement.

6. That the inputs (rope, tie-tie, floats, etc) will remain the property of the DEVELOPER and the DEVELOPER has the right to demand the return of all the inputs from any farmer who may be selling to other purchasers using inputs for purposes other than seaweed farming, or who sell to the DEVELOPER less than half the amount of seaweed per line that other producers in the village are selling.

7. That the DEVELOPER will have the right to refuse to provide farming materials to interested producers whom have in the past been provided with materials and have failed to produce and sell to the DEVELOPER an annual minimum of 5 kg per 20 meters line provided. Likewise the DEVELOPER may refuse to provide materials to additional farmers if the DEVELOPER has met the minimum requirements of this agreement and has insufficient supplies of materials or seed stock to meet requirements for additional farmers.

8. That the VILLAGE GOVERNMENT and the DEVELOPER together agree that the price of seaweed can rise or fall at any time, as it does with other produce, depending on the conditions of the market at that particular time.

9. That the VILLAGE GOVERNMENT will assist the DEVELOPER in making sure that production of high quality seaweed is achieved, and using standard industry hygiene practices in the drying process as elaborated in appendix 'B'.

10. That appendices 'A' to 'C' in this agreement shall be deemed to form and be read as part of this agreement.

11. That this agreement may be amended, renewed or replaced at any time upon the mutual consent in writing of the DEVELOPER, VILLAGE GOVERNMENT and witnessed by the District Fisheries Officer (acting on behalf of the District Executive Director).

12. That any disputes that may arise under this agreement must first be brought to the attention of the other party and the District Fisheries Officer (acting on behalf of the District Executive Director) through written notice to them and that the offending party will have 14 days to rectify the problem or reach mutual acceptance with the other party to the agreement to resolve the dispute after which if no solution is reach the offending party may take the matter to higher authorities and when appropriate, a court of law.

13. That this agreement may be terminated in the events stipulated /stated in appendix 'C' of this agreement.

14. That the duration of this agreement will be five (5) years, or other mutually agreed period of time, commencing from the date of signing this agreement.

IN WITNESS WHEREOF the parties hereto have executed this agreement the day, month and year as follows:

SIGNED AND DELIVERED

BEFORE ME: .....
ADVOCATE/MAGISTRATE

SIGNED AND DELIVERED

BEFORE ME: .....
ADVOCATE/MAGISTRATE

Seaweed farming agreements (Source: SDSP 2005).

APPENDIX 3

QUESTIONNAIRES DURING DATA COLLECTION FOR THIS STUDY: *Governance Issues in Mariculture Activities in Tanzania*

- When did you start seaweed farming/fishing activities? ..... (year)
- Where did you get the idea of seaweed farming/fishing? ……..
- What species are you dealing with? (In case of seaweed farming)? .....
- What is the area of your farm? .....
- How often do you harvest? .....
- How much do you harvest (quantity) per season? .....
- What is the price per kilogram (seaweed/fish)? .....
- Where does the farmer sell seaweed? .....
- What type of other activities were being done before engaging in seaweed farming/ fishing activities;

  .....

  .....

  .....
- Are you engaged in your activities as a full/ part time? .....

  a). if yes, Part time (how many days per week/weeks per month or which months in a year) .....

  Why so specific to such period of a week/month/year

  .....

  b). if no, give reasons .....

  .....

  What particularly do you do when you are not engaged in one of the two activities? .....

  .....
- Do you always keep the record for your production?

  If yes: How? ……..

  If not: what could be reasons? .....

  .....

.....

- Sometimes you to shift from fishing to seaweed farming and vice versa,

What reasons makes (the dynamics)

.....

.....

.....

- What do you think it pays you more, capture fisheries or seaweed

.....

- Do you receive any funds/grants for fishery/ seaweed farming activities

a) If yes, from where? mention various sources of funds

.....

.....

How do you use the funds/grants?

.....

.....

.....

b) If not: how do you manage your activities

.....

.....

- Does the government give you support according to fisheries policy and laws?

If yes, how does the fisheries policy and laws help in achieving your goals

.....

.....

.....

If not, how do you resolve your conflicts?

.....

.....

.....

- Do you have any association regarding to your activities?

If yes, is it registered? Yes/No .....

What is the organizational structure of your association?

.....

.....

.....

- Do you have an access to get funds to run your association? Yes/No .....

  If yes, what are the sources?

  .....

  .....

  .....
- Does your association have constitution and bylaws?
- How do they relate with the principle Fisheries Acts and Policies?
- What are your future expectations?

APPENDIX 4

INSTITUTIONS RESPONSIBLE FOR MARICULTURE INDUSTRY IN TANZANIA

Tanzania Coastal Management Partnership

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