

**SOCIAL ACTORS IN THE GLOBAL MARKET: SOCIO-ECONOMIC IMPACTS OF
SHRIMP AQUACULTURE IN SOUTH SULAWESI, INDONESIA**

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(May 2000)

Working Paper 316

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ISSN 0921-0210

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1. INTRODUCTION

1.1 Background of the Study and Statement of the Problem

Export-oriented cash crops production, for instance, coffee, banana, sugar, cacao and tobacco, has been encouraged among developing nations. Some governments in developing nations see that the expansion of cash crops production promotes not only substantial foreign exchange gains, but also the improvement of rural livelihoods through new employment generation and / or new economic opportunities among rural dwellers.

Of those cash crops, cultured shrimp is regarded as one of the most profitable crops, as a result of a booming international market demand for shrimp especially in industrial nations¹. The proportion of shrimp aquaculture areas and volumes have significantly increased not only in Asia, but also in Latin America since the 1980s². The increase of the volume of shrimp production has been achieved not only by the intensification of shrimp ponds, but also by the enlargement of shrimp pond areas; these changes have been called the “Blue Revolution”. Several governments in developing nations as well as international aid institutions³ have promoted shrimp culture, because they have assumed that shrimp aquaculture would result in the improvement of coastal livelihoods and would be alternative sources of foreign exchange.

With the booming popularity of shrimp production, quite a number of studies on socio-economic impacts of shrimp farming have been carried out. Some studies indicate various unfavorable consequences of commercial shrimp farming. These negative impacts are not only on local environments (such as mangrove deforestation, water pollution and degradation of ecosystems), but also on local dwellers (such as labour displacement of petty fishermen and rice share croppers, harming coastal food security and disregard for traditional customs)⁴. Meanwhile, several studies stress various positive points of com-

¹ Japan, USA and some of Western European nations import most of world shrimp (Murai, 1988; Rosenberry, 1998; Green Peace, 1997 and Barraclough et al, 1996).

² Volume of shrimp production has globally increased from 200,000 metric tons in 1985 to 630,000 metric tons in 1990 (Barraclough et al, 1996).

³ For instances, ADB (Asian Development Bank), the World Bank, JICA (Japan International Cooperation Agency) and others have provided a large amount of funds and technical assistance for the development of shrimp sector (Kihara, 1987; Green Peace, 1997).

⁴ See, among others, Murai (1988), Green Peace (1997), Barraclough and Finger-Stich. (1996), Stonich (1991) and Miyauchi (1989).

mercial shrimp farming (such as diversifying coastal employment, enhancing land use and inducing the development of other industries)⁵.

While different studies have indicated both negative and positive impacts of shrimp farming, the discussion points of these impact studies are not always on the same wavelength. For instance, Edwards (1991) stresses high economic returns of shrimp farming, but ignores the question of the distribution of profits. Meantime, Green Peace (1996) and Barraclough and Finger-Stich (1996) stress the unequal profit sharing among shrimp farming communities and conclude shrimp farming is the main factor for growing inequality, but they do not discuss how the long standing unequal social structure influenced such processes. Murai (1988) reports the marginalization of poor people through loss of labor opportunities, while Guimaraes (1989) and Kusumastanto et al. (1998) report shrimp farming generated labor opportunities through the diversification of activities in shrimp sector.

However, there is a lack of local level comprehensive analyses of the heterogeneous conditions of shrimp production areas, and of classifying the status of unequal social actors in coastal societies. Existing studies generally fail to clarify the various impacts of shrimp farming based on different production systems, or to differentiate newly constructed aquaculture ponds and long existing aquaculture ponds.

The socio-economic impacts of shrimp farming are different, and the impacts are dependent not only on socio-economic conditions of various actors, but also on macro socio-economic conditions of coastal communities. Also, the impacts are different depending on production systems as well as ecological conditions of coastal communities. Yet, there is no socio-economic impacts studies, which clarify and compare the impacts of “existing aquaculture ponds” and “newly constructed aquaculture ponds” considering various social actors. Therefore, this paper deal with the impacts of existing aquaculture ponds and new aquaculture ponds in relation to distinguishing different production systems. Also, the analysis of the impacts is based on the identification of various actors in shrimp sector.

⁵ See, among others, Kusumastanto et al. (1998), Hambrey (undated), Edwards (1999) and Menasveta (Undated).

1.2 Objectives and Scope of the Study

As already noted, most of the conventional impacts studies have been conducted without clarifying various social actors and the conditions of these actors in shrimp sector. Further, such studies have neither looked into the socio-economic impacts of long existing aquaculture ponds as well as newly constructed ponds

This paper, therefore, presents a case study from South Sulawesi of socio-economic impacts of shrimp farming between the 1960s and 1999 and contrasts its main finding to other studies.

This study will attempt to reach the following specific objectives.

1. To explore the reasons for the expansion of South Sulawesi's shrimp production by looking at the booming market demand for shrimp along with dynamic socio-economic changes in Japan.
2. To draw appropriate social actors maps in the shrimp sector on the basis of different production systems, and investigate relationships among described actors within their economic conditions.
3. To clarify the various types of commodity chains in different production systems, especially within the expansion processes of commercial shrimp production.
4. To analyze the different social and economic impacts of shrimp production activities on various social actors in particular coastal communities.
5. Through the above studies, to present local specific pictures of socio-economic impacts of shrimp production activities in different conditions and heterogeneous coastal communities.

1.3 Research Questions and Hypothesis

General Question:

What are the main impacts of commercial shrimp production on various social actors in coastal communities of South Sulawesi between the 1960s and 1999?

Specific Questions:

1. How did socio-economic changes affect the position of shrimp in diet patterns of Japanese people during the last 30 years?
2. How do various social actors deal with or regard commercial shrimp production? Which social actors adopt shrimp farming as a survival or consolidation or capital accumulation strategy?
3. How does the expansion of shrimp farming affect the situation of various social actors in coastal communities?
4. What are the effects of the expansion of shrimp farming upon the income gaps among various social actors?
5. Under what conditions, how do local people participate in the shrimp farming activities as hired labor?

Hypothesis:

1. The spread of shrimp farming in South Sulawesi has been strongly influenced by the transformation of people's lifestyles during the period of high economic growth in Japan.
2. Shrimp farming provides unequal benefits to the different actors involved: landowners and investors benefiting relatively more and hired pond workers relatively less. As a result, the gaps between rich and poor are wide and increasing. This is more likely to happen in intensive ponds than in traditional ponds.

1.4 Methodology and Limitation of the Study

This study attempts to cover various levels and has several objectives. The paper firstly uses Mintz's historical approach on social changes and the spread of particular cash crops for clarifying the expansion of shrimp farming in South Sulawesi in relation to the socio-economic changes in Japan. Second, the paper uses the concept of social actors in order to identify various heterogeneous coastal dwellers involved in the shrimp sector, and to understand how identified actors deal with shrimp farming for their livelihoods. Furthermore, the paper uses the concept of commodity chains which helps to show the work-

ing status of identified actors within the flows of certain labor and material inputs in the shrimp sector.

The study relies on primary and secondary sources. The secondary data are of limited use for giving satisfactory answers to the research questions, because these data do not cover the socio-economic conditions of various social actors in South Sulawesi's coastal communities. In order to analyze conditions at the village level, a field survey was conducted by the author in South Sulawesi, Indonesia for five weeks visiting period (in July and August, 1999). Especially, data on socio-economic conditions of coastal dwellers were collected. During the field survey, certain statistical data were also collected.

There are several limitations of the study due to the short period of the field survey: Firstly, the identification of social groups who have not engaged in the shrimp sector and their socio-economic conditions are beyond this paper.

1. The data are not enough to conduct comparative socio-economic analyses between social actors in shrimp sector and groups in other economic activities in particular communities.
2. The identification of social actors (such as government officers and politicians) from the Indonesian (national and local) government in coastal areas and the involvements of these actors in the shrimp sector are not discussed in the paper.
3. Ecological impacts such as water pollution and salinization on the fish catch and rice farming could not be analyzed during the brief period of the fieldwork.
4. Semi-intensive aquaculture ponds were not observed in the surveyed areas. Therefore, neither detailed socio-economic study on semi-intensive ponds, nor comparative studies among extensive, semi-intensive and intensive systems could be conducted.

The main analysis of this paper is on the socio-economic features of long existing extensive and newly constructed intensive systems as well as on the comparison between two systems. The village level data collected by the author provide insights to aquaculture organization with certain actors. The village level data analysis tends to be qualitative rather than quantitative.

1.5 Structure of the Paper

The rest of this paper is structured as follows: Chapter II conceptualizes several terms and builds analytical frameworks for chapters III and IV. It first discusses existing impact studies of shrimp farming. After that, it presents Mintz's classical approach for explaining dynamic socio-economic changes and the expansion of particular cash crop production. It then addresses the concept of social actors and the definition of commodity chains in order to clarify more precise insights of shrimp farming in chapter IV.

Chapter III provides a broad perspective of how shrimp production grew in response to market demand, especially as a result of the transformation of lifestyles associated with high economic growth in Japan. It then presents the background of the expansion of shrimp farming in South Sulawesi. Based on the analytical frameworks in chapter II, chapter IV describes various social actors in two different production systems and reviews the distinct socio-economic conditions of these actors in particular South Sulawesi's coastal areas. Then, it clarifies the commodity chains of shrimp from production site to consumer site. Chapter V analyzes the different impacts of two different production systems, and then compares how these impacts are similar or different from the conventional impacts studies. Finally, chapter VI summarizes the main findings in relation to the research questions of this paper, and gives conclusions with some recommendations.

2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Introduction

This chapter reviews several impacts of shrimp farming, and represents the conceptual and analytical framework of this study. The first section reviews certain negative and positive impacts of shrimp farming among developing nations, and clarifies linkages between causes of positive / negative impacts of shrimp farming. The second section discusses the changing linkages between transformation of people's lifestyles along with socio-economic changes in industrial nations and the expansion of particular commodity production in developing nations. The third section conceptualizes social actors referring to the discussion of the actor oriented approach. The last section defines the term of commodity chain in the line of global level commodity production and consumption processes.

2.2 Impacts of Shrimp Aquaculture

A number of studies have attempted to clarify the impacts of shrimp farming at various occasions, and have shown differently negative and positive outcomes of shrimp farming operations. This section will present both negative and positive arguments in existing studies. Particularly, it will deal with socio-economic impacts on coastal communities.

2.2.a. *Negative Impacts of Shrimp Farming*

A number of studies critically point out several negative consequences of shrimp farming to coastal people. Green Peace (1997: 2), for instance, highlights the “unequal profit distribution”:

Though the shrimp industry tries to promote itself as a boon to the local economies, it benefits mainly the wealthy investors, at great loss to local people.

Barraclough and Finger-Stich (1996: 24) point out the “deterioration of local livelihoods” :

Shrimp aquaculture is changing customary patterns of natural resource use by appropriating these resources for its own purposes while abrogating or restricting rights of local users. This in turn affects livelihoods more widely by disrupting earlier systems of production, distribution and social relations.

Sultana conveys the women’s voices who suffer from mangrove deforestation for shrimp pond construction in Bangladesh:

Our misery started since the clearance of mangrove forest. In the past the mangrove forest provided us with life, not only we lost our income from the forest, our work load and drudgery in our life also increased (...) If we went to the mangrove forest for a day to collect forest products we could live on that for three or four days. (Sultana, 1994:12 cited in Barraclough and Finger-Stich, 1996: 31)

Such negative examples are raised in several studies.

It is not difficult to find literatures which describe the destruction of coastal livelihoods by shrimp farming. Previously, many studies have in various ways attempted to clarify the negative impact of commercial shrimp farming on coastal dwellers⁶.

Mainly six negative points are commonly raised in those studies:

- 1) Unequal profits sharing among people;

⁶ See, among others, Murai (1988), Green Peace (1997), Barraclough et al. (1996), Stonich (1991) and Menasveta (Undated).

- 2) Displacement of employment opportunities;
- 3) Endanger food security;
- 4) Destruction of traditional social customs or rules;
- 5) Decline in access to natural resources by local people;
- 6) Loss of valuable land.

First, Green Peace (1997) points out unequal profits sharing of shrimp production; only few investors receive large amounts of profits, while majority of people get small profits or are marginalized. Murai's study in South Sulawesi, Indonesia (1988) supports the unequal profit sharing. It shows how large scale shrimp pond owners as well as shrimp traders monopolize profits, while hired laborers in shrimp ponds as well as in shrimp processing factories receive small wages. In addition, Stonich (1991) indicates huge wage gaps between skilled laborers and unskilled laborers in shrimp farming sector in Honduras. The small number of "skilled laborers" such as managers, biologists and technical supervisors receive high proportion of the total wage amount, while a large number of "unskilled laborers" such as manual laborers and security guards receive only a small wages (*ibid.*).

Several studies stress the decline of employment opportunities after the introduction of shrimp farming. Labor displacement occurs in coastal regions, especially relatively poor people (such as sharecroppers of rice, small-scale rice farmers, petty fishermen and traditional aquaculturalists) are excluded from the commercial shrimp production sector.

Khor (undated) reports that wealthy pond owners extensively buy rice fields for shrimp culture, and as a result around 300,000 rice farmers were forced to leave their lands in one region of Bangladesh. One similar example is reported in Kabir's study (1998) on landless rice farmers who lost their jobs because of shrimp farming. According to the same survey, it also undermines the food security of the poor strata.

Khor (undated) reports that several thousands of fishermen suffered from the sharp decline of fish-catch in Malaysia. The decline of yields results mainly from clearing mangroves and from water contamination by shrimp operations. Some fishermen can not sustain their livelihoods by fishing only. Also, Murai (1988) and Nixon (1996) point out the relation between the decline of the fish-catch and the displacement of fishing works in coastal regions. In addition, Green Peace (1997) stresses that intensive shrimp farming

uses more capital than labor. It is reported in an economic study for a Bangladesh university that: “shrimp farming displaces more jobs than it creates” (Green Peace, 1997: 2). This study shows that rice farming absorbs more labor than shrimp farming does⁷. Thus, Barraclough and Finger-Stich (1996: 27) conclude that “Shrimp farms often expand at the expense of agriculture, aquaculture, forests, and fisheries that are better suited in many places for meeting local food and employment requirements”.

Mangrove clearing for pond construction and intensive shrimp operations endanger coastal food security. Murai (1988) and Green Peace (1997) point out that mangrove clearing damages coastal ecosystems, thus it leads to a decline of coastal species such as fish, shellfish and shrimp. Further, their studies state that water contamination mainly by intensive shrimp operations also endangers coastal ecosystems and brings about a decline in the population of valuable coastal species.

Traditional land rights and other resource usages based on long-standing traditions are ignored and transformed by the commercial shrimp farming operations. Because, as Barraclough and Finger-Stich mention, “The control of local resources has shifted from communities to external institutions ” (1996: 35) and “Traditional production and exchange systems were disrupted (...)” (ibid.). In Honduras, intertidal lands which were opened for fishing, collecting shellfishes and firewood became totally private lands after the land ownership was transferred to outsiders (Stonich, 1991). Thus, local people’s autonomies are diminished, and people face more difficulty to access resources under the control of inter-tidal lands by outside pond owners.

Loss of valuable land is often reported as a consequence of the conversion of agricultural lands to shrimp ponds. It undermines food security of certain residents, and generates conflicts among local people (Khor, undated). Further, salinization of freshwater nearby shrimp ponds disrupts rice growing and causes reduction of rice yield, and in some cases the rice farming can not be continued (Barraclough and Finger-Stich, 1996). These problems sometimes cause serious conflicts among coastal communities (ibid.; Green Peace, 1997).

⁷ According to this economic study at Chittagong University, 50 workers can work in 40 ha of rice field, while only 5 people can work on the same land for shrimp culture (Green Peace, 1997: 2).

2.2.b *Positive Impacts of Shrimp Farming*

It is difficult to find studies which show positive impacts of shrimp farming. There are several studies only which refer to the economic contribution of shrimp export to the national economy and to foreign exchange gains⁸. Nevertheless, a few studies attempt to describe positive aspects of shrimp farming.

Three positive points are raised:

- 1) the contribution of income generation through creating employment opportunities;
- 2) enhancing land use more than other economic activities and
- 3) the conservation of mangrove forests.

First, Edwards (1999) states that intensive aquaculture farming promotes the diversification of employment in Thai coastal regions. His study shows small-scale brackish-water aquaculture (including fin fish, shrimp and sea-weeds) can contribute to the alleviation of poverty through generating various activities⁹ (ibid.). The diversification of works is also reported by Muluk's study (1994) in Java's intensive aquaculture.

Hambrey's study (undated :3) states the potential of employment provision in shrimp farming sectors:

[i]ntensive or semi-intensive shrimp farming, if well planned and managed, will generate far more income and employment than any alternative uses,

Kusumastanto et al. (1998) conclude that small- and medium-scale semi-intensive shrimp farming generates more employment opportunities as well as other economic opportunities among coastal dwellers.

Guimaraes's empirical study (1989) in the Southwest delta of Bangladesh draws positive contribution on the employment issue. During the rainy season, rice farming can not be practiced due to the salinization of water in the studied areas, under this condition shrimp farming (in extensive system) provides alternative employment opportunities. As Guimaraes (1989: 672) puts it:

[s]hrimp culture in the semi-saline zone does not displace rice culture. There is thus no significant destruction of employment in the cultivation of rice and there is significant creation of employment in shrimp culture....

⁸ See among others, Oguro and Kohama (1995) and Saragih (1990, 1991).

⁹ Yet, the employment impact studies based in long term shrimp farming are not done.

It is would be also important to study further about job security issue in the shrimp sector.

Secondly, higher economic returns of shrimp farming are reported in other studies. Hambrey (undated), for instance, presents that benefits from shrimp farming exceed any other economic activities in coastal regions. He criticizes the economic over valuation of mangrove forests in several studies. Another economic value is discussed by Weemaes's study (1997). It mentions that semi- and intensive aquaculture bring much higher profits than rice farming.

Thirdly, Hambrey (undated) does not consider that shrimp pond construction is a major element in mangrove deforestation. Hambrey stresses that even if there is no shrimp farming in mangrove areas, other heavy pressures such as over-exploitation for charcoal and firewood bring more serious mangrove deforestation (ibid.). He insists mangrove clearing is mainly caused by poverty among coastal people (ibid.). Because "Most mangrove areas are inhabited and exploited by very poor and often landless people" (ibid.: 5). Therefore, "The pressures exerted on the mangrove by such people seeking firewood, tannins, poles and wood for charcoal production are enormous" (ibid.: 5).

Under such mangrove exploitation by poor coastal residents, shrimp farming contributes not only to generating employment opportunities, but also to preserving mangroves from poor people. Hambrey (undated :5) stresses its importance:

Shrimp farming is one of the very few activities which could yield a decent income for large numbers of people in areas of mangroves... [e]mployment in shrimp farming should actually reduce the overall pressure on mangrove - related mainly to poverty and over-population – and reduce the risks of further incremental degradation of mature mangrove forest on high conservation value.

In addition, Menasveta (undated) argues that intensive shrimp farming preserves mangrove forests rather than destroys. Because intensive system requires less lands than semi-intensive and extensive systems do. Therefore he concludes that "[t]he intensive shrimp culture system may be the only means of preventing mangroves from being destroyed by extensive shrimp farming" (undated: 10).¹⁰

Diagram 1 reveals the already noted negative and positive impacts of shrimp farming. The negative impacts are seen in three different stages. Firstly, the shrimp pond construction brings loss of valuable land as well as mangrove forest. The conversion of

¹⁰ However, this discussion has some weakness, such as the impact of intensive shrimp operations on local dwellers as well as on the ecology are not considered.

valuable land and of mangrove forest to the ponds undermine food security of coastal poor people (such as the reduction of marine fish catch). The conversion also pushes out certain number of agricultural workers, and these people lose their subsistence base.

Secondly, the privatization of inter-tidal areas reduces access by landless and nearly landless people to local resources (such as mangrove forest). Existing social customs or roles are ignored or changed in the land privatization processes.

Thirdly, shrimp farming operations bring unequal profit. Particularly, small number of people monopolizes large amount of profit, while a large number of people receive small amount of profit. Finally, farming operations create environmental problems (such as water pollution). Those forces diminish coastal species and undermine local food security.

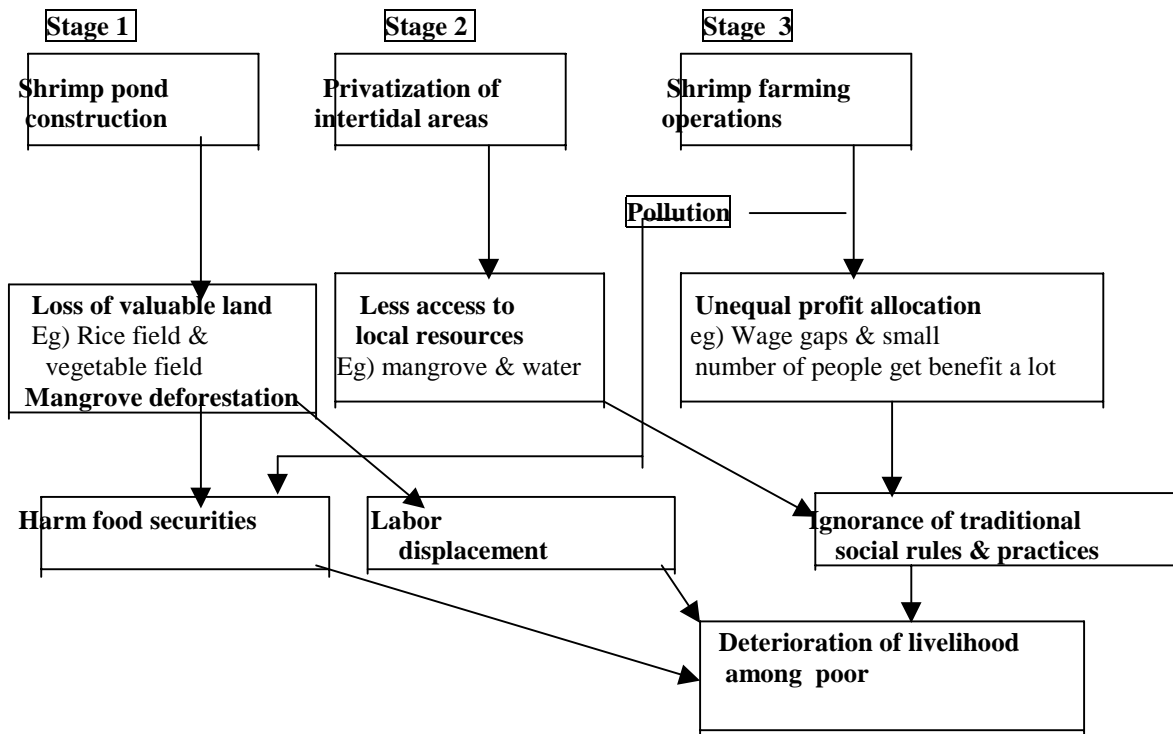
Throughout these processes, livelihoods of coastal poor deteriorate.

In the positive view, firstly intensive pond construction does not bring the loss of valuable land, but rather utilizes the land more valuable than other economic activities. Secondly, shrimp farming operations generate job opportunities through the diversification of activities. It contributes the improving conditions of coastal livelihoods. If the coastal livelihoods could be improved, mangrove deforestation by the poor would declines. Therefore, shrimp farming brings positive impacts not only on the livelihoods of the coastal poor people, but also mangrove forests.

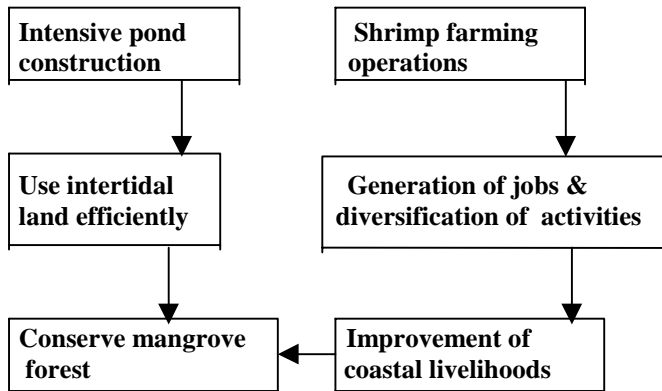
This study will examine which (positive and negative) consequences are observed in a case of particular coastal South Sulawesi. Particularly, whether or not shrimp farming operations bring unequal profit allocation among social actors, and do shrimp farming activities deteriorate livelihoods of coastal actors or improve the condition of coastal actors will be checked.

Diagram 1. Negative and Positive Impacts: Causes and Effects of Shrimp Farming

Negative View



Positive Views



2.3 Social Changes in Industrial Nations and the Expansion of Cash Crops Production in Developing Nations

The expansion of cash crops can not be realized without the growth of large markets, especially in industrial nations. The global market demand for cash crops is one of the obvious forces to stimulate cash crops production in developing nations. In order to understand how market demand work for the expansion of particular cash crop production (such as shrimp, coffee and so forth), it is indispensable to clarify how and why such cash crops became popular in industrial nations and under what conditions.

Particularly, there is a need to look into dynamic socio-economic changes, and how socio-economic changes influence changes in people's livelihoods, especially in dietary habits.

So as to clarify the popularization of the shrimp diet in industrial nations, Mintz's classical approach on sugar is useful. In his study, *Sweetness and Power*, Mintz (1986) clarified the expansion processes of sugar production in British colonies¹¹ looking into the enlargement of sugar demand along with the changes in lifestyles (especially, dietary habits) among the English working class. He analyzes how the popularization of sugar consumption occurred in the context of dynamic changes in the working people's lifestyles (and dietary habits) along with British industrialization. He particularly explores two phenomenon: the changes in labor patterns and in dietary patterns (especially, consumption patterns of sugar) among the English working class between 1650 and 1900 in relation to the industrialization process. Then, he links these changes to the expansion of sugar production in the British colonies.

Mintz's approach is useful for investigating how the market demand for shrimp expanded, and influenced the expansion of shrimp production: a) by clarifying how dynamic socio-economic changes influenced the changes of lifestyles among the working class in certain industrial nations (linkages between transformation of lifestyles / dietary habits among middle and poor strata in the context of the dynamic socio-economic changes); b) by clarifying linkages of these changes to the expansion of particular products in producer nations and the emergence of specific mode of production organization.

¹¹ For instances, Jamaica and Barbados, so called "Sugar islands" in the Caribbean.

This approach can be used to explain the relations between the changes of lifestyles in industrial nations and the organization of expanding shrimp productions in South Sulawesi.

Sugar (and sugar containing products¹²) is ubiquitous and commonly used in modern societies. Sugar once used to be seen as a “luxurious commodity” and it was only enjoyed by the wealthy stratum until the mid-eighteenth century. At first, sugar was brought to England in the twelfth century, and it was not used as sweetening, but as “medicine, seasoning and decoration” until the mid-eighteenth century (Mintz, 1986). Needless to say, the usage of sugar was different from the modern usage, and under this usage, total volume of sugar consumption was very limited in England.

However, a dramatic popularization of sugar consumption was occurred, as Mintz writes:

During the period 1750-1850 every English person, no matter how isolated or how poor, and without regard to age or sex, learned about sugar. Most learned to like it enough to want more than they could afford. After 1850, as the price of sugar dropped sharply... A rarity in 1650, a luxury in 1750, sugar had been transformed into a virtual necessity by 1850. Mintz (1986: 148)

With this popularization of using sugar, the usage of sugar was changed from medicine, seasoning and decoration to “sweetening” from 1750 onward (ibid.). In fact, the drinking of sweetened tea and the consumption of sugar containing foods (such as rice pudding, jam, biscuits and so forth) became popular spectacularly among the English working class (ibid.).

Through this study, Mintz shows that the changes of lifestyles (dietary habits) and the mass consumption of sugar along with changing socio-economy of English were the driving forces to promote the sugar production in the British colonies.

However shrimp is, needless to say, a different substance from sugar. For instance, shrimp has different characteristics and is eaten in different ways from sugar; shrimp is not a dietary necessity like sugar; shrimp is a perishable food, while sugar is a durable food. Therefore, the processes of mass consumption of shrimp can not only be analyzed by looking at the changing lifestyles. There is a need to explore other, for instance, the development of marketing routes, development of transportation systems and new techno-

¹² For instance, jam, biscuit, baked cake and so forth.

logical transfers, the diffusion of cold-storage system and of refrigerator among households, production methods, marketing destination and usages. Considering these factors, this paper will use Mintz's approach for explaining the expansion factors of shrimp production in the province of South Sulawesi, Indonesia in the context of the popularization of shrimp consumption along with dynamic socio-economic changes.

2.4 The Concept of Social Actors

The precise concept is given in Long and Der Ploeg's study (1994: 67), which states: "[s]ocial actor is socially constructed rather than simply a synonym for the individual or a member of homo sapiens." Further, Long and Der Ploeg explain the concept of social actors based on two different kinds of social sources. First, it is derived from "culturally endogenous (factors)". This means that social actors are shaped by some cultural representations in particular societies. Secondly, it arises from "[t]he researchers' own categories and theoretical orientation..." (Long and Der Ploeg, 1994: 67).

Social actors are commonly considered as a) individuals or groups who are active forces to shape society, and b) who make certain actions against outside forces in social, economic and political fields.

This concept seems to be based on two assumptions. First, social actors are active participants, as Long and Der Ploeg (1994: 64) write:

Social actors are not simply seen as disembodied social categories (based on class or some other classificatory criteria) or passive recipients of intervention, but active participants who process information and strategize in their dealings with various actors as well as with outside institutions and personnel.

In other word, social actors are not considered as vulnerable (or powerless) victims, but as capable and active participants who involve in the processes of social formulation with utilizing or against external forces. For instance, social actors are used in "actor-oriented approach" for identifying main factors of social changes, particularly analysis of changes in rural societies.

Actor-oriented analysis assumes that social changes are derived from mainly two factors: "outside forces" and the "reactions of various social actors" to the outside forces. Especially, it stresses changes in rural societies are brought by the (direct and indirect) "responses of various social actors" to external impetuses.

In the second assumption, social actors have capabilities to adequately adjust themselves and handle various problems, as Long and Der Ploeg (1994: 66) put it:

...social actors are 'knowledgeable' and 'capable'. They attempt to solve problems, learn how to intervene in the flow of social events around them, and monitor continuously their own actions, observing how others react to their behaviour and taking note of the various contingent circumstances.

What are the social actors precisely in such concepts? The concept of social actors includes various types of individuals and groups. In the case of rural communities, landless peasants, non-farm workers, landlords, money lender, merchants, extension workers and politicians are seen as social actors. Also, this term includes "non-human agencies" such as community development agencies, political parties, cooperatives, NGOs and religious organizations.

The actor approach is a) local level analytical model which is neither given in the modernization approach, nor in the neo-Marxist approach (exploitation model), thus, this model helps to understand development and social changes; b) helps to identify different types of social actors in particular places; c) understanding of the nature and socio-economic conditions of several actors (individual or group), it helps to show insights of differential responses or actions of certain actors.

In the paper, the concept of social actor is used for 1) identifying (mapping out) various social actors in particular coastal societies in South Sulawesi, 2) understanding the nature of identified actors's socio-economic status or conditions and 3) investigating how these actors react to the increase of shrimp farming booms and incorporate it into their livelihood strategies.

In this paper, social actors are viewed as individuals and groups who are capable participants, and do adequate certain responses to various outside forces for shaping their societies.

2.5 Definition of Commodity Chains

Commodity chains are defined by Hopkins and Wallerstein (1994: 17) as "a network of labor and production processes whose end result is a finished commodity". In other words, commodity chains mean the linkages of labor inputs as well as material inputs from production site to transportation site and consumption site of particular commodities.

The term of commodity chains is used for clarifying one series of production, distribution and consumption processes not only material inputs, but also labor inputs (in small scale enterprises, large scale enterprises, state owned enterprises and others) through one commodity. Thus, Gereffi et al. (1994: 2) say it: “The analysis of a commodity chain shows how production, distribution, marketing, and consumption are shaped by the social relations (including organizations) that characterize the sequential stages of input acquisition, manufacturing, distribution, marketing, and consumption.”

Firstly, the commodity chains approach is used to analyze global economic structure, especially inequality between industrial and developing nations. Through clarifying one series of production, distribution and consumption processes of one commodity, it analyzes the nature of wealth distribution between industrial and developing nations in macro-level (Korzeniewicz and Martin, 1994). In order to understand the unequal world economic structure, several studies have attempted to clarify the global division of labor of particular commodities (ibid.; Wilson and Zambrano, 1994). Other studies have clarified the global capital flows, trade networks and technological transfers between industrial and developing nations (Goldfrank, 1994; Kim and Lee, 1994). Through those studies, the commodity chains approach clarifies: the creation and the distribution processes of particular commodities at a global level.

Secondly, this approach is used for micro-level analysis of production sites, particularly the clarification of linkages at whole stages of labor inputs and material inputs (Korzeniewicz, 1994). It is also used for how the commodity is produced by what kinds of workers and by what kinds of technologies. On the processes of commodity production, how much of capital is used at each stage and where profits are flown are clarified.

Thirdly, the commodity chains approach helps to clarify how existing material and labor input chains are disappeared, and new commodity chains are emerged along with increasing or decreasing demand of particular substances. Looking at the changing commodity chains historically, for instance, what kinds of materials and technologies are newly used for producing a substance, and what kinds of production processes (including labor input) are left out can be explained.

In this paper, the commodity chains approach will be used for identifying one series of production, distribution and consumption processes in the shrimp sector. Specifi-

cally focusing on shrimp production sites in South Sulawesi, this approach also will be used for understanding how the shapes of commodity chains (labor inputs, material inputs and farming technologies) were changed along with the expansion of shrimp farming in the line of the enlargement of market demand in Japan.

In addition, this term will be used with incorporation of the concept of social actor, which helps to explain several linkages between commodity chains and the positions of various actors in the shrimp sector. The combination of the commodity chains approach with the identification of social actors is useful to clarify what kinds of material inputs and technologies are used in different kinds of shrimp productions by different actors.

3. REORGANIZATION OF DIETARY HABITS IN JAPAN AND DEVELOPMENT OF SHRIMP FARMING IN SOUTH SULAWESI

3.1 Introduction

This chapter attempts to trace historically the linkages between the booming market demand for shrimp in Japan and the expansion of shrimp production in South Sulawesi. Based on the Mintz's classical approach (the identification of changing lifestyles among the working class along with dynamic social-economic change and popularization of particular substances), the first section presents the historical change in shrimp diet in Japan. Focusing on the high economic growth period (post World War II), it clarifies how shrimp became popular along with dynamic reorganizations of Japanese socio-economy. After that, the background of dynamic expansion of shrimp farming and shrimp export in South Sulawesi is presented with major features of shrimp farming in South Sulawesi.

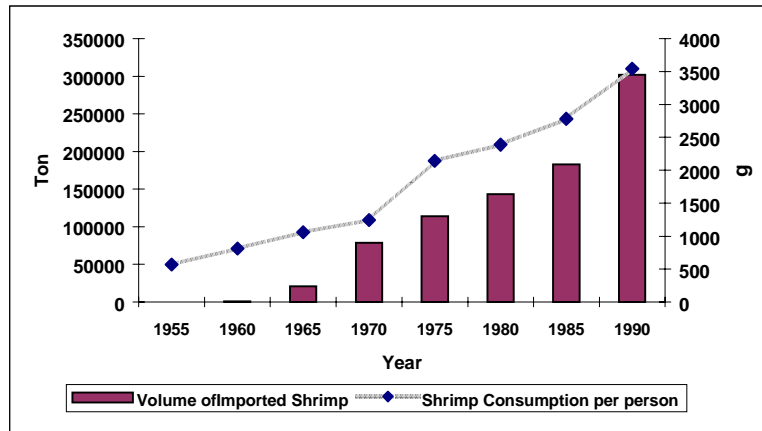
3.2 Are Japanese Shrimp Gluttons? .

Japan is currently the world's largest frozen shrimp importer and consumer. Once, Japan used to be a shrimp exporter, though nowadays more than 80 percent of shrimp consumption by volume¹³ is dependent on foreign production. As seen in Diagram 2, in 1955 all quantity of consumed shrimp was from the domestic production, however since 1970 more than a half of consumed shrimp has been imported from overseas. Large quantities

¹³ See, Nishizawa (1992: 271). It mentions that the total frozen shrimp is 301,800 ton in volume in 1990.

of shrimp are imported mainly from Asia. Annually, Japanese average shrimp consumption is 2.6 kg per person, which is 1.5 kg higher than the corresponding US consumption (Murai, 1992:3). Mass import and mass consumption of shrimp started from the 1960s. Before this period, shrimp has been eaten in particular places and in smaller quantity by certain strata for several centuries.

Diagram 2. *Volume of Shrimp Import and Consumption per Person in Japan*



Sources: Compiled from Murai (1992) Table 1-4, p. 10 and Nishizawa (1992) Table 12-1, p.271-274

Notes: Although import of shrimp in 1955 is 0 percent, before 1955 small volume of shrimp was imported (approximately 20 ton per year).

3.3 The History of Changing in the Shrimp Diet in Japan

Until shrimp became a popular food among Japanese people, shrimp had been considered as “rarity” or “luxurious” commodity for centuries. The first appearance of shrimp in the literature was in 892, shrimp diet was noted in “*Shinsenjikiyo*” (Sakou, 1985). Since around this year, shrimp has started to be written in several classics¹⁴. During *Heian* period (from 800 to 1200), shrimp, and especially lobster was basically not regarded as food¹⁵, but as “auspicious or a symbol of fortune”, “decoration” and “special gift”. Shrimp was used only at special ceremonies such as wedding banquets among the highest strata

¹⁴ For instance, “*Sukehitohonso*” in 918 notes about shrimp, “*Izumiorai*” also mentions about lobster (Tsunoda, 1992).

¹⁵ In fact, shrimp was used for nourishing sick people. However, this usage seems to be not commonly practiced and was limited to particular strata.

such as court nobles (ibid.). Furthermore, lobster was also used for sacrifice to gods of *Shintoism* (ibid.).

From the end of the *Heian* period (after 1150) to the *Muromachi* period (around the 1550s), lobster started to be used for banquets among the higher *samurai* (warrior) class people (Tsunoda, 1992). It had still limited to be used by a particular politically influential *samurai* class such as the *Toyotomi* family and the *Hosokawa* family (ibid.). Even in the higher strata, shrimp, prawn and lobster were rarely eaten.

From the *Edo* period (1660), shrimp became popular among wealthy strata, particularly in the capital area or the large cities (Sakou, 1985; Tsunoda, 1992). Between 1830 and 1844 is the booming period of the *Sushi*, *Tenpura* and *Soba* (noodle) in the capital (*Edo* city), and large number of people ate shrimp (ibid.).

However, it was still seen as a “luxurious food” among the populace.

From a first publication of shrimp statistics of 1894 to the end of the World War II, shrimp consumption had not increased dramatically (Sakou, 1985).

The post war period saw the beginning of the mass-import and mass-consumption of shrimp in Japan. Also, in the post war period, there were the dramatic transformations in Japanese socio-economy, especially in the high economic growth period. In this period, the volume of frozen shrimp import sharply grew from 4,509 ton in 1961¹⁶ to 301,800 ton in 1990.

The next section will focus on identifying main factors for increase of shrimp import and of consumption after the 1960s.

3.4 Conditions for Mass Import and Mass Consumption of Shrimp

Several studies¹⁷ attempt to explain the main aspects of mass consumption and mass import of shrimp in terms of variables such as income growth, reorganization of labor structure and population shifts from primary sector to other working sectors, diversification of shrimp cooking, development of marketing system, government intervention, diffusion of refrigeration system, expansion of cold-chains, the emergence of restaurant industry and so forth.

¹⁶ 1961 is the year of the liberalization of shrimp import in Japan.

¹⁷ See among others, Murai (1988; 1992), Miyauchi (1987; 1989), Tsunoda (1992) and Nakai (1984).

Shrimp became a popular food from a rarity or luxurious food after World War II (especially, during the last 30 years). It is not simple to explain how shrimp became popular and to identify these factors. In order to find the reasons for mass shrimp consumption, a comprehensive analysis is indispensable: a) what kinds of changes occurred during high economic growth, b) which changes influenced the increase of shrimp consumption. Besides these, other changes are also explored.

Between the 1960s and the 1980s is the dynamic transformation period of the Japanese socio-economy. The high economic growth in this period brought about several reorganizations of the people's livelihoods. Several reorganizations are observed such as in working patterns or sectors, in income levels, in working times, in people's dietary habits and so forth. Particularly, changes¹⁸ in the types of occupations and working patterns led to reorganize dietary habits.

The changes in working patterns influenced mainly the increase in number of "eating out" population among the working class, and the increase in the consumption of "easy cooked foods" such as frozen and processed foods (Miyauchi, 1989). The growth of eating out population was caused by the dramatic labor shifts in several working sectors in the industrialization process (Murai, 1988). It is observed that the working population in the secondary and the tertiary sectors increased, while the working population in the primary sector decreased (*ibid.*)¹⁹.

Major shift of workers from the primary sector to the secondary and the tertiary sectors suggests that a number of working people started to eat out for lunch and dinner. Thus, large number of the working people started to eat meals more frequently in outside than at home. The growth of eating out population promoted the increase in the number of restaurants, while the growth of the number of restaurants promoted the further eat out population. As seen in Table 1, the total restaurants number increased nearly four times in two decades. It is reasonable to assume that if these several kinds of restaurants use large

¹⁸ There are several pioneer works which explore the relation between the mass shrimp consumption and the reorganizations of working patterns (Miyauchi, 1989; Murai, 1988; Nakai, 1984). The reorganizations of dietary habits are observed not only in terms of change in taste, but also of change in places to eat meals.

¹⁹ The population of agriculture, forestry and fishing sectors declines from 30.5 percent (of total working population) in 1960 to 17.4 percent in 1980 and to 10.4 percent in 1980 (Murai, 1988: 183).

amount of shrimp, people who eat outside consume certain amounts of shrimp among restaurants.

Table 1. *Number of Various Types of Restaurants*

	Total number of restaurant	Japanese restaurant	Western restaurant	Chinese restaurant	Noodle shop	Sushi restaurant
1960	229,960	...	2,348	9,923	32,011	12,839
1968	371,331	17,575	6,936	23,587	30,011	26,622
1976	616,001	34,204	16,773	46,129	42,025	44,020
1982	838,449	34,893	22,512	56,488	41,542	49,825

Source: Murai (1988) Table 8, p. 185

Table 2 shows percentage of shrimp consumption by consumption places in one of representative Japanese medium size city. It shows that 51.2 percent of shrimp is consumed in household (domestic consumption), while 48.8 percent of shrimp is consumed in out of household. However, the trend of shrimp consumption location in Tokyo area is different from this medium city case. According to Nakai's study (1984), between 70 and 75 percent of frozen shrimp is consumed outside household, while between 25 and 30 percent of it is consumed in household.

Table 2. *Comparison of Domestic and Non-Domestic Shrimp Consumption in 1980*
(Unit: %)

	Domestic Consumption			Non-Domestic Consumption			Sum	
	Non-Farm Household	Farmhouse Household	Sum	Restaurant	School Lunch	Hotel		Sum
Shrimp	46.8	4.4	51.2	29.3	8.4	1.1	48.8	100

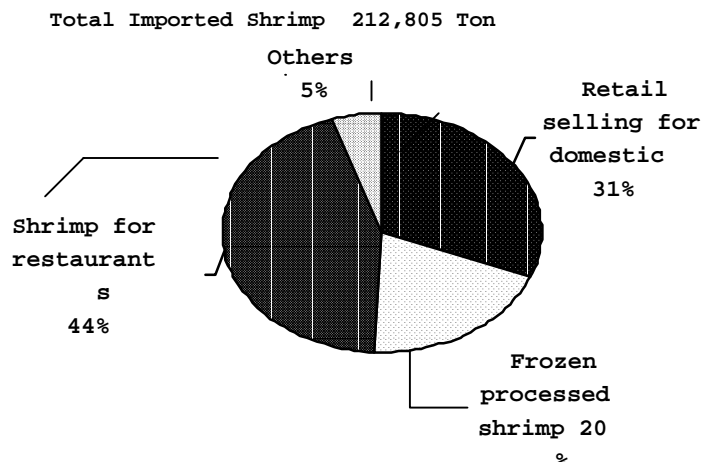
Sources: Compiled from Nakai (1984) Table 8-3 p.217

Notes: 1. This sample is a small and medium size city, Toyohashi city's case (population: 300,000).

A second reorganization of dietary habits is the high dependency on "easy cooked foods" which was induced by the change in working pattern. It is partly from women's growing participation in part-time and fulltime base occupations (Nakai, 1984; Miyauchi, 1989). In order to save time, cooks (mainly women) tend to use easy cooked foods. Shrimp is widely used for such easy cooked or processed foods in Japan. As Diagram 3 shows, 20 percent of frozen imported shrimp is used as processed foods. However, there is

no clear distinction between processed shrimp food and other forms in retail selling for domestic use. Thus, it can not seen what percentage of shrimp are consumed as processed shrimp.

Diagram 3. *Consumption Forms of Imported Frozen Shrimp in 1986*



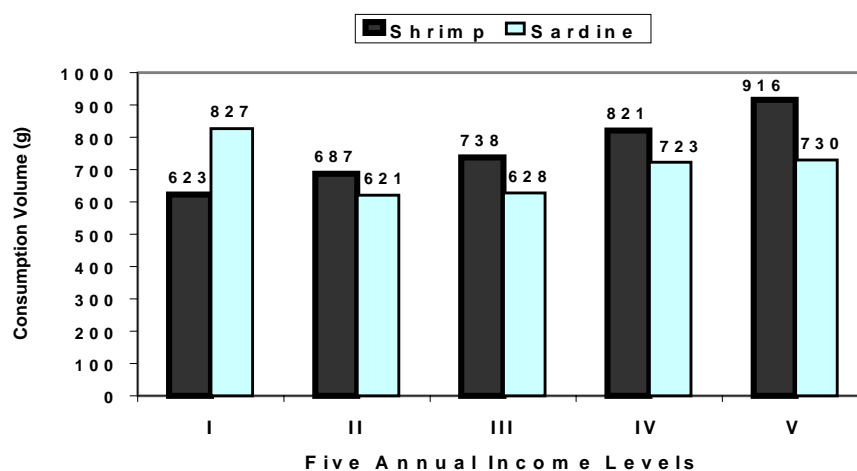
Source: Compiled from Miyauchi (1989) Diagram 0-1, p. 7

Notes: 1. Frozen processed shrimp includes fried prawns, cooked shrimps and other kinds of frozen shrimp.

2. Others include that shrimp is used for instant noodle, fried shrimp and tin.

Besides the changes in dietary habits (consumption place and processed food) associated with the changes in working patterns, several factors also influence the changes in eating habits and consumption patterns of expensive foods. The growth of household income levels also contributes to mass shrimp consumption.

Diagram 4. *Shrimp and Sardine Consumption by Five Annual Income Levels*



Five Annual Income Levels (1986)	Shrimp Consumption per Person
I: ~ 3,140,000 Yen	623 g
II: 3,140,000 ~ 4,340,000	687 g
III: 4,340,000 ~ 5,590,000	738 g
IV: 5,590,000 ~ 7,540,000	821 g
V: 7,540,000 ~	916 g

Source: Compiled from Murai (1988) Table 6, p. 167

Diagram 4 shows that the highest income household (V group) consumes the highest volume of shrimp, while the lowest income household (group I) consumes less. Income group I consumes sardine much more than shrimp. This tendency suggests that shrimp is still seen as a relatively high-price commodity. However, the shrimp consumption gap between I and V group is 293 gram, which means even the lower income group can eat a close consumption volume of the group V. This trend shows, so called the “popularization of shrimp” among lower and middle income people²⁰. In addition, the shrimp consumption gap between urban working household and on-farm household is still high, the former consumes 2.7 kg per household, while the latter consumes 1.7 kg per household in 1981 (Nakai, 1984). It means that shrimp is more consumed by urban workers than by rural on-farm workers.

²⁰ Given the rate of shrimp consumption shows the condition of 1986, the presented rate may have, somewhat or totally, changed in terms of income gaps and the price of shrimp.

The high involvement of fishery firms, trading companies and frozen industry since the end of the 1950s have created conditions for mass shrimp import (Nishizawa, 1992).

The establishment and expansion of the cold-chain also plays significant roles to promote mass-import and consumption of shrimp. The cold chain means the establishment of refrigeration system from production sites to trading, selling and consumption sites. Since 1965 the refrigeration systems such as refrigerator car, large-scale refrigeration facilities, showcases and home refrigerators have been widely diffused in Japan (Miyachi, 1989). The increase in the number of supermarket also enhanced the mass-consumption through mass-shrimp sale for cheaper prices (Nishizawa, 1992).

Also, the diversification of shrimp cooking is seen as one of factors to promote mass shrimp consumption. In post world war, especially the high shrimp consumption period between the 1950s and the 1960s was closely connected to a reorganization of Japanese diet (Miyachi, 1989). The pattern of the shrimp diet was also dramatically diversified during this reorganization of Japanese diet period. Shrimp started to be used not only in Western foods, but also in Chinese foods²¹ (Murai, 1988; Tsunoda, 1992). Such diversification of shrimp usage promoted further shrimp consumption in households as well as restaurants.

Exploring the relation between the reorganizations of lifestyles and changes in dietary habits based on the changes in working conditions has helped to clarify the condition for the mass shrimp consumption or the popularization of shrimp consumption. The investigation on other factors such as the establishment of cold-chain, diversification of shrimp cooking and several kinds of firms also have helped to clarify the mechanisms of the booming shrimp consumption.

If one considers the global trend of mass-consumption and mass-importation of shrimp in industrial nations, similar changing social and economic processes might be observed. Hence, the clarification of the links between the reorganization of lifestyles and changes in dietary patterns in a period of the economic growth in Japan may apply to explain global shrimp mass consumption in several industrial nations and mass-production in several developing nations.

²¹ For example, Western foods are fried shrimp, gratin and pilaf, and Chinese foods are shrimp with chili and steamed shrimp.

3.5 Background to the Case Study in South Sulawesi

Shrimp has become one of the most profitable export commodities in Indonesia since 1960s. The total exports rate has dramatically increased, and is now higher than any other major cash crops such as tea, tobacco and coffee²². From the 1960s to the beginning of the 1980s, most of the frozen shrimp for export was from sea-fishing, and shrimp was caught by modern trawlers. However, as a result of over-fishing by the intensive trawling operations in this period, some negative consequences resulted²³. Hence, the Indonesian government has forbidden trawling in the whole Indonesian oceans since 1983. Under these conditions, brackishwater shrimp culture has been highlighted and promoted by the Indonesian government as well as by international development organizations²⁴. Because shrimp farming is considered as an important sector to contribute not only to foreign exchange earning²⁵, but also to generate employment opportunities and to improve livelihoods among coastal dwellers.

Indonesia has the world's largest brackishwater pond area,²⁶ and its cultured shrimp consists of 9.4 percent of the total cultured shrimp in Asia (Rosenberry, 1998). According to *World Shrimp Farming* (Rosenberry, 1998), 50 percent of Indonesian brackishwater ponds, or *tambak*, is "extensive production system", 15 percent of them is "semi-intensive production system" and 30 percent of them is "intensive production system". In addition, nearly 90 percent (300,421 ha) of *tambak* areas concentrates in four regions: the east coast of Sumatra, the north coast of Java and the west coasts of South and South Sulawesi (BPS, 1998).

The study region, "South Sulawesi" currently has 84,832 ha of *tambaks* of 1996, which represent about 25 percent of *tambak* areas in Indonesia (BPS, 1998). This section presents six characteristics of South Sulawesi *tambaks*: i) high export dependency on Japanese market; ii) predominance of long existing *tambaks* (more than half of *tambaks* were

²² See among others, BPS statistics (1990-1997) and Oguro and Kohama (1995).

²³ For example, the reduction of total shrimp haul, the displacement of petty-fishermen' fishing operations, destruction of the ocean floors and polluting of ocean by dumping small fishes. Some petty-fishermen had raised riots towards the operation of trawling and burned down trawlers.

²⁴ See among others, Muluk (1994), Bailey (1992), Kusumastanto (1996) and Weemaes (1997).

²⁵ For reducing the dependency on revenues from petroleum, oil and gas export, the Indonesian government promotes alternative foreign exchange earning sources. Therefore, the government promotes shrimp farming as national projects (Muluk, 1994).

²⁶ According to BPS statistics (1998), the gross brackishwater pond area is 344,759 ha.

constructed before 1970s); iii) the “extensive system” is a major production system with low productivity; iv) a large number of *tambak* household; v) major production commodities; vi) popularly practiced polyculture.

Expansion of Shrimp Farming in South Sulawesi

Indonesian shrimp export is characterised by a long standing high export dependency on Japanese market. As Table 3 shows that since 1985 most of the frozen shrimp was exported to Japan. The proportion of the export to Japan declined from 83 percent in 1985 to 68 percent in 1995, however the total volume of exported shrimp to Japan increased sharply from 23,828 ton to 62,380 ton. Meanwhile, as Table 3 shows the diversification of the export destinations, the proportion of the export to other countries such as USA, Hong Kong and Singapore increased gradually. Nevertheless, the Japanese market still absorbs a large amount of frozen shrimp from Indonesia.

Table 3. Indonesian Major Export Volume of Frozen Shrimp by Country of Destination (Unit: Ton)

	Japan	Hongkong	Singapore	USA	Total
1964	0				
1970	3,684				
1985	18,764				
1987	23,828 (83 %)	1,604	2,173	,481	28,780
1989	49,462 (69 %)	2,547	2,868	1,091	40,941
1990	58,570 (65 %)	2,499	9,052	8,634	89,877
1992	56,169 (61 %)	2,590	6,809	14,720	91,512
1994	62,380 (68 %)	4,262	6,463	10,249	92,401

Source: Based on BPS (1997) table 2.2.3-a and .2.2.4-a, p.126. and 130; data from 1964 to 1983 based on Miyauchi (1989) annex table 1, p. 231

Note: The statistics do not differentiate volume of frozen shrimp between sea catch and cultured shrimp. Percentage of exported shrimp to Japanese round off to the nearest whole number.

- 1) There are no available data to show the export destinations of frozen shrimp from South Sulawesi. However, it could be assumed that large volume of shrimp is exported to Japan, if considering three of five major cold-storage and export firms in South Sulawesi are joint ventures of Japanese trade firms. Diagram 5 shows volume and value of exported frozen shrimp, both volume and value increased steadily from 1984 to 1990. From 1990 to 1996, both rates in-

creased sharply from 4,216 ton to 8,825 ton in volume and from US\$ 41,830 to US\$ 96,781 in value.

Diagram 5. *Export Volume and Value of Frozen Shrimp in South Sulawesi, 1978 – 1996*

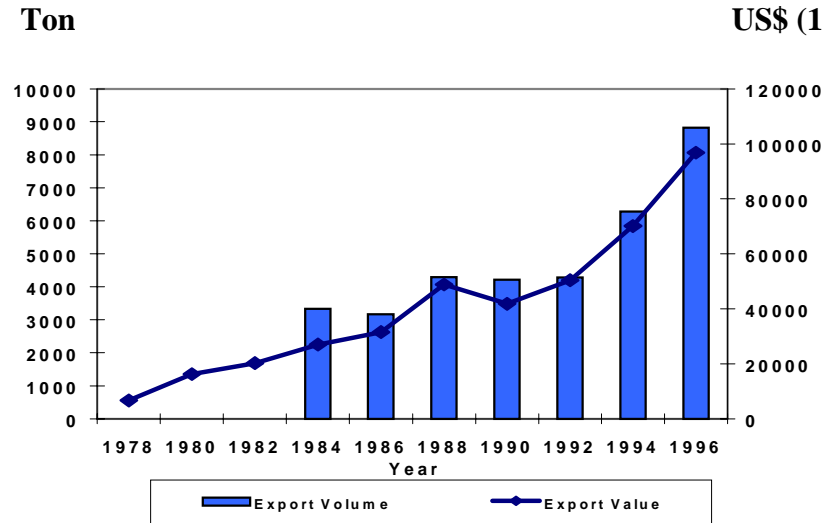


Table 4. *Export Volume and Value of Frozen Shrimp in South Sulawesi, 1980 – 1996*

	South Sulawesi		Indonesia Total	
	Volume (Ton)	Value (US\$ 1,000)	Volume	Value
1976	---	6,669	---	---
1978	---	13,440	---	---
1980	---	16,271	---	---
1982	---	20,245	---	---
1984	3,332	26,960	---	---
1986	3,168	31,562	33,992	280,697
1988	4,293	48,866	53,294	489,067
1990	4,216	41,830	89,887	690,230
1992	4,280	50,390	91,512	764,850
1994	6,283	70,160	92,401	1,009,738
1996	8,825	96,781	---	---

Source: BPS (1994) table 2.1.4, p.111; (1997) table 2.1.3-a, p.108; BPS South Sulawesi (1996) table 7.1.1, p. 371; (1984) table VII.1.3, p.465; (1981) table VII.1.1, p. 200

- 2) South Sulawesi is the largest *tambak* holder in size by province, the area growth continued steadily from 57,858 ha in 1980 to 84,832 ha in 1996. One of South Sulawesi *tambak*'s features is the predominance of relatively long existing *tam-*

baks. Before the shrimp culture boom (before 1980), more than half of *tambak* areas had already been constructed. Among five provinces, the sharp growth of *tambak* areas is seen in South Sulawesi and Aceh, and particularly South Sulawesi *tambak* area dramatically increased between 1979 and 1996. Meantime, area growth in three Java provinces is less prominent than the two other provinces. One of the main factors for the less expansion of *tambak* area in three Java provinces is widely spread semi-and intensive production systems in those provinces. The intensification of ponds brought a higher volume of output without expanding the *tambak* area.

Table 5. *Area of Tambaks in Major Provinces* (Unit: ha)

	South Sulawesi	West Java	Central Java	East Java	Aceh	Indonesia total
1979	55,787	---	---	---	---	---
1980	57,858	34,783	20,140	43,080	25,227	188,601
1983	63,824	42,981	45,683	46,702	32,643	242,308
1986	67,467	46,712	26,577	50,336	35,475	241,445
1990	74,877	51,724	16,606	46,384	40,402	268,326
1992	79,681	53,909	29,638	49,736	42,574	304,506
1996	84,832	54,308	27,955	60,173	70,559	344,759

Sources: BPS (1980, 1983, 1986, 1990, 1992 and 1996); Collier et al. (1977) Table-1, p.11

- 3) The “extensive production system” is widely practiced in South Sulawesi. One of the reasons is that *tambak* farmers do not have enough capital for investing semi- and intensive systems. Table 6 gives the insight in average usage rate of three production systems in a whole of Indonesia and South Sulawesi. The proportion of the intensive operation²⁷ increased from 15 percent to 30 percent between 1994 and 1998. While the proportion of the extensive operation decreased from 70 percent to 50 percent in Indonesia. Nonetheless, the extensive operation is still predominant production system. It is still practiced in half of the Indonesian *tambaks*.

Such trends are more obvious in South Sulawesi. Extensive operations are used

²⁷ According to some studies (Muluk, 1994; Hanning, 1988), intensive *tambaks* are concentrated in East Java province. Also, large number of shrimp farming development projects, so called, *INTAM* program, were intensively carried out in East Java during 1984 to around 1993.

predominantly (80 percent), while the intensive system is used only 3 percent of total *tambak* areas. It means that even though South Sulawesi has almost 25 percent of Indonesia *tambak* areas, South Sulawesi uses a larger *tambak* areas to produce the same volume of shrimp compared to the rest of provinces.

Basically, three types of *tambaks* are observed in South Sulawesi²⁸:

① Improved extensive *tambak*²⁹: there are several types of improved traditional *tambak* in South Sulawesi, a) poly-culture of shrimp & milkfish, b) shrimp mono-culture, c) milkfish mono-culture³⁰ and d) poly-culture of shrimp, milkfish and sea weed (sometimes with crab).

② Semi-intensive *tambak*: there are basically three types of semi-intensive *tambak*, a) poly-culture of shrimp and milkfish, b) shrimp mono-culture and c) milkfish mono-culture.

③ Intensive *tambak*: shrimp mono-culture.

Table 6. Shrimp Production Systems (Unit: Percent)

	South Sulawesi			Indonesia		
	Extensive	Semi-intensive	Intensive	Extensive	Semi-intensive	Intensive
1994	---	---	---	70	15	15
1998	80	17	3	50	15	35

Sources: South Sulawesi's rate is from the interview to Ambas Irfan³¹; Indonesia's rate is from Rosenberry (1994 and 1998)

A further feature of South Sulawesi *tambaks* is low productivity as seen Table 7, which is as a result of the wide spread extensive system. The average productivity of 1996 is 98.34 kg/ha, this rate is much lower than its rate of other two provinces. This table shows that two Java provinces, which hold relatively small

²⁸ The precise data on area of each production system could not be found in BPS data.

²⁹ The improved extensive *tambak* is characterised by more capital and labor intensive than the extensive *tambak*. It means that *tambak* farmers use more artificial feeds, chemical fertilizers and shrimp fry as well as labor forces than the extensive *tambak* farmers.

³⁰ According to BPS statistics, 50 % of total households, who run *tambak* operation, take poly-culture of milkfish & shrimp in South Sulawesi. The percentage of shrimp mono-culture in households is still low in this region.

³¹ The interview was held to Ambas Irfan, is a lecturer of Social-Economic Fisheries at Faculty of Marine Science and Fisheries at University of Hasanuddin in Ujung Pandang (1999/July/ 11).

tambak areas, produce much higher output than South Sulawesi's output.

Table 7. Comparative Data on *Tambak* Area and Production Rate of Three Provinces

	<u>South Sulawesi</u>			<u>East Java</u>			<u>West Java</u>		
	<i>Tambak</i> area (ha)	Production (ton)	Productivity (kg/ha)	<i>Tambak</i> area	Production	Productivity	<i>Tambak</i> area	Production	Productivity
1980	57,858	26,119	45.14	43,080	24,013	55.74	34,783	17,759	51.05
1986	67,467	39,424	58.43	50,336	46,340	92.06	46,712	32,532	69.64
1990	74,877	63,042	84.19	46,384	61,094	131.71	51,724	55,881	108.03
1996	84,832	83,432	98.34	60,173	113,616	188.81	54,308	76,096	140.11

Source: BPS (1980, 1986, 1990 and 1996)

Notes: BPS data do not differentiate various production commodities. *Tambak* commodities include not only milkfish, but also various kinds of shrimps and other species such as mullets, tilapia, crabs and so forth.

- 4) The number of households which operate *tambaks* increased. Table 8 shows that the number of total *tambak* households sharply increased from 58,861 households in 1978 to 132,450 households in 1996. The growth the number of *tambak* households was took mainly place in the major five provinces, which contributes 72 percent increase during this period. A sharp growth is observed in South Sulawesi from 9,873 to 26,698 households, and West Java from 7,689 to 13,943 households and East Java from 8,378 to 18,993 households between 1979 and 1996. On the other hand, only the *tambak* households in Central Java shows an adverse trend. The number declined from 20,750 households during the same period.³²

³² However, there is no data to explain the decline of the number of *tambak* households in Central Java.

Table 8. *Shift in Number of Tambak Households by Major Provinces* (Unit: No.)

	South Sulawesi	West Java	Central Java	East Java	Aceh	Indonesia total
1976	9,873	7,689	20,750	8,378	---	---
1978	12,159	6,874	14,340	8,869	---	58,861
1980	12,727	7,210	13,273	13,090	15,493	65,878
1983	16,853	8,190	15,479	14,862	10,390	71,597
1986	16,908	11,125	15,463	16,180	13,762	82,428
1990	19,673	11,814	11,050	16,553	15,556	89,327
1992	21,104	13,168	17,507	18,764	15,556	109,173
1996	26,698	13,943	17,962	18,993	18,347	132,450

Sources: BPS (1980, 1983, 1996, 1990, 1992 and 1996); Fuke (1992) Table 6-5, p.160

(5) Black tiger prawn (*Penaeus monodon*) and milkfish (*Chanos chanos*) are the major production commodities in South Sulawesi. The net-output of both commodities increased: black tiger shrimp is from 2,955 ton in 1976 to 15,266 ton in 1996, and milkfish from 16,905 ton to 53,658 ton. Meanwhile, the trend of other production commodities (banana prawn and metapenaeus shrimp) is different. The total output of banana prawn declined slightly and the output of metapenaeus shrimp increased steadily.

Table 9. *Tambak Farming Yields by Species in South Sulawesi* (Unit: Ton)

	Black tiger	Shrimp		Milkfish
		Banana Prawn	Metapenaeus	
1976	2,955	---	---	16,905
1980	3,393	1,476	1,606	15,980
1983	5,316	1,658	1,621	24,325
1986	6,999	1,479	1,094	26,473
1989	9,152	1,525	2,141	37,100
1991	11,372	1,421	2,449	44,987
1993	13,657	1,362	1,913	49,894
1996	15,266	1,236	2,306	53,658

Sources: BPS (1980, 1983, 1986, 1989, 1991, 1993 and 1996); Fuke (1992), Table 6-3, p. 158

Polyculture of milkfish and shrimp is commonly practiced not only in South Sulawesi, but also in the rest of major Indonesian *tambak* regions³³. Several references³⁴ mention that polyculture of milkfish and shrimp has been widely practiced in South Sulawesi for several centuries, and in this production system milkfish, namely *ikan bandeng*, was considered as a prime product, while shrimp was considered as a by-product (Muluk, 1994). Table 10 shows different trends in the shift of the number of *tambak* households by species. The sharp increase of shrimp monoculture in household number is commonly observed in three of major provinces. The number of polyculture households (produce both milkfish and shrimp simultaneously) in South Sulawesi distinguishably increased from 5,937 households in 1980 to 16,713 households in 1996.

One of the reasons why the number of milkfish and shrimp monoculture household increased is a dramatic growth of the urban population (such as Ujung Pandang city), it led the market demand for milkfish.

Meanwhile the number in case of Aceh declined dramatically from 13,697 households in 1980 to 2,846 households in 1996. In addition, the steady increase in the number of milkfish producers is seen in South Sulawesi, the number has increased from 3,888 households in 1980 to 5,162 in 1996. Meantime, the number of milkfish producers in East Java declined slowly as Table 10 shows.

Table 10. *Number of Tambak Household by Species* (Unit: No.)

	South Sulawesi			East Java			Aceh		
	Milkfish	Milkfish & Shrimp	Milkfish & Shrimp *1	Milkfish	Milkfish & Shrimp	Shrimp	Milkfish	Milkfish & Shrimp	Shrimp
1980	3,888	5,937	,055	7,434	3,047	,240	1,031	13,697	,651
1983	4,418	9,018	,018	9,917	3,074	1,382	4,143	2,301	4,047
1986	7,326	9,478	,104	9,041	1,376	1,336	2,017	2,073	3,734
1989	4,838	14,368	,261	4,182	5,216	4,546	1,798	5,993	6,615
1991	5,171	15,421	,465	---	---	---	,728	,229	3,173
1993	4,695	15,585	,588	6,709	4,823	7,041	4,997	2,561	19,967
1996	5,162	16,713	2,935	6,131	5,178	5,328	2,465	2,846	13,934

Source: BPS (1980, 1983, 1986, 1989, 1991, 1993 and 1996)

Note: *1 Households which use polyculture of milkfish and shrimp

³³ Muluk (1994: 14) puts it, "Extensive growout systems for fish and shrimp farming were developed in Indonesia, the Philippines, and other Asian countries centuries ago; ...".

³⁴ See, among others, Whitten et al. (1988), Pelras (1996), Davies (1990), Murai (1988), Fuke (1992), Kumagai and Yoshida (1992).

4 ORGANIZATION, STATUS AND CHANGE: MODELS FOR SOCIAL ACTORS AND COMMODITY CHAINS

4.1 Introduction

This section firstly identifies certain social actors in two *tambak* systems and then, investigates how identified actors deal with shrimp farming in the context of their livelihood strategies. After that, it draws the ways various commodities are interlinked from production sites in South Sulawesi to consumer sites in Tokyo, Japan.

4.2 Physical Conditions of the Surveyed *Tambak* Areas

The field survey was mainly carried out in two districts, namely Maros and Takalar. A detailed *tambak* households survey was carried out by the author and one assistant³⁵ using an Indonesian language questionnaire (which is the national language in Indonesia). 19 samples were totally collected during two weeks field survey (2 intensive ponds and 17 improved traditional ponds). The survey on the “extensive *tambak* ” was carried out in Maros, while the survey on the “intensive *tambak*” was done in Takalar. The “semi-intensive *tambak*” was not observed.

Some geographical and physical differences were observed in both *tambak* areas. First, the extensive *tambaks* in Maros are characterised by the existence of plentiful brackishwater, while the intensive *tambaks* in Takalar are characterised by the absence of brackishwater.

Secondly, the construction periods of *tambaks* are different in both areas. The extensive *tambaks* in Maros were being constructed between the 1960s and at the beginning of the 1970s, while one of the intensive *tambaks* in Takalar was constructed in 1994 and another was in 1998. Besides, there were only intensive *tambaks* in the studied Takalar area. As the absence of brackishwater river, any extensive *tambaks* could not emerge.

Thirdly, original land status before the *tambak* construction were different. The extensive *tambaks* were converted from mangrove and palm tree forests, while the inten-

³⁵ M. Chasyim Hasani, who is a lecturer of Social-Economic Fisheries at Faculty of Marine Science & Fisheries, at UNHAS (University of Hasanuddin), assisted the author’s field survey. He speaks not only Indonesian language, but also Bugis and Makasaar (which both are local languages in South Sulawesi).

sive *tambaks* were converted from vacant land, and this region is characterised by the absence of mangrove and palm forests.

Fourthly, a difference of production commodities was observed. Maros *tambaks* were mainly used for milkfish production between the 1960s and the end of the 1970s. Around 1980, the milkfish production has been shifted to more shrimp based production. Some *tambaks* have totally shifted to shrimp production, while some *tambaks* have raised shrimp and milkfish at the same time. On the other hand, the intensive *tambaks* in Takalar have only produced shrimp.

4.3 Two Models of Social Actors in Coastal Communities

4.3.a Extensive Tambak Case

Various actors and social relations

The extensive aquaculture sector is composed of two large social organizations: i) an organization for *tambak* operations in coastal communities, and ii) an organization for trading and processing in the urban area. Within the two large organizations, certain social actors are involving the shrimp sector. Diagram 6 reveals various social actors in Maros extensive *tambaks*.

The basic production relation of *tambak* is “*Pengawa-Sawi*”³⁶. In fish farming societies, *pengawa* means an “owner” of a brackishwater pond (*tambak*) who employs “*tambak* laborers”, namely *sawi* (hired fish farmer). *Sawis* participate in *tambak* activities under instructions of a *pengawa*. Under *pengawa-sawi* relation, other actors such as “harvesting laborers” and “temporary laborers” work in *tambaks*. Harvesters are basically hired only for harvesting time and temporary workers are hired for dike restoration and so forth.

In addition to these actors, there are “local coordinators” (shrimp trader or middlemen) and “money lenders” in *tambak*’s communities. It is reported that local-coordinators

³⁶ The term, *Pengawa-Sawi* is originally derived from the ranking of certain actors in Bugis fishermen’s society (Murai, 1988 and Fuke, 1992). This term is used by some Japanese academics for identifying the social actors of *tambak* farming communities in South Sulawesi. However, according to some academics at UNHAS, the term is not appropriate. Because originally *pengawa* means owner of big fishing boat and *sawi* means laborers of the big boat, and this *pengawa-sawi* can be applied to fishermen’s social relations. Strictly speaking, a *tambak* owner is called as *pemilik tambak* and a laborer is called as *penggarap*. However, in reality *pengawa-sawi* is used among social actors in the studied communities.

and money lenders are often the same actors, and own relatively large *tambaks* (Fuke, 1992). The activities of local coordinator are not only collecting shrimp from the communities, but also to lend money to *tambak* owners³⁷. Moreover, they are local elites who occupy a higher position in the communities and who sometime have links with the local royal family (ibid.). It can be said that a local-coordinator (or money lender) is a local elite and acts to organize the *tambak* communities through money and socio-political power. Thus, a fish farming society is highly structured by organized social relation among various actors.

The actors described above are linked with external actors, that is, a coordinator (who collects shrimp and trades), and a packing factory / a cold storage (cold storage / packing factory is seen as actors) which are in Ujung Pandang city. It is reported that cold storages / packing factories lend money to coordinators, and the coordinators lend money to local-coordinators³⁸ (Fuke, 1992).

Labor usage and economic status of identified actors

The interviewed extensive *tambak* households are 17, and their *tambaks* vary from 0,4 to 7 ha in size. All *tambaks* are improved extensive system, nevertheless operation methods are not homogeneous. For instance, labor usage, production commodities, techniques and intensification levels of *tambak* are different from one another. As seen in Diagram 6, two kinds of labor usages can be observed in the coastal Maros *tambaks*. First, *tambak* which is operated by only the owner's own family labor, and secondly *tambaks* which are operated by both hired labor and family labor. In all cases, family laborers are commonly used for *tambak* operations, which is to save labor costs. Besides, in both cases seasonal workers are hired for harvesting and dike maintenance. Also, the extensive *tambak* is commonly characterised by low labor input. The average labor input of the extensive *tambak* is 0.85 person per ha³⁹.

³⁷ It is observed that small- and middle-scale *tambak* owners borrow money from local- coordinators or money lenders, when the owners do not have enough capital for purchasing shrimp fry and other inputs.

³⁸ However, whether loaning is done between cold storage and packing factory and coordinator as well as between coordinator and local-coordinator is not examined.

³⁹ This labor input per ha excludes harvesting and other seasonal hired workers.

Six of 17 households operate *tambaks* with own family laborers, and the rest of 11 households use both hired and family laborers. The hired laborers are used when *tambak* owner can not provide enough laborers from their own families. In the study areas, all hired laborer and seasonal laborer are recruited from the same communities. Therefore, *tambak* operations are carried out within the framework of traditional coastal actors, particularly men. In addition, women⁴⁰ neither involve in daily *tambak* activities, nor participate in harvesting work.

The economic gap between social actors in Maros seems to be large. However, there are neither appropriate data, nor indicators which show income gaps of the identified actors. In order to know the gaps, the holding conditions of visible assets and whether owners carry the title of “hajji” in each household were examined. 10 of 17 *tambak* owners have already gone on a pilgrimage to Mecca and have owned the title of “hajji”. The owners, who have main income sources out of *tambak* activities and regard *tambak* activities as a side-business, own relatively large houses with lots of furniture⁴¹. Also, some owners who consider *tambak* activities as main-income sources and own large areas of *tambak* show the same characteristics⁴².

On the other hand, the livelihoods of the hired laborers (*sawi*) seem to stay at marginal levels. The income for profit sharing does not seem enough to sustain the livelihoods of the hired laborers and their family. Their economic marginal condition could be inferred from their housing conditions. Their houses looked like a “hut” rather than a house, and their dwelling do not have separated rooms. Most of the households have no electricity and do not hold fine furniture.

In the surveyed *tambaks*, the hired laborer receive a cash share of around 15 ~ 20 percent of total shrimp production and around 20 percent of total milkfish production⁴³. Basically, the profit shares are allocated by the owners to the hired laborers after harvest. If hired laborers can not wait to receive share profit until harvest, he borrows money from

⁴⁰ The detail economic activities of women in on-farm were not clarified.

⁴¹ Distinguished features of their houses and furniture are: their houses have separated rooms, window pane, electricity connection; furniture such as TV, drawers, cup and plate for ornament, sofa and a telephone. As an another asset, two households own car.

⁴² However, how much of income is derived from *tambak* activity can not be clarified during the field survey.

⁴³ Inputs expenses such as shrimp and milkfish fry, fertilizer and feeds are borne by the owners.

his owner for living⁴⁴. As not all of the extensive *tambak* create a full-time employment, a majority of the hired laborers need to diversify their income sources by involving in other activities such as fishing and non-farm activities. Profit sharing of harvesting workers has not been investigated. These people usually engage in outside *tambak* activities.

Production system differences among the extensive *tambaks*

Maros *tambaks* are characterised by widely spread polyculture of shrimp and milkfish production. In the interviewed households, 10 of 17 households raise both shrimp and milkfish, 5 of 17 households raise only shrimp and 2 of 17 households raise milkfish alone. Those *tambak* owners know the high profitability of shrimp in the market. Nevertheless, they tend to use polyculture of shrimp and milkfish instead of shrimp monoculture. This trend can be explained by the risk avoidance or the risk spread behavior of fish farmers. Because if shrimps were died as a result of the spread of disease or by the fluctuation of salinity levels, farmers lose profit or in many cases fall in debt. When the farmers farm shrimp and milkfish together, even if the shrimps die, they can eat milkfish and sell it to the local market or to the local coordinators. Thus, security of livelihoods is more important than higher profit for the extensive *tambak* owners.

Another feature is diverse intensification levels of *tambaks* within the category of the improved *tambak* system. Smaller-scale *tambaks* (from 0,4 to 1,5 ha) tend to use more inputs (such as shrimp fry, fertilizers, pesticides and artificial feeds) than large-scale *tambaks*. This inverse relationship between farm size and intensification levels is pointed out in Weemaes's study (1997) in Maros. Weemaes (1997: 194) writes: "Farms smaller than 5 ha use per hectare more inputs (fertilizer, post-larvae, feed) than farms bigger than 5 ha in size. But farms between 1 and 2 ha have shown the highest levels in the use of inputs,...."

In addition, the degree of the application of those inputs depends on owners's economic situation.

Economic strategy of extensive *tambak* households

Two income generation strategies are identified among *tambak* households: a survival strategy and a consolidation strategy. The economic meanings of *tambak* activity are

⁴⁴ Whether interest rate exists or not in this form of money lending was not examined in this study.

different among households, and are dependent on the conditions of each household. In fact, not all of the interviewed households consider *tambak* activity as a main income source (main activity).

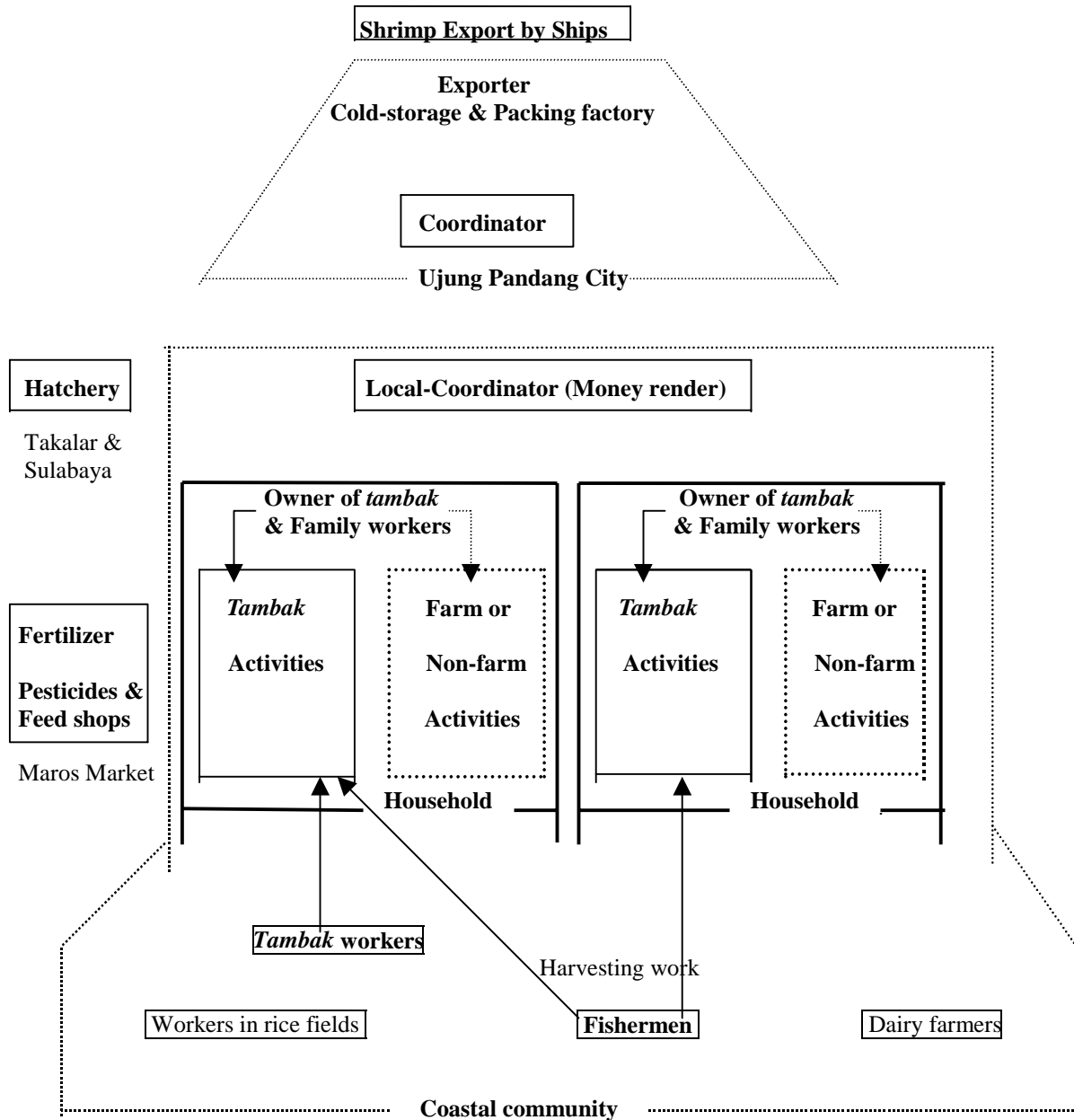
Nine of 17 households consider *tambak* activity (shrimp and milkfish farming) as main income sources. Eight of 17 households consider *tambak* activity as a “side-business” (side-earning).

In the former category, 5 within 9 households have additional income sources from on-farm (rice farming and vegetable farming) or non-farm works (construction work, shrimp fry selling and other wage activities). Under this condition, the household whose main income is derived from *tambak* activity and partly from side-earning in non-*tambak* activities, can be classified as a consolidation strategy of household. Meanwhile, 4 of 9 households which are only dependent income source on *tambak* activity can be classified as a survival strategy of household.

The later category, (8 of 17 households) which considers *tambak* activity as a side-business, has regular income sources especially in non-farm sector (government officer, village-chief, owner of rice threshing home and other business). In this condition, households, whose main income sources are derived from regular non-farm works and for whom *tambak* activity is a secondary activity, are classified as a consolidation strategy of household.

Diversification of income sources are commonly observed, and in many cases income from *tambak* activities contributes to consolidate certain owners’s households.

Diagram 6. Social Actors Map in Extensive Shrimp Sector



4.3.b Intensive Tambak Case

The surveyed intensive aquaculture sector has several different features in terms of labor structure, social relations, sustainability and economic strategy. Basic production relation is completed within one *tambak* organization, there is no participation of local dwellers.

Various social actors and pyramidal social relationship

The intensive *tambak* system is characterised as a hierarchical system of social relations based on clearly separated division of labor. Diagram 7 reveals a hierarchical human order among the social actors. Shrimp production activities are clearly separated into several activities, and the divided activities are operated by certain social actors, that is manager, aquaculture engineer and daily operators.

Two intensive *tambaks* (8 ha and 4 ha in area) were surveyed in Takalar district. The owners of the *tambaks*, who invest in the shrimp business, live in the urban area (Ujung Pandang city). Under *tambak* owner, hired *tambak* laborers are identified. A manager from the urban area deals with a management of *tambak* business. Aquaculture engineer from the urban area gives technical advice and tests the water quality and quantity of several inputs. Under these actors, there are ordinary *tambak* operators from other districts. These hired laborers are recruited by the owners from outside the communities⁴⁵. Gender difference in the hired laborer is clear. All of the hired laborers from the manager to daily operators are males. However, four females in 8 ha's *tambak* and three females in 4 ha's *tambak* are employed for the provision of food and cleaning tasks. Young and single males tend to be recruited for *tambak* daily activities, because young males normally work with low wage and more obedience than older males.

Intensive *tambak* operation is commonly considered to absorb a large number of workers. However, no local dwellers are hired for the surveyed *tambak* operations. In addition, the pond owners basically do not involve in any *tambak* operations, but sometime they come from the city and supervise *tambak* operations. In both cases, even for the construction of the ponds, local dwellers were not hired. Neither hired harvest laborers nor seasonal hired laborers are employed from the local communities.

⁴⁵ However, some researchers at UNHAS indicated that some intensive *tambaks* partly use local workers as *tambak* daily operators and as harvesters. However, some studies point out that hired local laborers are low skilled and low paid.

Economic status of identified actors

Both of the pond owners, are Chinese Indonesians⁴⁶, own main businesses (motor bike selling and car selling) in the city, and regard shrimp activity as a side-business (side-earning). Therefore, high production of the intensive *tambaks* bring higher profits to the owners. In this condition, shrimp farming can be seen as an accumulation strategy of the pond owner. Beside, one interesting point was mentioned by both owners that they consider shrimp business as a form of “gambling”. One remarked that if he failed in the shrimp business, shrimp eats his car, his house and his family! It means that the failure of shrimp business brings loss of properties.

The income level of *tambak* managers and aquaculture engineers was not clear. However, Muluk’ s study (1994) in Java intensive *tambaks* shows that these actors normally get much higher wage than ordinary *tambak* operators.

The intensive *tambaks* absorb large number of full-time laborers. In the surveyed intensive *tambaks* in Takalar, the average labor is 2.75 person per ha⁴⁷. If comparing to the Muluk’s Java case of 1.37 person per ha (ibid.), the Takalar *tambaks* absorb much higher labor per ha.

Production system

The intensive *tambak* is characterised by high capital intensity as well as a short operation period. Large amount of artificial feeds and chemical inputs are used during the raising period. Although the intensive system makes large amount of profits in each production cycle, this operation is not sustainable. According to the interviewed intensive *tambak* owners, the period of *tambak* operation is between 3 and 5 years, then shrimp ponds are abandoned and shifted to new places⁴⁸. The reason is to avoid the failure of

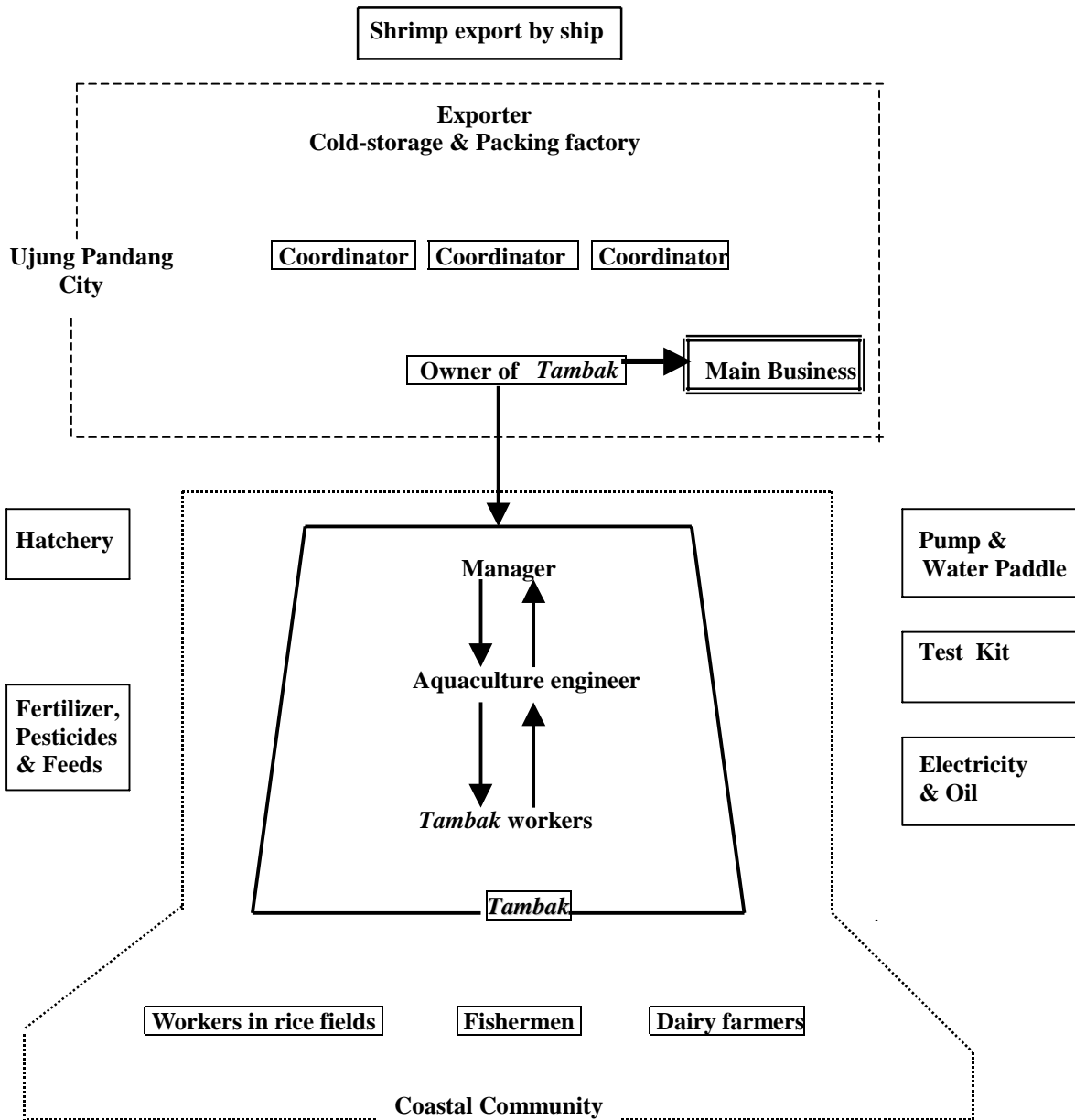
⁴⁶ The surveyed *tambaks* are owned by Chinese Indonesian, this trend is observed in other *tambaks* areas in South Sulawesi. The features of intensive *tambak* owners can be classified to three categories: i) Chinese Indonesian business men who live in the urban areas, ii) local elite such as official and royal family who live in coastal areas, iii) large scale enterprises in the urban areas.

⁴⁷ This labor input per ha excludes the female workers who do not engage in *tambak* activities.

⁴⁸ In some cases, the abandoned ponds are sold to other people, and used for milkfish production or shrimp production in the extensive way. The short period of intensive shrimp operation is also mentioned by UNHAS researchers. The productivity of shrimp declines and the spread of disease become more frequent after 3 to 5 years operation.

shrimp production from the spread of disease. This shifting shrimp *tambak* operation is commonly practiced in South Sulawesi. This form of operation brings several problems such as water pollution and soil degradation. However, it is difficult to find out whether such negative results occurred in the surveyed *tambaks* without detailed tests, which were not possible during the short period of field research.

Diagram 7. *Social Actors Map in Intensive Shrimp Sector*



4.4 Two Models of Commodity Chains in the Shrimp Production Sector

This section analyses commodity chains of shrimp production in two *tambak* systems. It especially investigates commodity flows and the position of identified actors. After that, it shows how the output chain from South Sulawesi is interlinked to consumer sites in Tokyo, Japan.

4.4.a. Extensive Tambak Case in Maros

Diagram 8 shows the linkages of several commodities from input site until export sites on the line of the identified social actors. Mainly three kinds of commodity chains are observed: i) external material inputs base chain, ii) monetary base chain and iii) output base chain.

First, the present material input base chain is formulated with shrimp fry, fertilizer, pesticides and artificial feeds. These commodities are brought from urban areas. Most of shrimp fries are purchased from hatcheries in other cities such as Takalar and Sulabaya. Shrimp owners buy fry from hatcheries or in some cases from local fry distributors (namely mini-hatchery). Factory made fertilizers, pesticides and artificial feeds are basically bought from shops in Maros and Ujung Pandang. These inputs are used on the basis of each *tambak* owner's insight and economic availability.

However, the shape of the present input commodity chain was formulated through two changes. Input commodity chains before and after the 1980s have different features from the present chain. Before the 1990s, the input commodity chain was not expanded to outside the coastal communities. Before the 1980s was the period of milkfish production, and the external inputs were hardly used. When *tambak* farmers raised milkfish and shrimp together, shrimp fry was caught from brackishwater river nearby *tambak* or brought from petty fishermen. Milkfish and shrimp production was mostly dependent on *tambak*'s natural productivity such as nutrient from tidal fluctuations and plankton. Under milkfish based *tambak* production with lower intensification, the commodity chain was not expanded to outside the communities.

After the 1980s was the period of growing market demand for shrimp and *tambak* was intensified by using several material inputs such as organic fertilizer and home-made feeds. In some cases, chemical inputs were brought from cities (Maros and Ujung Pan-

dang), and using shrimp fry from hatcheries was started. In this period, the simple and limited input commodity chain was expanded to outside the communities.

After the 1990s is characterised by a dramatic expansion and reformulation of the input commodity chain in *tambak* communities. The route of the natural fry from petty fishermen disappeared and hatchery became major fry supplier. Factory produced inputs such as artificial feeds⁴⁹ and chemical inputs have become popular and these inputs replaced using home-made inputs. Thus, the shape of the locally based input commodity chain was changed to an external base input commodity chain.

Secondly, there is a monetary based chain which is borrowing and lending of money among identified actors. Money is borrowed from a local-coordinator when small-scale *tambak* owner does not has enough capital for purchasing inputs. Also, hired laborers often borrow money from their owners, when they can not wait to receive profit share until the harvest period. This inter-local loan⁵⁰ seems to be based on traditional human relations such as trust and neighborhood. Besides, Fuke's study (1992) in South Sulawesi indicates that lending between local actors (*tambak* communities) and external actors is common. Coordinators and cold-storages often lend to sub-coordinators in order to consolidate the shrimp collecting route (ibid.).

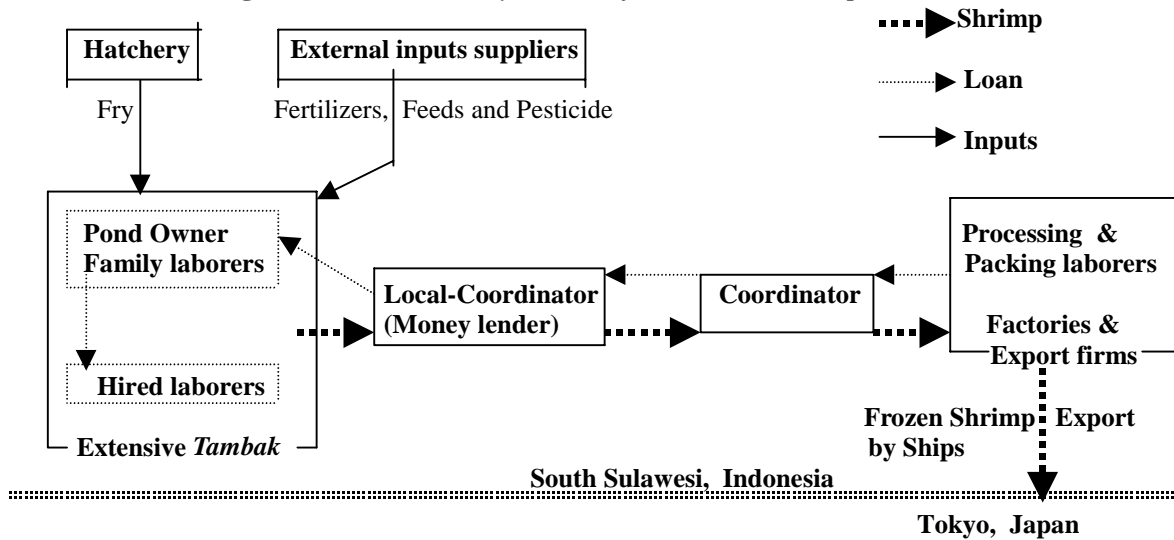
Thirdly, there is output base chain which is cultured shrimp. After harvesting, shrimp is collected and traded by local-coordinators from *tambak* sites to the city. Then, the collected shrimp is traded to coordinators and finally to cold-storages.

In sum, the expansion of shrimp production in the existing *tambaks* made commodity chains more complex, and expanded its chains from the local base to external base. Thus, through the formulation of commodity flows between *tambak* communities and outside, the locally based commodity chains were more integrated into to the urban areas.

⁴⁹ Whether the increase in using artificial feeds brought the establishment of rural feed industry in the study area or not could not be observed.

⁵⁰ However, neither money is borrowed by what percent of interest rates, nor what conditions are put for lending are examined in this study.

Diagram 8. *Commodity Chain of Extensive Shrimp Production Sector*



4.4.b. *Intensive Tambak Case in Takalar*

Commodity chain in the intensive system is characterised by a high dependence on inputs resources from the cities. Around two interviewed intensive *tambaks*, there are neither any intensive *tambaks* nor any extensive *tambaks*. Main activities in the two locations are fishing, rice farming and dairy farming. There is no commodity chains of shrimp until the *tambak* business was started.

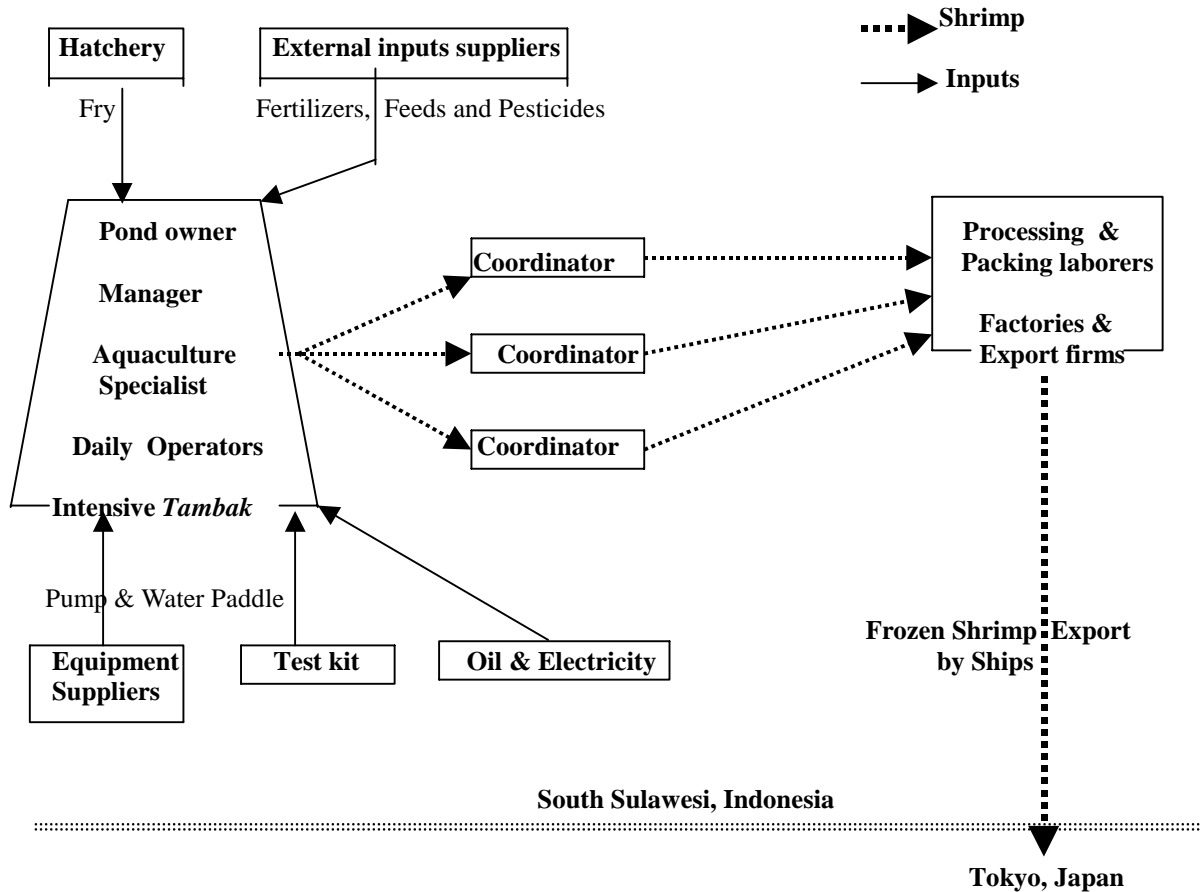
Diagram 9 shows complex commodity chains in the intensive shrimp sector. Three types of commodity chains are clarified: i) input based chain, ii) instrumental based chain and iii) output based chain. Monetary based chain was not found in the intensive sector.

The input based chain is formed by shrimp fry, fertilizers, pesticide and artificial feeds. All shrimp fry is bought from one hatchery in Takalar. Other inputs are purchased from shops in Ujung Pandang. Tools such as water pumps, water paddles, exam kits are purchased from Ujung Pandang. In order to use water pumps and water paddles, a large amount of oil and electric power from urban areas are consumed. These inputs and instrumental chains are brought from outside the *tambak* areas. These commodities are directly brought into production sites and have no relation to the local communities.

Farmed shrimp is collected by coordinators or sometime directly by cold-storage personnel. *Tambak* owners choose cold-storages for selling shrimp which offer higher purchase price. Therefore, farmed shrimp is sold to one of five cold-storages in Ujung Pandang. Linkage of local communities to the outside through shrimp commodities does

not occur in the intensive system. Therefore, commodity chains of the intensive system were established after the introduction of shrimp business, but these chains are only found between the isolated *tambak* sites and the city without a link to the rest of the communities.

Diagram 9. Commodity Chains in Intensive Shrimp Sector



4.4.c. The End of the Commodity Chains: Consumers in Japan

The chain of frozen shrimp in South Sulawesi continues into the Japanese market. This section specifically describes the frozen shrimp distribution in Tokyo market. Diagram 10 is a simple representation of the commodity chain of frozen shrimp from the export site in South Sulawesi to the consumption site in Tokyo. The frozen shrimp is purchased from mainly two kinds of packing factories in Indonesia: “local Indonesian processing and packing factories” and “factories of Japanese joint venture”. The former import channel is called “purchase import”, and it is mainly done by Japanese trading firms. The

latter import channel is called “development-and-imports”⁵¹, and is done by the fishery firms as well as the Japanese import trading firms. Until the imported frozen shrimp is consumed by people in Tokyo areas, the shrimp flows through various distribution channels.

Firstly, the imported frozen shrimp is distributed from the import trading firms and the fishery firms to three channels: “primary wholesale stores”, “central wholesale market” in the large cities and “frozen food makers” as shown in Diagram 10. It is reported that the import trading firms tend to sell the frozen shrimp to “primary wholesale stores” more than central wholesale market, meanwhile the fishery firms tend to sell the frozen shrimp to the “central wholesale market” more than to the primary wholesale stores (Miyachi, 1989). The trends of shrimp sales can be described as a) import trading firms → primary wholesale stores and b) fishery firms → central wholesale markets. However, as seen in Diagram 10, a certain volume of the imported frozen shrimp is sold to the “frozen food makers” from both the import trading firms and the fishery firms.

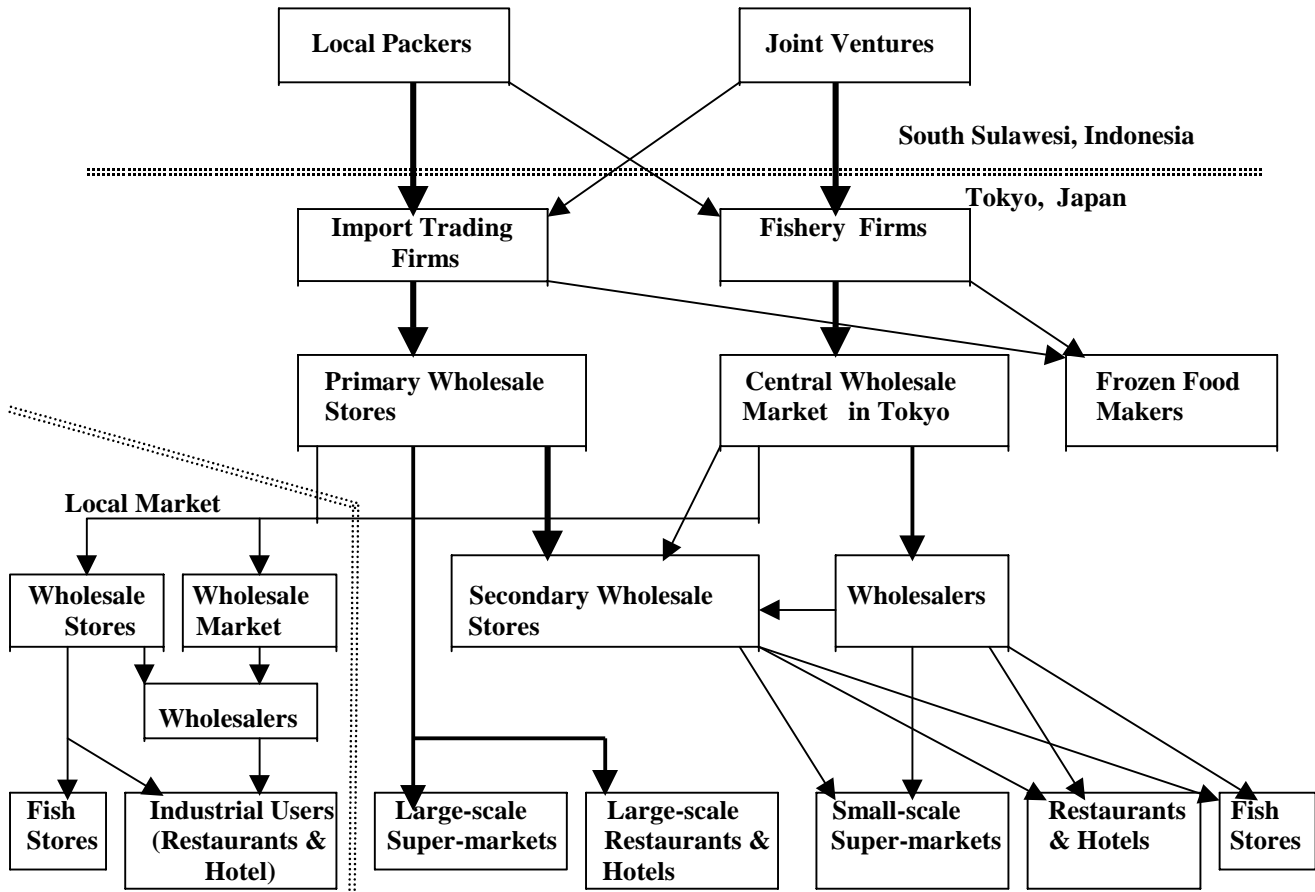
Secondly, from the primary wholesale store the sold frozen shrimp is distributed into three directions: 1) secondary wholesale stores, 2) large-scale super markets and industrial users and 3) local wholesale stores and local wholesale market in outside Tokyo. Some of the frozen shrimp are sold to the secondary wholesale stores in Tokyo, some of them are sold to the large-scale super markets, large-scale restaurants and hotels, and the rest of them are sold to the local markets. Meanwhile, from the central wholesale stores in Tokyo the sold frozen shrimp are distributed to 1) mostly “wholesalers”, and a small volume of them 2) “local wholesale stores” and “local wholesale markets”. The frozen shrimp in the wholesalers in Tokyo is distributed through three channels: 1) fish stores, 2) industrial users (restaurants and hotels) and 3) the secondary wholesale stores in Tokyo.

Thirdly, the secondary wholesale stores sell the frozen shrimp to 1) fish stores, 2) restaurants and 3) small-scale supermarket. The secondary wholesale stores purchase frozen shrimp from 1) the primary wholesale store, 2) the central wholesale market and 3) wholesalers. And then, the secondary wholesale stores sell the shrimp to relatively small-scale restaurants and fish stores (Miyachi,1989).

⁵¹ Most of imported frozen shrimp from Indonesia is imported via development-and imports (Nakai, 1984).

Through the various distribution channels, finally the frozen shrimp is consumed by people in Tokyo.

Diagram 10. Shrimp Commodity Chain from Producer to Consumer



Sources: Modified from Nakai (1984) p. 108, Diagram 3-7 and Miyauchi (1986) p.231, Diagram 8-3

5. COMPARATIVE ANALYSIS

5.1 Introduction

The preceding chapter has identified various social actors in two kinds of *tambaks* systems, and explained the nature of the socio-economy in particular South Sulawesi's coastal communities in connection with the enlargement of market demand for shrimp. Also, it has clarified the various commodity chains of shrimp from the production site to the consumer site, and the transformation of the chains along with the spread of shrimp farming. Based on various findings of two production systems, this chapter firstly analyzes different socio-economic aspects of two *tambaks* activities. After that, it attempts to

show the specific impacts in the studied areas in comparison with the presented socio-economic impact studies of shrimp farming in Chapter II.

5.2 Different Responses of Social Actors in Two *Tambak* Systems

A first distinguishable response of the owners in two types of *tambaks* can be seen in “enclosure” and “common” or non-enclosure of *tambak* sites. The intensive *tambaks* sites are isolated from the rest of the communities, because the *tambak* sites are enclosed by fences. The owners put a clear ownership of land by the enclosures, and local people who live in around the *tambaks* are not able to access or even see the production sites. The owners and hired laborers are outsiders, and do not have strong socio-economic and political ties to the local residents. Therefore, the intensive *tambak* owners need enclosed production sites in order to avoid shrimp thieves. On the other hand, there are no fences around the extensive *tambaks* sites. As the community member and the pond owners know each other and jointly guarding the communities in the context of mutual assistance, the owners do not need to enclose *tambaks* sites against shrimp thieves. Thus, the *tambak* production sites are more integrated with the rest of communities.

A second distinguishable reaction of the owners in two production systems can be observed in their differential farming strategies. This intensive owners invest in the shrimp business to gain high returns, while the extensive *tambak* owners raise shrimp and milkfish in order to satisfy their family’s subsistence needs or to consolidate their livelihoods rather than to aim at higher profit.

In the intensive system, shrimp is produced under the principle of owners’s profit seeking. This production method is characterised by high capital intensity. This form of high profit seeking can be seen un-sustainability of the intensive production system. In fact, even though the owners know that the intensive production systems can be used only for a short period (about five years), they decide to invest in the shrimp business to have high economic returns in a short period. With the booming shrimp demand, the owners invest shrimp production to maximize profit rather than to gain relatively small amount of profit in a long periods. Meantime, in the extensive system, shrimp is produced for securing the owners and their families livelihoods or for consolidating the livelihoods. The production method is characterised by more livelihood oriented. The popularly practiced

polyculture of shrimp and milkfish signifies that the extensive *tambak* has both production characters: a cash crop and a food crop or a subsistence food production. Even though the owners know higher profit return of shrimp monoculture, they prefer to raise shrimp with milkfish. This response can be characterised by the owners's risk spread behavior as well as reliable livelihood strategy.

Thirdly, the intensive system can be operated only by people who have large amount of capital, technologies and high management abilities. The pond owners or investors can choose the production system from the extensive, the semi-intensive and the intensive, though they choose the intensive system. This production choice is simply derived from high profit seeking of the owners. It is possible for the owners to choose the extensive system which brings low profit in the long period. However, the owners prefer to make massive profits in a short period. Meantime, the extensive system is relatively easily to operate by people who even do not have high capitals and advanced techniques. As the enlargement of demand for shrimp, the pond owners responded to shift production system from milkfish based polyculture to shrimp based or shrimp and milkfish based polyculture. Also, in order to get more profits within limited capital and techniques, the owners changed the intensification level of the extensive system from less material inputs to more material inputs, namely the improved *tambak*.

Fourthly, a distinguishable response of the *tambak* owners can be seen in the ways of using hired labor. The extensive *tambak* can generate employment opportunities for the local residents, although it absorbs a few full-time workers (0.85 person per ha) than the intensive *tambak* (2.75 person per ha). The extensive *tambak* owners operate fish farming with a combination of their family member and the hired laborers. How these two actors are used depends on the owners's decisions or insights. As a participation of family members in the extensive *tambak* activities, employment opportunities for the coastal residents are limited. Although the limited working opportunities are opened to certain local dwellers. In fact, all of the hired *tambak* workers for the studied extensive *tambaks* are recruited from the local communities. Meanwhile, the intensive *tambak* can not generate any employment opportunities to local residents, even though it can absorb relatively a larger number of full-time workers. Because all hired laborer are recruited from outside the communities. This fact shows the owners's reaction for minimizing the risk of theft.

Thus, the studied intensive *tambaks* can not generate any full-time employment, and local residents around the *tambaks* can not get any economic benefits⁵².

In addition, the intensive *tambak* system shows clear division of labor. The *tambak* production is operated by various actors. The extensive system does not have a clear division of labor. The extensive *tambak* is operated basically by the same actor.

5.3 Different Impacts of Two *Tambak* Systems:

Debate to the Past Studies on Socio-Economic Impacts of Shrimp Culture

Based on the field work in particular South Sulawesi *tambak* areas, this paper has attempted to clarify several socio-economic impacts of shrimp farming. As presented in Chapter II, a number of researches on the negative and the positive impact of shrimp farming have been carried out in the last two decades. The impacts of shrimp farming are, needless to say, dependent on socio-economic and ecological conditions of each country, region, community, social actors and the intervention of the Indonesian government. Though, certain impacts suppose to be observed in differential conditions of coastal areas. This section attempts to analyze whether or not such arguments can to what extent be seen this particular case study of South Sulawesi. It also attempts to describe different pictures of the impacts of two shrimp farming systems.

As the negative consequences, firstly, the unequal profit sharing was observed in both aquaculture systems. The extensive aquaculture case shows that the owners get relatively higher profits than the hired laborers (profit share between the owners and the hired laborers is about 80 : 20). The unequal profit distribution in the intensive system is more obvious than in the extensive system, because the pond owners get the highest profit, the managers and the aquaculture specialists get middle level profits and the daily operators receive the lowest profits. A comparative study of profit differences between actors in the shrimp sector and other social groups such as rice farmers and fishermen could not be examined in this paper.

⁵² Muluk's study (1994) on labor in intensive *tambak* in Java mentions that if the *tambak* owner is a local resident, more hired laborers tend to be recruited from his local community, while if a owner is an outsider of the *tambak* site, more outside laborers tend to be hired. These trends can be partly explained by the owner's preference for outside laborers, because the outside laborers are relatively more controllable and more trusted.

Secondly, displacement of employment opportunities to the poor was not clearly observed in both aquaculture cases. In the extensive aquaculture case, all of the ponds were converted from mangrove and palm tree forests before the 1970s, and the main production commodity was milkfish until the 1980s. The displacement of certain dwellers such as rice farmers maybe have happened after the construction of milkfish ponds. However it can be said that the displacement was not derived from shrimp farming, but from milkfish farming. Meanwhile, in the intensive aquaculture case the ponds were converted from vacant land. Therefore, the exclusion of other employment may not have happened.

Thirdly, endangering local food security was not clearly observed in both cases. In order to construct the extensive ponds, large areas of mangrove and palm tree forests were cut down. The destruction of the forests may have undermined the inter-tidal ecosystem and hence it may have reduced fish catch. On the other hand, the subsistence base milkfish production may have contributed food security of certain coastal residents. Without comparing disadvantages of the fish catch from the deforestation and benefits of milkfish production, the food security issue can not properly be analyzed.

It is difficult to judge that salinization of the fields nearby the extensive ponds brought about the reduction of rice yields, without taking detail field survey. It was not clear whether or not the water pollution from the intensive shrimp operations brought about decline of the fish catch in the inter-tidal zones.

Fourthly, disruption of traditional customs and roles could not be examined in the short period of the field survey. There is a need to understand what kinds of traditional customs or roles existed in the coastal communities, and how these customs were transformed or disregarded by the introduction of shrimp farming.

Fifthly, less access to natural resources could not be examined because of lack of data. There is a need to clarify how the transfer of land ownership has restricted the accessibility of what local resources among the residents. Also, it is a need to know the process of production commodity shift from milkfish base to more shrimp base and how this shift influenced the property rights.

Sixthly, a loss of valuable land was not examined in this study. Unlike several studies mentioned, a conversion of rice fields to aquaculture ponds was not found in the surveyed areas. The extensive ponds were converted from mangrove forests in semi-saline

zones which are not suitable for agricultural activities. The intensive ponds were converted from vacant lands. In both cases, using land for aquaculture brought higher economic value than other usages.

As the positive consequences, firstly, an increase of employment opportunities was observed in the extensive case. A few residents around the extensive ponds got opportunities to work the ponds. However, the intensive ponds did not generate any employment opportunities for the local residents, although the intensive system brought various activities.

Secondly, a positive view which shrimp farming uses the inter-tidal zone more efficiently than other economic activities is fit for a case of the extensive system. However, considering a short operation period (about five years) of the intensive shrimp farming, it can be mentioned that the intensive shrimp farming does not utilize the land appropriately in a long run.

6. SUMMARY AND CONCLUSIONS

This paper has attempted to analyze the socio-economic characteristics of two types of commercial shrimp production in South Sulawesi. The paper firstly has studied the links between the increase in Japanese market demand for shrimp in the context of changing lifestyles and the booming shrimp production in South Sulawesi. Secondly, focused on the long existing aquaculture ponds and newly constructed aquaculture ponds, the paper has identified various social actors in the shrimp sector. It then has compared the economic conditions, social relations, labor organization of identified actors in both ponds. It has also clarified the shapes of shrimp commodity chains in terms of labor inputs, financial inputs and material inputs processes incorporating with the identified social actors. By comparing other impact studies of shrimp farming to this case study, this paper has presented locally specific socio-economic impacts of shrimp farming.

This last chapter will summarize the discussions in the preceding chapters in relations to the research questions, hypothesis and main findings of this study. Finally, it will conclude with some recommendations.

- 1) The expansion of a particular cash crop production can be understood by the dynamic socio-economic changes in consumer nations. In the case of shrimp production, the

spread of shrimp farming in South Sulawesi could be explained by the expansion of market demand for shrimp in Japan in the context of the process of the high economic growth. Especially, changing lifestyles (labor patterns and dietary patterns) have induced the conditions for the mass-consumption and the mass-import of shrimp. However, in order to precisely explain the driving forces behind the spread of shrimp farming, other factors, such as the development of the cold-chain system, import liberalization of shrimp and the reorganization of market system in Japan as well as the prohibition of trawling operations and the aquaculture development projects by the government in Indonesia, need to be incorporated.

- 2) The economic significance of shrimp farming for the identified social actors varies in two production systems as well as among various actors. In the extensive system, the aquaculture farmers whose main income source is only from shrimp and milkfish farming can be classified the fish farming as a “survival strategy”. The aquaculture farmers whose income sources are not only from the fish farming, but also from non-farm or on-farm activities can be classified the fish farming as a “consolidation strategy”. Meanwhile, in the intensive system, the shrimp pond owners who consider shrimp business as a side-earning and have main income source in the city can be classified the shrimp farming as a “accumulation strategy”. The hired laborers (low-skilled daily operators) in the intensive system whose main income source is only from the shrimp farming activities can be classified the shrimp farming as a “survival strategy”. However, it is not clear that whether or not the skilled hired laborers (managers and aquaculture technicians) have other income sources. The economic importance of shrimp activities for the skilled workers is dependent on the diversification of their income sources.
- 3) Human relations in two aquaculture systems is slightly different. Human relations in the extensive system are based on the traditional human relations, namely “*pengawa* and *sawi*” relation. Human relations in the intensive system are based on clear division of labor. The human order is decided by the positions of their works, and the human relations are characterised by a hierarchical structure.
- 4) The expansion of shrimp farming has brought about an income gap among identified actors in the both systems. In the intensive system, the income gap between the owners

and various hired workers is obviously wide, and the income gap between the skilled workers and the daily operators is large. Meantime, in the extensive system, the gap between the pond owners and the hired workers is also large. The owners can get share of 80 percent of total profits, while the hired workers only get 20 percent of the profits. The owners own relatively large houses with a lot of furniture and in some cases own cars. The households of these hired workers, on the contrary, dwell in small huts without basic furniture and live at a marginal level. In some cases, they have to engage in fishing or non-farm activities to survive. However, this study can not conclude that the income from fish farming is the only one factor to create such a gap between the owners and the hired laborers. Other factors such as remittances from the other family members, other income sources and unidentified assets maybe also contribute to the gap. Further exploration on this point is needed.

- 5) The generation of employment opportunities through shrimp farming activities for local residents is dependent on aquaculture production system. The extensive system can not absorb large number of full-time workers, though the employment opportunities are certainly open to local residents. Therefore, the extensive system can contribute to create small employment opportunities for some coastal people. The intensive system creates diverse farming activities and absorbs relatively large number of full-time workers, although all hired workers were recruited from outside the communities. Thus, the intensive system can not generate any employment opportunities for local residents.
- 6) A study of the diversification of income sources in the extensive farming households shows dynamic economic insights of each aquaculture households. Some households regard the aquaculture as a main activity, and besides they have side-earning activities in on-farm or non-farm sector. Other households regard aquaculture farming as a side-earning activity, and they have their main activities in on-farm or non-farm sector. However, to understand precisely the dynamics of income diversification, further investigation in on-farm and non-farm sectors is required.
- 7) The relation between the aquaculture producers (owners / hired workers) and other coastal residents would not be clearly identified in this study. As to the enclave intensive production site with the fences, it can be said that the intensive shrimp farming is operated without having any relations to the rest of the communities. On the other

hand, the extensive shrimp and milkfish production sites are opened to the rest of the communities in terms of labor opportunities and the accessibility to production sites. Thus, it can be said that extensive farming activities are more integrated with the traditional coastal communities.

- 8) In the extensive aquaculture areas, the polyculture of shrimp and milkfish is widely operated. The milkfish based production system was changed to more shrimp based production system along with the increase in the market demand for shrimp. The pond owners tend to use polyculture of these commodities, although they know that the polyculture brings lower profits compared to shrimp monoculture. This trend can be explained by the risk avoidance behavior of the owners from shrimp farming failure.
- 9) Intensive aquaculture system requires large amounts of capital for purchasing various inputs, tools, high management ability and advanced farming techniques. This system can be used only by large capital holders. The goal of the intensive system is a high profit in the short run rather than solid or steady profit in the long run. On the other hand, extensive aquaculture can be operated with relatively small amounts of investment without special knowledge and skills. Thus, this system can be easily used by lower capital holders. The extensive system is characterised as a livelihood oriented rather than a high profit oriented.
- 10) The patterns of several commodity chains of shrimp in two production systems are distinct. Commodity chains in the extensive case were expanded and transformed from the locally based simple material inputs chains into the external based complex inputs chains along with the expansion of shrimp farming. The commodity chains in the intensive system were brought to the communities along with the introduction of shrimp business. From the intensive production sites, the chains are not linked to the rest of the communities, and the chains are connected to the urban area. The shape of chains in the former system is that of simple commodity chains, while the shape of chains in the latter system is that of more complex chains.

The concept of social actors has helped to explain not only socio-economic nature of various social actors in shrimp production sector, but also different responses towards the booming shrimp demand.

The commodity chains approach has helped to clarify the linkages of identified actors to various commodity chains of shrimp in terms of looking at global commodity distribution in shrimp production and distribution sector.

The expansion of shrimp production in South Sulawesi grew along with the enlargement of market demand associated with dynamic socio-economic changes among shrimp consumer nations, particularly in Japan. The analysis of the transformation of Japanese lifestyles along with high economic growth, for instance, has clarified the processes of mass-consumption and mass-importation of shrimp in the light of the changing of shrimp diet patterns. It is reasonable to say that the dynamic socio-economic changes influenced shrimp diet patterns on a global scale, and promoted shrimp farming not only in South Sulawesi, but also in other shrimp producing regions.

This paper could not reach or clarify several objects and brought certain questions.

Firstly, the survey samples and areas are small. They are only a part of South Sulawesi aquaculture areas. In this sense, several findings in this paper may not be seen in the rest of the aquaculture areas. Thus, based on the main findings in this study, comparative village analyses are needed with quantitative data.

Secondly, this paper could not clarify the socio-economic characteristics of other social groups in the studied areas. Thus, the considerations such as how the shrimp farming effect on other social groups, and how other groups responded or regarded the expansion of shrimp farming are not discussed. Based on the clarification of the socio-economic and political nature of other social groups, one needs to study how the identified social actors and other groups interact with each other in the same community, and how shrimp farming influences accessibility to local resources and social values, customs and roles.

This paper does not discuss the ecological impacts of shrimp farming. The ecological issue should be analyzed along with socio-economic impacts studies. To find out how ecological and socio-economic impacts interacted, further analysis is needed.

This paper has made a contribution to analyze the socio-economic aspects of shrimp farming in the long existing ponds and the newly constructed ponds. At the same time, it has attempted to compare different responses of various actors in both ponds. As presented in Chapter II, a number of studies revealed that shrimp farming creates several problems, especially negatively impacts on coastal dwellers. These views are not always

true, because the case study from South Sulawesi has not clearly shown those negative impacts of shrimp farming.

As the data were limited, this study could not reach several objectives, which were set out at the beginning.

Such unresolved objectives and analyses suggest the necessity of collecting further reliable data based on solid field study with rigid methodologies. Accumulation of such locally specific studies would contribute to bring better policy formulation and implementation of projects in aquaculture development sector for the improvement of large numbers of coastal people.

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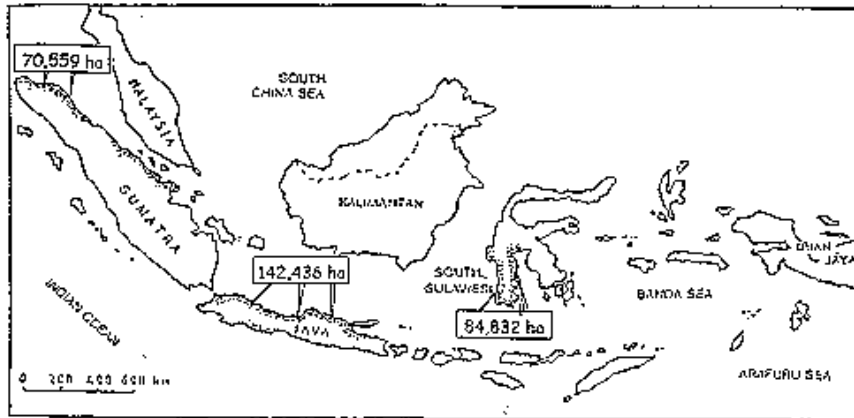
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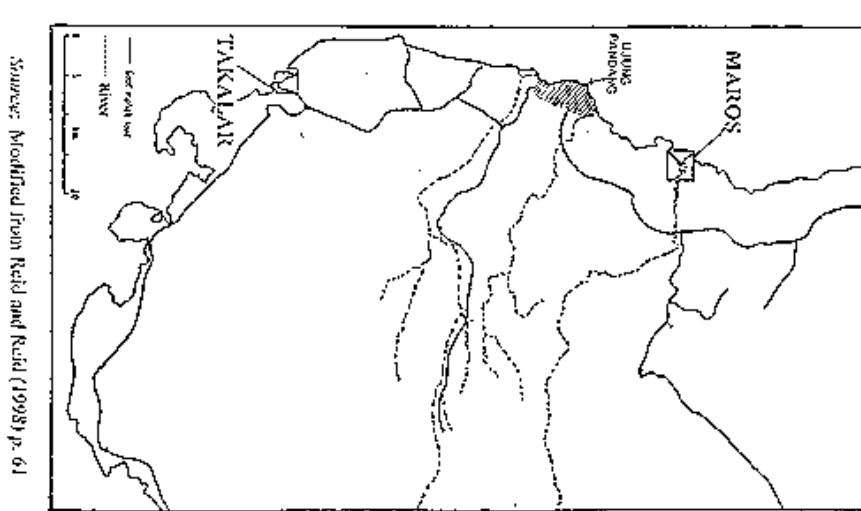
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Map. 1 Distribution of Major Tambak Areas (brackishwater pond) in Indonesia, 1996



Source: The number of *tambak* is compiled from BPS (1998) Table 3-3, p.53 and the map is modified from Muluk (1994) Figure 1. P. 172



Source: Modified from Reid and Reid (1998), p. 61

Map.2 Location of the Study Sites in South Sulawesi