COPING VULNERABILITY: ASSESS THE STRATEGIES WITH SPECIAL REFERENCE TO IDIOSYCRATIC SHOCKS IN THE SMALL - SCALE FISHERY IN SOUTHERN SRI LANKA

By

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Master Thesis in Fisheries and Aquaculture Management and Economics (30 ECTS)

The Norwegian College of Fishery Science University of Tromso, Norway & Nha Trang University, Vietnam

May 2009

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Coping Vulnerability: Assess The Strategies With Special Reference To Idiosyncratic Shocks In The Small - Scale Fishery In Southern Sri Lanka

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ABSTRACT

Vulnerability leads to poverty; poverty leads to vulnerability, a controversial two concepts without an end nor a start. From recent past, poverty has been addressed in terms of vulnerability. There, the possible ways to be vulnerable is stressed to investigate. Risks, shocks, and uncertainty have been identified as the profound sources of vulnerability so as to poverty. The coping strategies of such negative impacts or coping mechanisms to way out of the vulnerability is essential to alleviate poverty within the community. In fact, the study was designed to assess the coping mechanisms of vulnerability that are adapting to hammer the idiosyncratic risks and shocks in the small-scale fishing community in Southern Sri Lanka.

Stratified random technique was applied to draw a sample of three groups representing, NMRT owners, FRP owners, and crew members. Totally 25 households were selected from each sites of Rekawa and Kalamatiya; two fishing villages in South. Both panel data of six month period and a cross sectional survey was carried out to glean the data.

The results highlight a clear variation of fishing income between season and off-season for the whole three groups. The FRP owners', main cash inflows are fishing income, drawings, gifts, bank loans, and co-operatives where the fishing income and drawings would be for the NMRT owners, irrespective of the season. Zero income, harsh sea condition, inability to secure operational expenses, and damage of crafts/ gear knock their livelihoods frequently. Hence, the individuals are adapting memberships in formal organizations, accumulation of wealth, activity diversification, migration, and social networks as ex-ante risk coping strategies. Loans from friends, selling/mortgage, borrowing/withdrawals from banks, and intra- community transfers are the ex-post risk coping strategies. The safety net arrangements are vital to ensure the mutual insurance among the small – scale fishers. The importance of a high heterogeneity within a network is elaborated by the income- expenditure, and saving patterns of the groups.

ACKNOWLEDGEMENT

I indebted to my parents, sister and brother for their blessings, dedications and continuous encouragements given me through out the period.

Finally I would like to express my heartiest thanks to all those who were with me in numerous ways during this study.

ABBREVIATIONS

EEZ	Exclusive Economic Zone
FCS	Fisheries Co – operative Societies
FI	Fisheries Inspector
FRP	Fiber Reinforced Plastic boat
GDP	Gross Domestic Product
GNP	Gross National Product
LKR	Sri Lankan Rupees
NGO	Non Government Organization
NMRT	Non Mechanized Traditional Boats
OBM	Out Board Motor boats
USD	United States Dollars

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1. Introduction

Are fishers poor? A profoundly asking question from every corner of the world. Absolutely the answer is "yes" regarding developing countries like Sri Lanka, where the fisheries sector dominates by small scale fishers. From the past to the present a myriad of projects, fundings, subsidies, and rehabilitation programmes are running to assist fishermen in Sri Lanka. Unfortunately, most are still struggling to come out from this abysmal. In fact, it is of paramount importance to find the key points to break the iron grips of poverty among fishers. In that respect, one would be in doubt whether the fishing activity acts as a way to the penury or a way out from the penury.

In this fast moving world, poverty reduction and sustainable livelihoods are the mostly focused issues at present. This has been iterated by the United Nations by setting their goals that have to be achieved in year 2015 as Millennium Development Goals. Therefore, the development programmes are now steering on the sustainable approaches in order to uplift the standard of living among general public. In that connection, the small scale fisheries sector in developing countries is unavoidable. Because, their lives are affiliated with the fish resources, which are now in the declining phase due to the unsustainable exploitation (Nomura, 2007). Hence, fisheries management, economic roles of fisher folks, vulnerability and poverty are emerging issues that should be considered carefully (FAO).

1.1 Small scale fishery

Small scale fisheries sector in the world substrates for about 37 million people directly and over 100 million indirectly in fishing associated activities such as fish processing, marketing, net making, etc (Yami,2000; www.fao.org). Small scale fishery has been defined along two main streams based on socio economic criteria and technical criteria (Yami, 2000).

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Socio – economic criteria – people of both genders, who usually operates their own fishing craft and equipment, and go to sea themselves either alone or with a few crew members (preferably their own relatives)(Yami, 2000).

Technical criteria - a sector in which fishermen fish and collect aquatic organisms from beaches, from under ice, either by swimming, diving, or wading, or using small-scale fishing craft(Yami, 2000).

 The sector shows a diverse combinations of crafts and gears operating across different localities (table 2.5). In the small scale fishery, all are engaged in the fishery on daily basis, where their daily expenses are mainly depend on the fish income. Hence, almost all the small scale fishing and related activities are regarded as small scale enterprises. Moreover, the small scale fishery and related activities are important as a way of women's empowerment in poor coastal communities who are mostly ill – educated and poorly positioned in the society. Further, the small scale fishery generates revenue for the national government through licensing, taxation, permits, etc. Moreover, as a very good source of animal protein, the fish and fisheries products play a remarkable role to the nutritional well being for consumers especially for poor, fishing households, and non-meat consumers (Bay of Bengal News, 2004).

1.2 Nature of the marine fishery

Marine fishery includes always more risk, uncertainty, and danger than any other livelihood activities (Yami, 2000). In 1990, an American study revealed that the fatality rate of the USA commercial marine fishery is about seven times higher than the national average for all the other industry. This is much more worsened in the small scale and artisanal fishery. In Guinea, it has been reported that in every 15th canoe has an accident and for every 200 registered fishermen, one fisher dies in a canoe accident, annually. This is 120 deaths and 640 accidents when comes to Oceania during 1989 – 1990 (Yami, 2000). Since the small scale fishery is absent with advanced technology, modernized equipment, and first aid facilities, they are highly vulnerable (Amarasinghe, 2003[a]). The

pressure of the weather is immense than the large scale - off shore fishery. Large scale fishery in Sri Lanka, comprises with multi day boats with ice cabin. They possess advanced fishing equipment and technologies (Amarasinghe, 2003[b]). Hence, there is no doubt that the small scale fishery is one of the most risky and vulnerable livelihood activities on the earth.

1.3 Poverty

Poverty has been described under two broad categories *viz,* absolute poverty and relative poverty. Absolute poverty is the incident where the individual / household unable to demand a descent life; or in other word, the households cannot fulfill even the core essentials for a standard life pattern in the community. Contrast, relative poverty is a comparative measurement where one household / individual's endowments are compared with the other. In fact, the relative poverty difficult to measure exactly, also vary from place to place, person to person. But, an attempt had been taken to measure as an co-efficient, termed Gini – Coefficient (www.wikipedia.org). The Gini-coefficient of Sri Lanka is 0.47 (Central Bank, 2007). This study would be proceeded with absolute poverty, where it is needed to assess the vulnerability and well-being of individuals as one, single unit.

As many researchers pointed out, poverty is a multi dimensional concept (Dercon, 2001). It may be reflected by many indicators like malnutrition, low education, lack of proper sanitary facilities, vulnerability to risk, low income, etc. Many of these factors have a clear cut measurement and can elaborate or predict poverty using exact figures. For example; less than 1 USD per day termed as chronic poverty and less than 2 USD per day is termed as poverty. Poverty has been defined in FAO as *a human condition characterized by the sustained or chronic deprivation of the resources, capabilities, choices, security and power necessary for the enjoyment of an adequate standard of living and other civil, cultural, economic, political and social rights* (UN Committee on Social, Economic, and Cultural Rights, 2001 in FAO). Earlier, the poverty reduction in fisheries sector has been aimed through improvements in technology, infrastructure, and market – led policy reforms (FAO). But, still the fishers are poor or with a limited

success in developing countries. Hence, it is worthwhile to dive in the phenomenon of poverty in order to identify the cause roots of such hindrance.

There is a growing recognition that vulnerability to risk is one of the defined characteristics of poverty (World Bank, 2000). Therefore, any development measurement should link with understanding risk, shocks among destitute, coverage and vaccums in safety nets while eliminating poverty traps (Battamishra, *et al*. 2008). But, vulnerability to risk is bit vague and researchers are still trying to find out the exact impact of the vulnerability to the poverty and coping strategies to usher a good life.

1.3.1 Vulnerability

Vulnerability is defined as the exposure to future loss of household or individual income/ assets due to shocks that would negatively affect on the well being and, cause to fall below a given socially accepted level (Rubio and Soloaga, 2004). From the recent past, especially after the world development report (World Bank 2000) the term vulnerability was used profoundly (Heitzmann, *et al.* 2002). Vulnerability also has been defined as the magnitude of the threat of future poverty (Calvo and Dercon, 2005). According to the FAO article on sustainable fisheries livelihood programme, the vulnerability looks on people's exposure to risks, the sensitivity of livelihood systems to risks and limited ability to cope with and adapt to risks (FAO). There, the vulnerability has been drawn to elaborate the relationship between poverty, risks and efforts to manage the risk. The general principle underline the vulnerability are, forward looking and it is the probability of a future loss compared to a benchmark of welfare (Heitzmann, *et al.* 2002). The vulnerability is caused by uncertainty and the severity based on the characteristics of the risk and the resilience of the household (Ligon and Schechter, 2003). Hence, the vulnerability of a household can be decomposed into several components as mentioned in the risk chain (fig. 2.3) (Rubio and Soloaga, 2004). According to this, the understanding of the risk chain occurring in one locality, livelihood or household is paramount in order to go for vulnerability reduction measures (Alwang, *et.al*, 2001).

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1.3.2 Risk, uncertainty, and shock

Risk is characterized by a known or unknown probability distribution of events (Heitzmann, *et al*. 2002). Albeit, few authors could pin point a difference between the terms, risks and uncertainty while other literature sources considers these as interchanging. As per the article of Heitzmann, *et al.* (2002), risks are uncertain events that would lead to a welfare loss in future. Risk fetch a formidable threat to poverty reduction effort (Battamishra and Barrrett, 2008).

Some examples of risks are; natural risk, economic risk, political risk, health risk, life cycle risk, social risk, and environmental risk. In fisheries, according to Amarasinghe (2003[a]), there are three types of specific risks can be noticed :

      1. risk of nature of fishery - this comprises with multiple causes; risk of damage or loss of craft/gear, risk of catch and income fluctuation, risk of life/ injury, illness/ disability, and risk of natural hazards.

      2. Low bargaining power in dealing due to powerlessness and social exclusion.

      3. Resource degradation

All these risky events are associated with shocks. Shocks are uncertain events that can cause significant negative impacts (Heitzmann, *et al.* 2002). The same authors define the negative impacts as risky events that can cause a 50 percent loss in welfare putting many households under the poverty line. In a case study carried out in Philippines (Agnes, *et al.* 2008) defines shocks as adverse impacts, result a loss of household income, reduction in consumption, loss of productive assets (Dercon, *et al*. 2005), and / or serious concern / anxiety about household welfare.

These shocks are two types. Idiosyncratic shocks (one household experience but not affect to neighbours) and covariate / collective shocks. Catch fluctuations, loss/damage of crafts/ gears, health/injury/ disability are few incidents of idiosyncratic shocks faced by fishers in Sri Lanka. Contrast, climate/ weather change, sea water condition, changes in fish migratory habits, natural disasters (tsunami, flood), epidemics are collective shocks.

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1.3.3 Fishery and the poverty

Regarding the Sri Lankan fisheries context, fishermen's consumptions/expenses are mainly based on their daily catch/harvest. They do not have a fixed income nor predictable earning. Moreover, the sea is not a calm and salubrious place of certainty forever. The far most sea is veiled with danger, isolation and life threat. Fishers' income are daily basis and primarily determined by their effort. On the other hand, the opportunity to involve in another income generation activity is hard to obtain. Contrast, farmers and other self employees can engage in many alternative income generating sources during the off seasons. This is hardly practiced among fishermen. In fact, the fisherman as an individual, always combats with many risks and shocks.

The prior studies and surveys reveal certain problems encountered by fishers on their livelihoods. Those can be categorized as; risky nature of fishery, low bargaining power in the market for their harvest, and biological(fish) resource degradation. It is not a doubt that all these are interlinked and inter – dependent. Consequently, their income generation would be affected. The risks appear in the fishery can be illustrated as ; risk of catch fluctuation – risk of zero catch, risk of damage or loss of craft / gear, risk of life, injuries, illnesses born by fishing, risk of the condition of sea, and natural hazards like tsunami. Low producer prices, problems with traditional fishing rights, and landing rights make fishers powerless and social exclusion. Over exploitation, usage of destructive and unauthorized gears, degradation of coastal habitat threat for the sustainability of the resources (Bay of Bengal news, 2004). It results in stock depletion and there by low income for small scale fishers. Occurrence of one of these problems prevent fishers from fishing. As the sole income generating activity for fishers, staying in land would gives them nothing. In this relation, fishing is a livelihood with a higher vulnerability veiled with poverty.

1.4 Problem statement

As discussed above, the small scale fishers are being hammered by idiosyncratic shocks as well as covariate shocks. Since, idiosyncratic shocks affect in individual/ household basis, are considered as most manageable shocks at community level (Dercon, 2001). Shocks directly affect on the household well being, where a slight negative impact considerably curtails the consumption expenses letting them to be vulnerable. In that connection, it is worthwhile to go for remedial issues that would be helpful to mitigate the chronic impacts of idiosyncratic shocks. But, the magnitude of each shock is questionable and not yet explored. If one can determine the importance of each idiosyncratic shock in their livelihood or in the household consumption, it is easier to formulate the risks / shocks mitigating measures and policies to bring fishermen above the poverty line.

According to the concept of 'sustainable livelihood' the fishermen *per se* might be resilience for the shocks (MRC,2006). In that connection, safety nets and community based arrangements are important. By establishing a proper community based risk sharing arrangements, the affected households can recover smoothly. No assessment has been done in the study area, in Hambantota District up to now. The absence of data and figures make the situation complex in the process of policy planning and implication. As a pre-requisite, proper identification and quantification is paramount. In fact, this study aims to assess those idiosyncratic shocks and coping strategies analyzing the mutual insurance as a common and easiest risk sharing tactic. Therefore, the objectives have been formulated as follows:

Objectives of the study

1. To analyze the income / expenditure patterns of small scale fishers in Southern Sri Lanka.
2. To identify the prevailing strategies to overcome the vulnerability in the community .
3. To assess the role of mutual insurance as a mechanism of risk sharing.

In order to achieve these objectives the following questions are tried to be answered.

- What types of risks and shocks prevailing in the small scale fishery in southern province, Sri Lanka?
- How often such shocks meet individuals / households?
- How do these shocks affect household consumption and expenditures?
- How do family members respond on such shocks?
- Does the impact of shocks differ between household?
- What are the strategies they use to overcome risks and shocks?
- What kinds of formal and informal groups and networks have they formed?
- How do those react for shocks met by individuals?

2.0 Literature Review

2.1 Introduction

Sri Lanka, the pearl of the Indian Ocean, is a developing country with an agriculture based economy. The island located to the south east of India between latitudes 5^0 55'- 9^0 51' north and longitudes $79^0$41'- 81^0 54' east, between the tropic of cancer and the equator. The island has a land area of 65610 km^2 (25000 $mile^2$). The country has a 1770 km long coastline and 27,800km^2 continental shelf area up to 120 m depth. From the declaration of the Exclusive Economic Zone (EEZ) in 1978, Sri Lanka has sovereign rights over 517,000 km^2 of ocean; which is around 7.8 times than the land area of the country (www.fao.org). Therefore, there is a high potential to develop the fisheries sector as a powerful component in the economy.
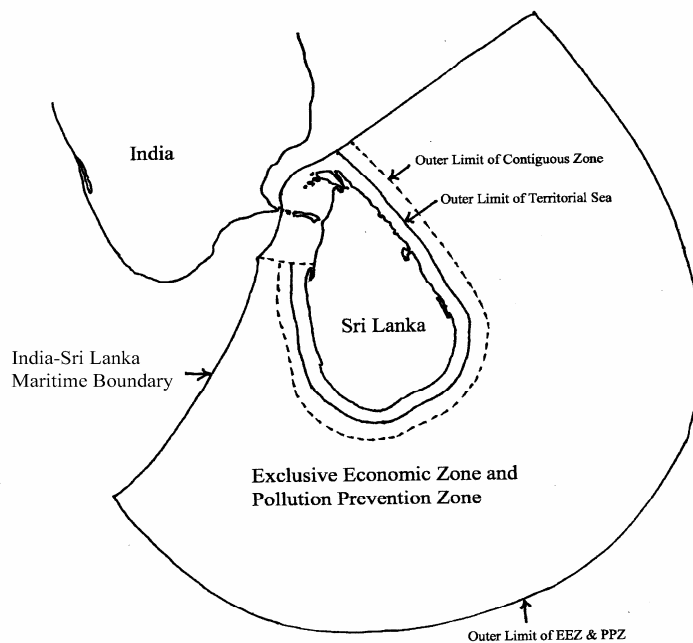
Figure 2.1. Exclusive Economic Zone – Sri Lanka

(Source : NARA, 2001)

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Being an island, Sri Lanka has only a limited cultivatable land of 62705 km^2 from the total 65610 km^2. It is an obstacle to increase the agricultural production under present condition of the rapidly increasing population. As an alternative, harvesting of aquatic resources is becoming more important (table 2.1). The fishery is one such resource where there exist possibilities for further exploration.

Table 2.1: Fisheries sector contribution to GNP

Year	GNP (LKR)	Agriculture sector		Fisheries sector	
		Value (LKR mn)	% Of GNP	Value (LKR mn)	% Of GNP
1999	976,899	205,599	21	25,838	2.6
2000	1,102,292	218,408	19.9	29,386	2.7
2001	1,227,754	242,532	20.1	31144	2.7
2002	1,379,113	287,840	20.5	34,421	2.7
2003	1,546,202	297,342	19	34,442	2.4
2004	1,777,253	320,201	17.9	33,812	2.3
2005	2,068,273	178, 475	17.2	21,577	1.0
2006	2,061,791	257,131	12.3	21,260	1.0
2007	2,208,137	265,586	11.9	24,576	1.1

(Source: Statistical unit of MFAR, 2007; Central Bank,2000…2007)

The fisheries sector has been categorized in to three sub sectors *viz;* marine fisheries, inland fisheries, and aquaculture (www.fao.org). The contribution of each sector to the national economy has shown in table 2.2.

Table 2.2: The contribution of different components to the total fish catch

YEAR	Coastal	off shore/ Deep sea	Total Marine	Inland	Total fish
1980	165264	2,148	167412	20,266	187678
1985	140270	2,400	142670	32,740	175410
1990	134120	11,670	145790	38,190	183980
1995	157500	60,000	217500	18,250	235750

2000	175280	88,400	263680	36,700	300380
2001	167530	87,360	254890	29,870	284760
2002	176250	98,510	274760	28,130	302890
2003	163850	90,830	254680	30,280	284960
2004	154470	98,720	253190	33,180	286370
2005	63690	66,710	130400	32,830	163230
2006	121360	94,620	215980	35,290	251270
2007	150110	102,560	252670	38,380	291050

Source: www.fisheries.gov.lk

The table 2.2 shows the importance of the marine fishery to the entire fisheries sector in Sri Lanka. Its contribution is higher in marine fisheries sector about 87 percent to the total fish production in year 2007 (www.fisheries.gov.lk). The marine fishery too can be divided into sub sectors as; coastal fishery and the deep sea fishery.

According to the table 2.1, it can be noticed that the deep sea fishery is increasing its production dramatically rather than the coastal fishery. The scenario can be justified as the availability of multi-day boats with ice cabins (table 2.3) and easy access to formal credit facilities (Central Bank, 2006). The sudden decline of the production in year 2005 reflects the tsunami devastation occurred as a collective shock for all fishers.

Table 2.3: Registered fishing fleets in Sri Lanka : 1990 - 2007

Year	Total Fishing Crafts	Inboard Engines		Out Board Engines		Traditional
		IMUL	IDAY	OFRP	MTRB	NTRB
1990	27,269	2,364	**	9,758	973	14,580
1995	27,491	1,639	1,357	8,564	1,060	14,649
1999	27,595	1,419	1,275	8,623	1,274	14,900
2000	27,149	1,430	1,170	8,690	1,205	15,100
2001	28,135	1,572	993	8,744	640	15,200
2002	29,694	1,614	1,112	9,033	776	15,600
2003	30,567	1,530	1,486	11,020	618	15,040
2004	29,901	1,581	1,493	11,559	674	15,260
2005	35,350	1,328	1,164	11,010	1,660	14,739
2006	37,040	2,394	907	13,860	1,842	16,347
2007	37,040	2,460	1,060	15,200	1,680	16,640

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Source: Source: www.fisheries.gov.lk

Though the Sri Lankan economy is agricultural based, the contribution of the agriculture sector to the total GNP is decreasing over time so as in the fisheries sector. But in volume wise the fisheries sector is ever increasing (table 2.1 and 2.2). Highest ever annual fish production of 291 million kg has been recorded in year 2007 depicting a 16 percent increment. This reflects a complete recovery of the fisheries sector from the tsunami devastation (Central Bank, 2007). There the marine and aquaculture and inland fisheries production has been increased by 17 percent and 9 percent respectively (Central Bank, 2007). In fact, now the fisheries sector contribution to the national GDP also started to increase assuring 0.1 percent increment from 2006 to 2007 (Central Bank, 2007).

2.2   Fishing population in Sri Lanka

Sri Lankan fisheries community has been divided into 143 Fisheries Inspector (FI) Divisions including 1,337 fishing villages. About 158,650 fishermen are in the fisheries sector from 139,400 fishing households. Hence, the fisheries sector substrates for about 664,819 populace from the 19.8 million of the total population in Sri Lanka (www.fisheries.gov.lk). The fishery ensures part time or full time employments and income generating activities in coastal households in fishing, fish marketing and fish processing. The labour force engaged in fisheries sector in Sri Lanka shown in the table 2.4 .

Table 2.4: labour force engaged in the fisheries sector

Labour	No. of people
Direct livelihood (full-time active fishermen)	173,090
Indirect or part-time livelihood	100,000
State employment	5,000
Private sector or self employment	400,000

(Source: Ministry of Fisheries and Aquatic Resources, 2005)

The fisheries sector contribute to the national economy by providing direct and indirect employment opportunities and facilitate 2.4 million fisheries and related livelihoods as a way of means (www.fisheries.gov.lk). The entire sector stimulates the growth of a cash based economy by contributing 1.5 percent to the national GDP (Central Bank, 2007).

The marine fisheries sector contributes the national economy significantly by fetching foreign exchange by means of exportations of fish and fisheries products. According to the year 2005 statistics of Export Development Board, Sri Lanka, the fisheries sector export earnings contribute by 1.7 percent to the national economy. In 2007 remarked 173 million USD fish export earnings resulting a 65 million USD fish trade balance to the country (www.fisheries.gov.lk).

2.3 Small scale fishery in Sri Lanka

The importance of the fisheries sector, especially the small scale fisheries sector in developing countries like Sri Lanka plays a great role for the national economy. It is a key contributor to the food security and poverty alleviation which is being drawn the attention at present (Nomura, 2007). The importance of this small scale fishery i.e focusing the subsistence level of the households are being addressed in the FAO code of conduct by the article no. 6.18 as *"Recognizing the important contributions of artisanal and small-scale fisheries to employment, income and food security, States should appropriately protect the rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access, where appropriate, to traditional fishing grounds and resources in the waters under their national jurisdiction."*

The fishing operations in this sector are limited to one-day trips up to a distance of 40 Nautical miles far from the shore (Amarasinghe, 2003). In fact, the small-scale fishery is almost all concentrated on the near shore area. Foreign equipment, modern / technically advanced inputs are minimal and the fishermen are hardly willing to accept such innovations; but they had developed techniques themselves (Amarasinghe, 2003[b]). The

income, production, productivity, and fishing methods are completely depending on the season, *i.e.* the seasonal variation is the driving factor of the fishery. Further, the small-scale fishery is enriched with a range of crafts - gear combinations and traditional fishing techniques (Table 2.5).

Table 2.5: Craft – gear combinations in small scale fishery in Sri Lanka

Craft	Gear
Beach seine craft (paru)	Beach seine
Small outrigger canoe	Rod and line
Both mechanized (small) and non – mechanized traditional crafts	Small – meshed gill nets, Hand lining, Bottom set long line
Traditional craft	Cast net
The 17 – 23 feet FRP boats	Multi hook trawling, Long lining for yellow fin (*Maruwel pannaya*), Large meshed gill netting
The 3.5 ton one day boats (28 – 32 feet craft with inboard engine)	Multi hook trawling, Long lining for yellow fin (*Maruwel pannaya*), Large meshed gill netting

 (Source: Amarasinghe, 2003).

2.4 Poverty and risk in the small - scale fishery

Poverty has been recognized as an ex-post measure of household well being. It is a stochastic phenomenon (Chaudhuri, 2003; Morduch, 1994). But, current poverty does not certain the future poverty and even can not be able to forecast the expected poverty level, too (Chaudhuri, 2003). Current state of deprivation, poor access to resources, and inability to satisfy basic needs are the reflections of poverty (Chaudhuri, 2003). In fact, poverty is the situation where the households come across low endowments, low returns for those endowments, and vulnerability to shocks (Baulch and Haddinott, 2000). It has now recognized that the vulnerability and risk as causative agents of poverty and distribution rather than dimensions of poverty (Dercon, 2001). Also, poverty and risk

have an equal negative impact on household welfare (Ligon and Schechter, 2003). Reduce vulnerability and marginalization are the key ways to overcome the poverty ensuring sustainable livelihoods in fishing dependent communities without putting additional pressure on the marine resources by exploiting excessively (FAO) as expressed in today's terms.

Marginalization, insecure property rights or lack of property rights to access the resources, dependence on natural but uncertain environment and the production systems, risky nature of the fishery make the small - scale fishers more vulnerable (Amarasinghe, 2003[a]). They are heavily exposed to risks and the entire livelihood filled with such risks and shocks. But, the homogeneous community unable to compromise such adverse impacts confronted by poor marginalized fishers.

Therefore, the risks, shocks, income fluctuations, seasonality, poverty traps and other parameters should be considered at household, individual, and community levels, especially in the developing countries like Sri Lanka. Further, it is much difficult to quantify such shocks appear as idiosyncratic and covariate and hitherto have not been done. But, a well addressed policies and governance is required to mitigate these negativity among the fisher folk and strengthen them to be resilience for any type of shocks and risks, which can call as sustainable. In that connection, the importance of quantitative data and research are highlighted for well focused policy issues and recommendations (Dercon, 2001). For policy purposes what really concerns is the ex - ante risks, where the individuals / households are vulnerable to be poor or to fall below the poverty line (Chaudhuri, 2003). The categories of risks are in table 2.6.

Table 2.6 : Categories of risks

Risk	Examples
Natural risk	Heavy rainfall, landslides, volcanic eruptions, earthquakes, floods, hurricanes, drought, strong wind, etc
Health risk	Illness, injury, accident, disability, epidemics, famine, etc
Life cycle risk	Birth, maternity, old – age, family break up, death, etc
Social risk	Crime, domestic violence, terrorism, gangs, war, social upheaval, etc.
Economic risk	Unemployment, harvest failure, business failure, resettlement, output collapse, balance of Payment shocks, financial crisis, currency crisis, technological or trade induce, terms of trade shock, etc.
Political risk	Discrimination, riots, political unrest, etc.
Environmental risk	Pollution, deforestation, land degradation, nuclear disaster, etc

Source: Rubio and Soloaga, 2004, based on Holzmann and Jorgensen, 2000.

According to the table 2.6, the natural risks appear as collective or covariate shocks where all the households in the community would get affected. Such risks are uncontrollable and assistance from outsiders are essential. Health risks except epidemics and famine would be born in individual basis that would affect in different severity based on the types of risk encountered. Life cycle risks are totally idiosyncratic where the family *per se* can find solutions. Social risks occur in both forms of idiosyncratic and covariate so as the economic risks. But, political and environment risks results covariate shocks (Dercon and Krishnan, 2000; Skoufias, 2003; Lybbert *et al*. 2004; Battamishra and Barrrett ,2008).

The abundance risks in the fisheries sector can be noted as; the unpredictable nature of the fishery, high occupational risk, dependence on the natural resources, sensitivity to macro economic changes, natural disasters like tsunami, typhoon, land-tenure issues, economic and political marginalization, etc (Nomura, 2007). In order to provide coping strategies this study attempts to find a way to meet those risks in individual basis. In that respect, focus on idiosyncratic shocks would be worthwhile.

2.4.1 Importance of idiosyncratic shocks – world evidence

There are number of evidences have been drawn by many empirical studies about the importance of idiosyncratic shocks in household income. Udry (1993) has shown that 42 percent of the variation in farm yield is mainly due to idiosyncratic shocks based on a survey data from rural Nigeria. The inferences from rural Thailand survey (Townsend, 1995) and rural Cote d'Ivoire survey(Deaton, 1997) find that the variation in household income changes cannot be solely explained by the common villages components, *i.e.* by the covariate shocks. Hence, those emphasize the impact of idiosyncratic shocks for poor, rural households are vital than any other shocks. The findings of Morduch (2005) strongly support this by revealing that 75 to 96 percent of the total variation of the logarithm of household income in ICRISAT villages in Southern India is idiosyncratic. Also, the importance of idiosyncratic shocks has been iterated as a shock, which dominates over the covariate shocks in rural Asia and Africa (Deaton, 1997; Kazianga and Udry, 2006; Lybbert *et al.* 2004; Morduch, 2004; Townsend, 1995; Udry, 1993; Battamishra and Barrrett, 2008). A panel survey carried out in South India reveals the importance of idiosyncratic shocks over the covariate risks and even above the risks of poverty for landless farmers. The largest share of 37 percent occupied by idiosyncratic shocks and poverty was only upto 35 percent. The rest 22 percent was corresponded to covariate shocks (Gaiha and Imai, 2006).

Further, the coping mechanisms of idiosyncratic shocks have been highlighted in certain studies. A successful full risk sharing mechanism had been adapted among the highest income decile in rural China (Jalan and Ravallion, 1999). Fafcamps and Lund, (2003) mentioned a mechanism of risk sharing via informal insurance in rural Philippines. This has reported the successfulness only in the cases of acutely ill young adults.

2.5 Coping mechanisms

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Coping mechanisms are the practices that can be adopted by households in deciding and selecting appropriate activities utilizing their assets and endowments (Bird and Prowse, 2008). Small scale fishery plays an important role in poverty alleviation, mainly in the streams of mitigating risks and vulnerability. Moreover, the fishing related coastal communities, especially in developing countries like Sri Lanka, Bangladesh, India demonstrate high levels of vulnerability that has to be addressed urgently (Nomura, 2007). Therefore, the coping strategies for vulnerability is becoming a burning issue at present. The coping strategies to overcome the individual vulnerability or the fragility relies on the capacity and ingenuity to response shocks (Bird and Prowse, 2008). Inversely, Deaton (1989) in Baulch and Haddinott, 2000, dictates shocks as the primary motivator for saving among poor households in developing countries. Thus, the communities *per se* tend to be in coping mechanisms along with the risk chain (fig 2.2).

Coping vulnerability involves not only the threat/ risk/ shock identification, but also the possibilities of resilience, resistance that can be settled with mobile and manageable assets and entitlements in the presence of negative effects of the changed environment (Moser, 1998). Households adopt a wide array of coping strategies that has been broadly categorized in to two viz; ex - ante risk management strategies and ex-post risk management strategies (Bird and Prowse, 2008; Battamishra and Barrrett ,2008).
.

2.5.1 Ex – ante risk management strategy

Ex – ante risk management strategies are the actions taken before a risky event. Such practices mainly focus on risk reduction, avoidance or lower exposure to risk. Risk mitigating tactics taken prior to the shock also comes under this. Household smooth their income for precautionary purposes.

2.5.2 Ex – post risk management strategies

The ex – post risk management strategies are the remedial measures taken place after its realization. Household smooth their consmption to cope up the shock. Mutual insurance mechanism under the ex – post risk management strategies is the most extensively practiced consumption smoothing mecahnism in developing countries (Battamishra and

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Barrrett ,2008). The profoundly using risk management strategies are given by the table 2.7.

Table 2.7: Ex-ante and Ex-post risk management strategies

Ex – ante risk management strategy	Ex – post risk management strategies
Activity diversification	Selling assets
Accumulation of assets	Removing children from school
. Technologi diversification	Migration
Patron-client relations	Seeking temporary employment
Formal insurance	Reciprocal giving
Self insurance	Credit
Building networks	Reducing consumption

Even though , the risk management steategies divide in to two as above, the most effective strategies can be built by combining the two (Gaiha and Imai, 2006).

2.5.3 Community based arrangements

The community based arrangements are becoming importance and growing recognition in social protection policies pertaining to risk management and poverty reduction. Hence, policy makers, practitioners, and researchers are much more interest on informal or semi informal arrangements (Battamishra and Barrrett, 2008). The community based arrangement has been defined in Battamishra and Barrrett, 2008 as systems arranged by social groups of individuals either indigenously developed or executed by members of the groups themselves.

What is a community ?

The agents in a community have an informal and non-market characters. People in the community possess related and linked lineage, ethnicity, religion, occupation, historical ties, proximate residence, etc. Common motivation for risks and strategies, which are explicitly informally coordinated can be noticed in a community (Battamishra and Barrrett, 2008).

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Informal and semi – informal arrangements perform similar characteristics. Both are based on interpersonal relations between members and live in close geographical proximity. Infact, the information and transaction costs are considerably low. Since, the members are relatives or closely related, the economic status (wealth, income, realization of shocks) are easily observable making the decision making process much more easy.

Table 2.8: Comparison between informal and semi – informal arrangements

Informal arrangements	Semi – informal arrangements
Transfers to beneficiary households typically take place ex-post; i.e. after realization of a shock Premiums and coverage are not well defined State – contingent and implicit Embedded in the cost establishing and maintaining social ties Characterized by simple transactions Rarely have any requirements for accounts and financial management skills Scalability is limited by the capacity of individuals to track transactions informally	Transfers often take place: ex-ante(akin premiums to pay under formal insurance contract; ex-post (akin to claims in formal insurance)
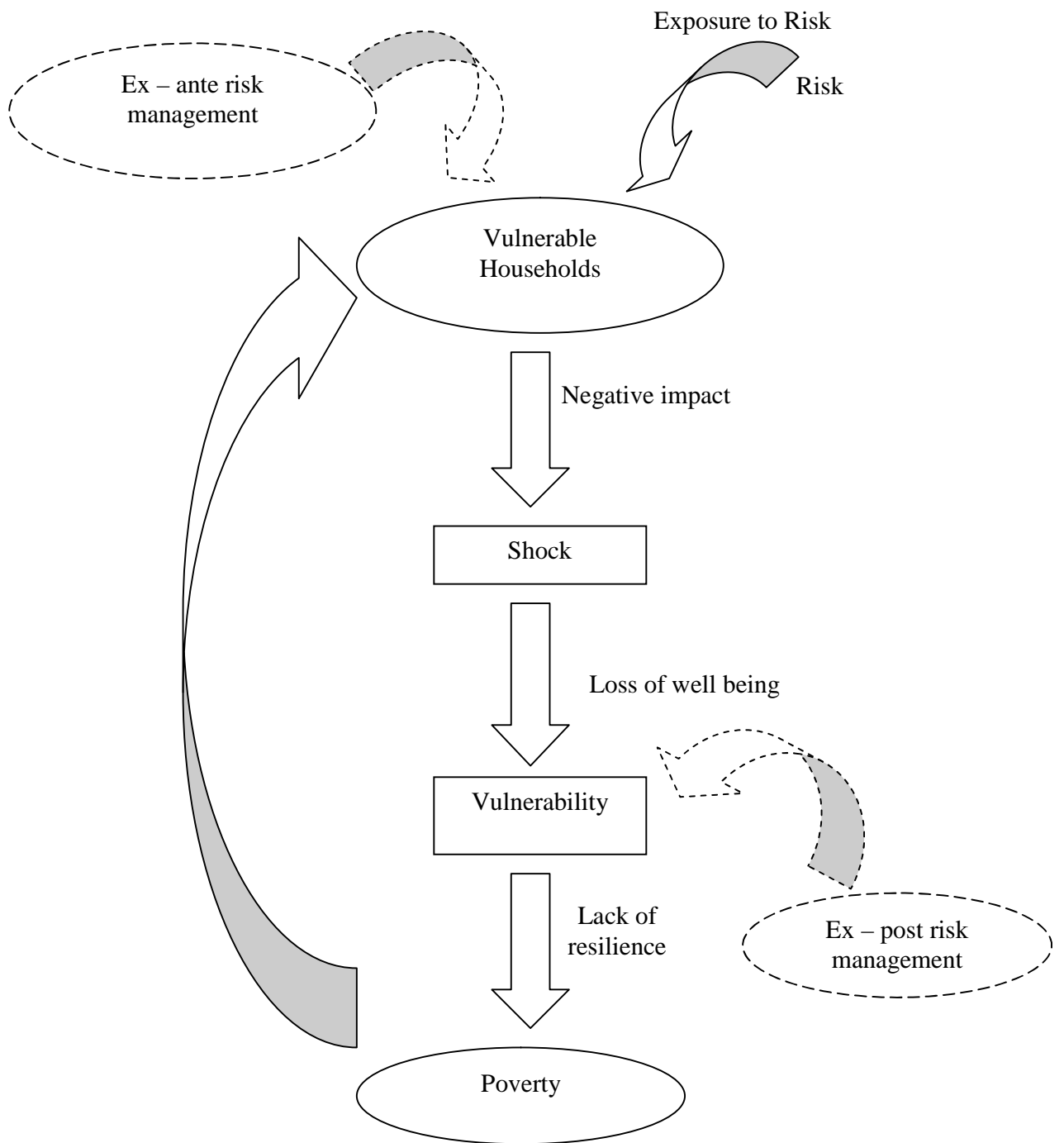
Fig 2.2 : Risk chain
(source : Heitzmann, *et al.* 2002– modified by Koralagama, DN)

3.0 Methodology

3.1 Area selection

The study was conducted in Hambantota District, located in the Southern of Sri Lanka with a 151 km littoral. Hambantota District was selected mainly due to the following reasons. The district is responsible for 27.8 percent of poverty, which is the highest in Southern Province and seriously below than the national poverty of 22.7 percent (Dept. of census and Statistics, 2007). The district bears 525,000 population of whom 89 percent lives in rural areas. The average per capita monthly income is around 40 USD when the people in the capital (Colombo) are enjoying an average per capita income of 111 USD per month (Dept. of census and Statistics, 2007). Hence, Hambantota district comes to the third place among the poorest districts in Sri Lanka. Moreover, they receive the highest percentage of government relief packages viz; food stamps, Samurdhi benefits.

On the other hand, the coastal zone in Hambantota is enriched with a wider variety of coastal habitats than the other districts in Southern Province, Galle and Matara (Table 3.1).

Table 3.1 : Extent (ha) of Coastal Habitats in the Districts of Southern province

District	Mangroves	Salt Marshes	Dunes	Beaches, Barrier Beaches, Spits	Lagoons, Basin Estuaries	Other Water Bodies	Marshes
Galle	187	185	-	485	1144	783	561
Matara	6	-	-	191	-	234	80
Hambantota	539	318	444	1099	4488	1526	200
SOUTHERN PROVINCE	**732**	**503**	**444**	**1775**	**5632**	**2543**	**841**

 The Coastal Zone Management Plan of Sri Lanka (CCD, 2003)

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In that respect, Hambantota district bears a very good potential pertaining to fisheries over the three sectors *viz* marine, brackish water, and inland. Of that, the marine fisheries play a vital role rather than brackish water and inland fisheries. Infact, the marine fisheries in Hambantota district attracts much more attention as a livelihood practice. Hambantota district has been divided into ten Fisheries Inspector areas aggregating 79 fishing villages(Table 3.2).

Table 3.2: Fishing Villages and Fishing Population in the Hambantota District

FI Division	villages	Fishing households	Fishers population	Active fishers
Kirinda	13	950	4400	1200
Sisilasagama		875	1830	1100
Welipatanvila		256	957	302
Hambantota		950	4500	1200
Kalamatiya	**11**	**348**	**1432**	**589**
Tangalle	10	860	3450	430
Pallemalala		223	923	270
Unakooruwa	4	290	980	315
Kudawella	5	1007	5400	1800
Mawella	5	283	1206	323
Kahandamodara	4	149	692	189
Rekawa	**6**	**358**	**1563**	**589**
Total		7842	27333	8707

(Fisheries district office, 2007)

The study was planned in Hambantota district aiming two main FI divisions; Kalamatiya and Rekawa. Since the funding project aimed on these FI divisions, which were selected as most appropriate with the objectives of the project, the same localities were considered here, too.
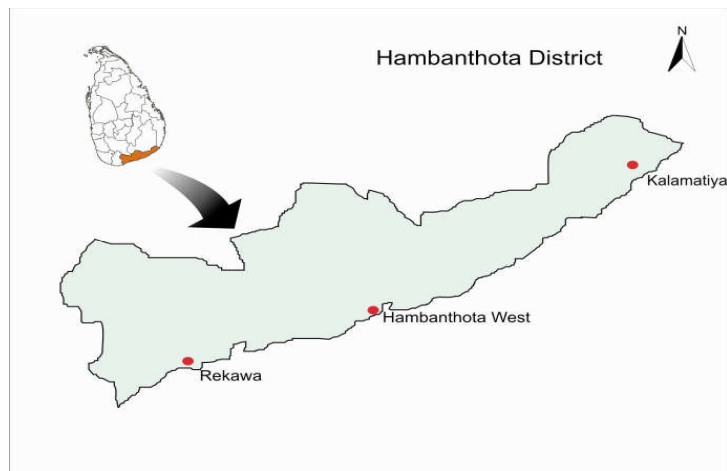
Fig 3.1. The study area – Hambantota District, Sri Lanka

3.2 Sample selection

Fifty households were selected from Rekawa and Kalamatiya (25 from each site) including owners of traditional crafts (NMRT), owners of small mechanized boats (FRP) with out board motors (OBM), and crew labours. Stratified random sampling technique was used to select the sample units taking the list obtained from Fisheries Inspector(FI) for each FI division as the sampling frame.

3.3 Data collection

Both primary and secondary data are paramount to conduct a successful study. In fact, this study was supported by both primary and secondary data.

3.3.1. Primary data

The study was designed to use both panel data as well as cross sectional data. Hence, the panel data on income and expenditure of fishing households were collected daily basis over a period of 6 months from July to December, 2008. The cross sectional data were gathered in February, 2009 by means of a pre – tested, structred questionnaire survey

(Appendices 1 and 2). It was conducted to obtain socio – economic status, activity pattern, personal views, etc of the sample. Other than that, informal discussions and field observations were employed. Discussions were carried out with, fishers, fishing communities' leaders, members/ officers of related associations, and FI in order to enrich the awareness and to be thorough with the scenario. Further, certain cross checking and additional information were gathered by means of Participatory Rural Appraisal sessions carried out in the study areas.

3.3.2 Secondary data

The study was well supported with secondary data sources such as; previous reports, especially unpublished thesis and researches carried out in the area , and tsunami reports.

3.3 Data analysis

The daily basis data were summarized into weekly for the convince. The relationship between income and expenses of the three categories were investigated using regression models. The qualitative data were analyzed using non parametric tests (Chi Square, Kruskal - Wallis). The SPSS soft wear was demonstrated for the analysis.

4.0 Results

4.1 Fluctuation of expenses with fishing income
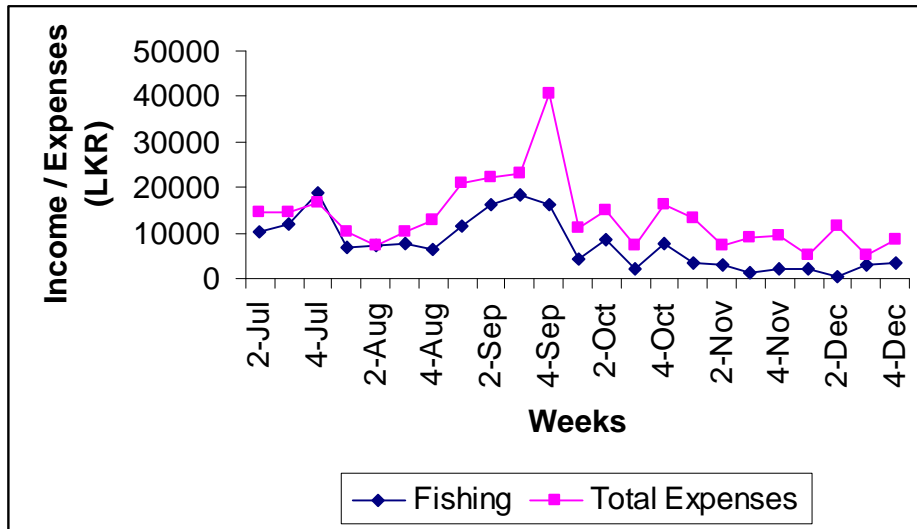
Fig 4.1: Weekly fishing income / total expenditure of FRP owners
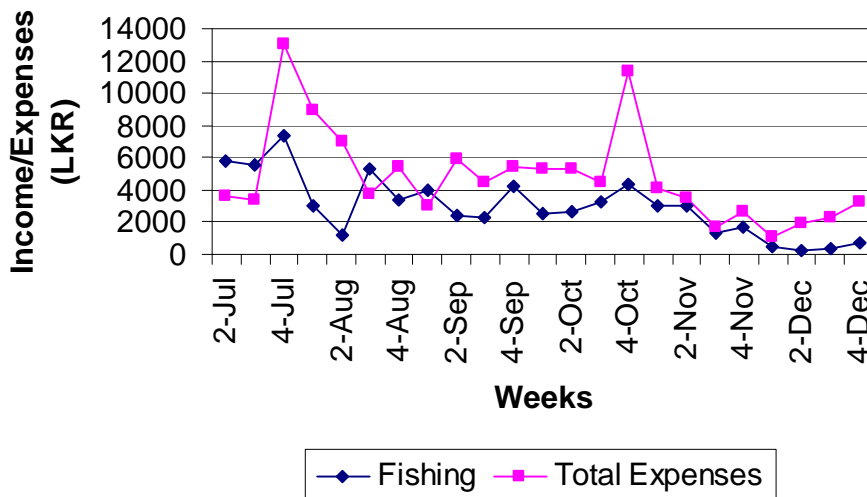
Fig 4.2 : Weekly fishing income / total expenditure of NMRT owners

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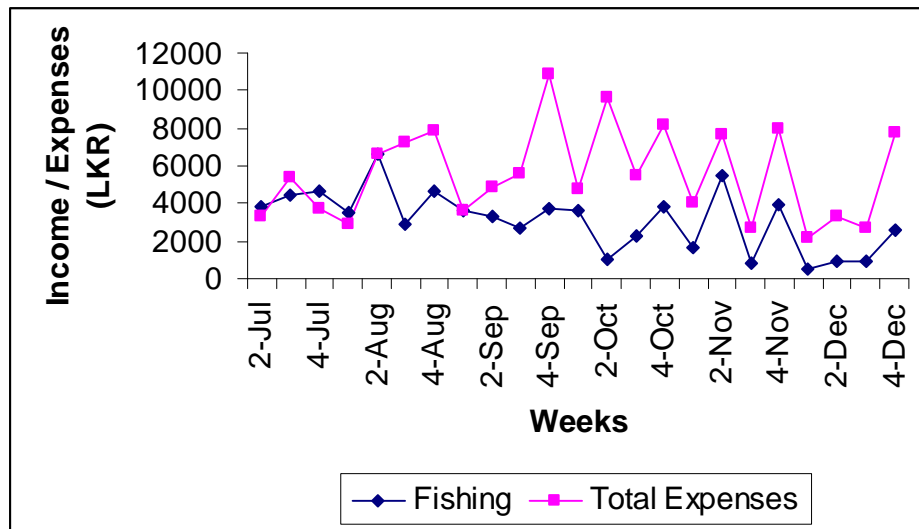
Fig 4.3: Weekly fishing income / total expenditure of Crew members

4.2 Relationship between fishing income and total expenditure

Correlations

Correlations

		FISHING	EXPENSES
FISHING	Pearson Correlation	1.000	.792**
	Sig. (2-tailed)	.	.000
	N	69	69
EXPENSES	Pearson Correlation	.792**	1.000
	Sig. (2-tailed)	.000	.
	N	69	69

**. Correlation is significant at the 0.01 level (2-tailed).

4.3 Income / expenditure differences based on the season – Warakan and Haraya

4.3.1 Income / expenditure differences based on the season – FRP owners

Independent Samples Test

| | Levene's Test for Equality of Variance | | t-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
FISHING Equal variance assumed	6.785	.017	5.457	21	.000	8471.70	1552.47	5243.16	700.23
Equal variance not assumed			5.317	14.788	.000	8471.70	1593.45	5071.08	872.31
TOTEXP Equal variance assumed	4.011	.058	2.668	21	.014	7689.43	2881.73	696.56	8682.31
Equal variance not assumed			2.581	12.843	.023	7689.43	2979.16	245.36	4133.50

4.3.2 Income / expenditure differences based on the season – NMRT owners

Independent Samples Test

| | Levene's Test for Equality of Variance | | t-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
FISHING Equal variance assumed	6.785	.017	5.457	21	.000	8471.70	1552.47	5243.16	700.23
Equal variance not assumed			5.317	14.788	.000	8471.70	1593.45	5071.08	872.31
TOTEXP Equal variance assumed	4.011	.058	2.668	21	.014	7689.43	2881.73	696.56	8682.31
Equal variance not assumed			2.581	12.843	.023	7689.43	2979.16	245.36	4133.50

4.3.3 Income / expenditure differences based on the season – Crew members

Independent Samples Test

		Levene's Test for Equality of Variance		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
FISHING	Equal variances assumed	2.734	.113	2.944	21	.008	684.90	572.33	494.68	875.12
	Equal variances not assumed			2.992	19.611	.007	684.90	563.23	508.54	861.27
TOTEXP	Equal variances assumed	.685	.417	.112	21	.912	116.80	046.03	058.53	292.14
	Equal variances not assumed			.112	20.999	.912	116.80	041.97	050.09	283.70

4.4 Regression Models

4.4.1 Model for FRP owners

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3217.956	1984.988		1.621	.120
	DRAWING	2.467	.408	.797	6.052	.000
2	(Constant)	2173.445	1620.201		1.341	.195
	DRAWING	2.407	.328	.778	7.349	.000
	GIFT	69.087	19.466	.376	3.549	.002
3	(Constant)	3088.956	1505.038		2.052	.054
	DRAWING	1.923	.357	.622	5.392	.000
	GIFT	64.566	17.593	.351	3.670	.002
	LOANCOOP	4.579	1.907	.278	2.401	.027
4	(Constant)	2985.911	1278.284		2.336	.031
	DRAWING	1.096	.417	.354	2.632	.017
	GIFT	39.415	17.285	.214	2.280	.035
	LOANCOOP	5.905	1.683	.359	3.510	.003
	FISHING	.494	.171	.358	2.891	.010
5	(Constant)	2761.510	1009.737		2.735	.014
	DRAWING	.809	.339	.261	2.388	.029
	GIFT	39.107	13.626	.213	2.870	.011
	LOANCOOP	7.239	1.381	.440	5.241	.000
	FISHING	.560	.136	.405	4.116	.001
	BANKLOAN	1.507	.436	.231	3.459	.003

a. Dependent Variable: TOTEXPEN

* For the entire analysis see the appendices

4.4.2 Model for NMRT owners

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2817.774	795.504		3.542	.002
	DRAWING	1.660	.508	.580	3.267	.004
2	(Constant)	239.780	880.159		.272	.788
	DRAWING	1.703	.387	.595	4.402	.000
	FISHING	.854	.212	.546	4.034	.001

a. Dependent Variable: TOTEXPEN

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*   For the entire analysis see the appendices

4.5 Idiosyncratic shock analysis

Ranks

	VAR	N	Mean Rank
VAL	1	25	36.66
	2	25	72.24
	3	25	104.60
	4	25	44.54
	5	25	125.68
	6	25	157.90
	7	25	170.96
	8	25	91.42
	Total	200	

Test Statistics[a,b]

	VAL
Chi-Square	128.866
df	7
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: VAR

4.6 Ex – ante Coping strategies

4.6.1 Formal Institutes
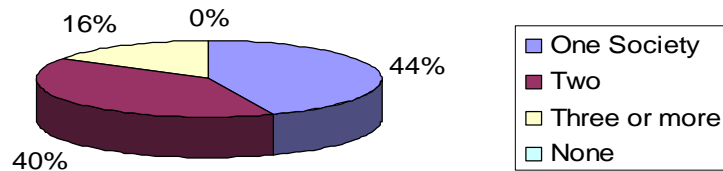
Fig 4.4: Membership holders in Community Based Organizations

4.6.2 Accumulation of wealth

☒ Threewheel	☒ Motorbicycle
☐ Television	▥ Refregirators
▨ Mobile phones	☒ Other electrical goods (At least one)
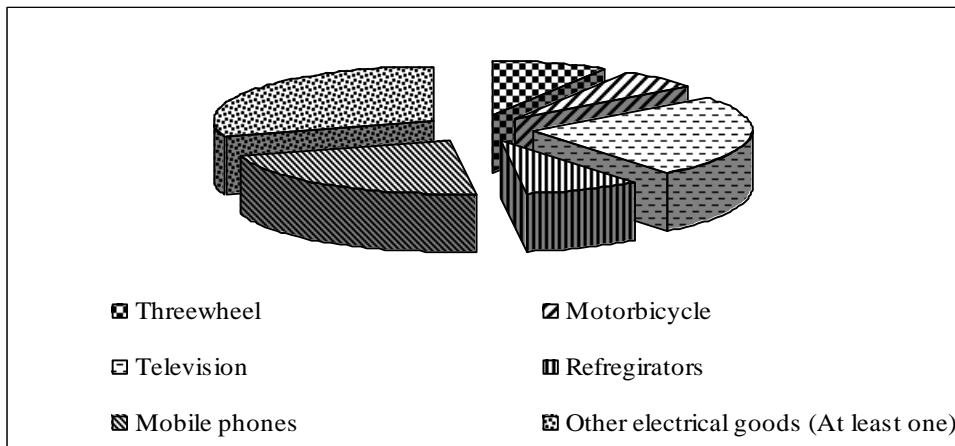
Fig 4.5 : Accumulation of wealth

4.6.3 Activity diversification
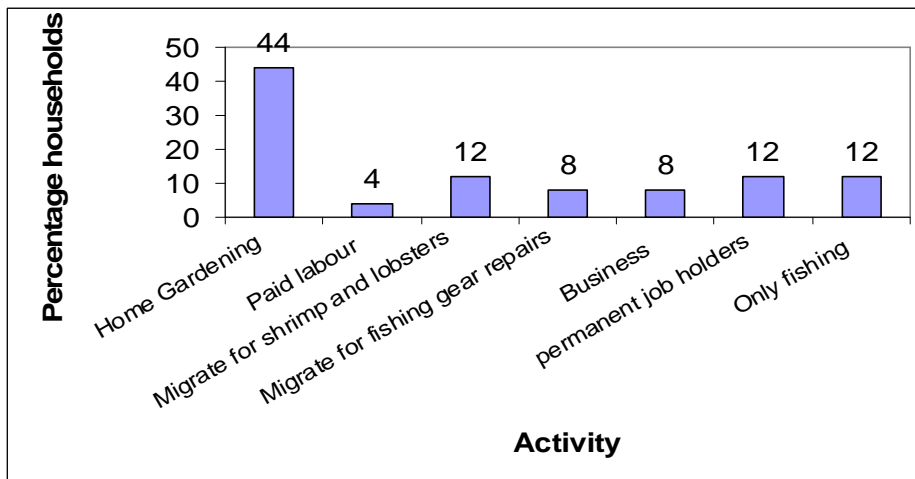
Fig 4.6 : Activity diversification among fishing households

4.6.4 Savings
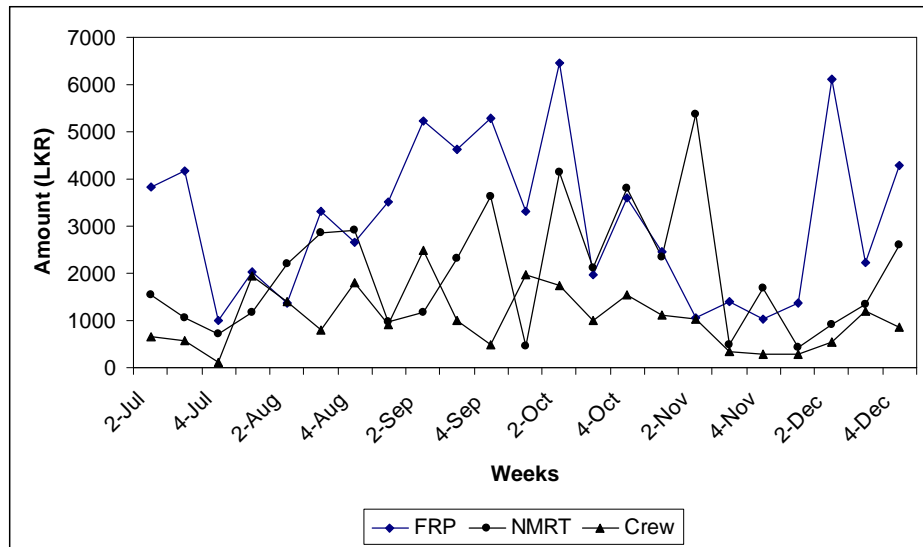
Fig 4.7: Savings among small scale fishers

4.7 Ex – post coping strategies

Ranks

	VAR	N	Mean Rank
VAL	1	25	43.00
	2	25	24.00
	3	25	92.00
	4	25	128.00
	5	25	101.00
	6	25	65.00
	Total	150	

Test Statistics[a,b]

	VAL
Chi-Square	102.137
df	5
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: VAR

4.8 Mutual Insurance

Ranks

	VAR	N	Mean Rank
VAL	1	25	102.00
	2	25	158.00
	3	25	28.00
	4	25	100.00
	5	25	36.00
	6	25	73.00
	7	25	119.00
	Total	175	

Test Statistics[a,b]

	VAL
Chi-Square	126.573
df	6
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: VAR

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5.0 Discussion

This chapter would touch several facets in the fishing livelihoods of the small scale fishers. First, the basic socio-economic background of the surveyed households would be elaborated. Second, the attention would pay on income and expenditure status of the fishing households pertaining to the groups. At last, the existing risks and shocks confronted by the fishers would be focused together with ex-ante and ex-post coping strategies that can be adopted in the small scale fishing communities in Southern Sri Lanka.

5.1 Socio – Economic background of the sample
5.1.1 Annual fishing activity pattern

The annual fishing activity in small scale-fishery determined by a seasonal factor, which is in-line with monsoon rainfall pattern of the country *viz* South-west monsoon- May to September and North-east monsoon – December to January. In that connection, the fishing season commence with the onset of South-west monsoon in May and lasts until October. This period is called as "warakan" where the sea is rough, stormy and aggressive. The off - season called "haraya" is the period of North-east monsoon. The sea is calm and quiet making a salubrious environment for fishers. Albeit, the condition of the sea vary as above, the fish catch shows a reciprocal behavior. *i.e.* fishers can enjoy a big quantity of harvest with high value fish varieties during the *warakan* season, and *vice versa.*

Normally, in the warakan season, the gambling sea waves permit only the OFRP boats for fishing. Mostly, the gill nets, long lines, single and multi hook trawling, bottom set long lines are laid for skip jack tuna, sail fish, narrow barred Spanish mackerel, etc. These fish varieties attract high prices touching the middle and high income earning market segment in the society. Moreover, a well established export market is existing

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with a high volume of international demand (MFAR, 2006). Therefore, the mechanized craft fishers (FRP owners) can enjoy a higher income during the warakan season.

Contrast, haraya comes with a serene sea where all types of fishing crafts and gears can be employed. In that respect, oru, traditional mechanized fishing crafts, traditional non-mechanized fishing crafts, OFRP occupying in fishery with hooks and lines, gill nets, baited traps, beach seine, etc. But, the catch is comparatively low in quantity as well as in value. The abundant fish varieties are; splendid pony fish, big-eyed scad, white sardinella, bony flying fish, Indian scad, spotted sardinella, ribbon fish, anchovy, etc. These fish are just for the domestic market, and consumed by middle and lower income classes. Therefore, the fishing income during haraya is somewhat lower than in warakan. This has been shown clearly in the fishing income analysis comes later on this chapter. The summery about the fishing activity in two seasons are given in the next page.

Apart from this, some fishers are fishing for lobsters. As per the statutory, the lobster harvesting is prohibited in February and September months being the spawning seasons. Unless that issue, lobster fishery is lucrative throughout the year.

| April | May | June | July | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar |

Warakan (Season)
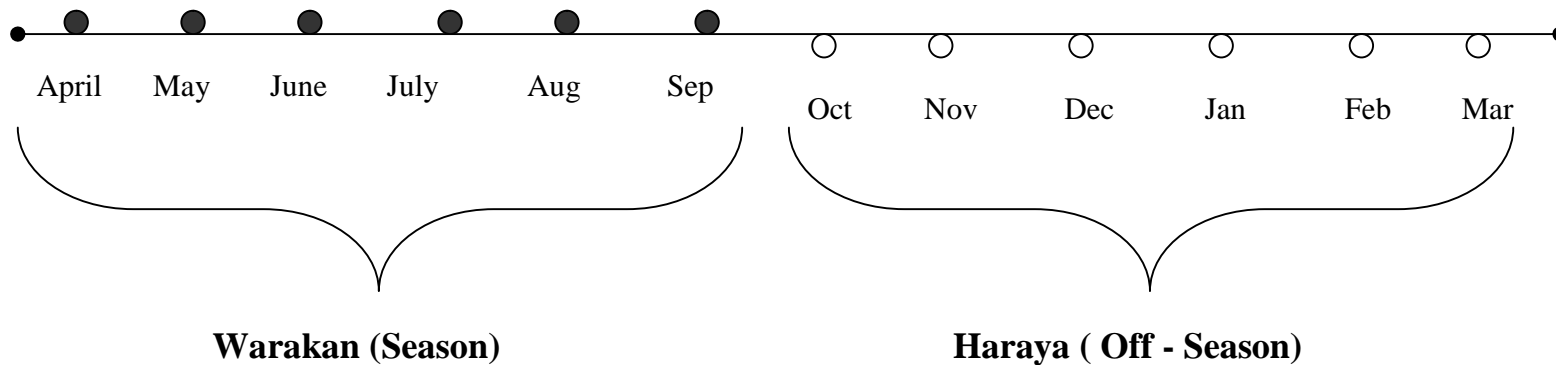
- South-west monsoon period
- Crafts – FRP, large and small Mechanized boats
- Gears – 5", 3.5", 4.75" gill nets, single and multi hook trawling, long line, bottom set long line
- Catch composition – spotted sardinella (*Amyblygaster sp*), frigate tuna (*Auxis thazard*), Skip jack tuna (*Katsuwonus pelagis*) and yellow fin tuna (*Thunnus albacares*), Spanish Mackeral (*Scombcromorous commersoni*), (*Acanthocybium solandri*), Sail fish (*Histioporus orienttalis*),

* Lobsters are harvested through out the year except February and September.

Haraya (Off - Season)

- North – east monsoon period
- Crafts – FRP, NMRT, mechanized crafts, traditional crafts
- Gears – Hooks and lines, gill nets, cast net, beach seine, pole and line
- Catch composition - rock fish (*Lithrinus sp.*), ribbon fish (*Trichiurus savala*), (*Sardinella melanura*), white sardinella (*S. albella*), spotted sardinella (*Amyblygaster sp*), (*S.longiceps*), splendid pony fish (*Leognathus sp.*), (*Chirocentrus dorab*), anchovy (*Anchova commersoni*) and bony flying fish (*Hirundichthuys coromandelensis*).
- Shrimps (*Penaeous sp*)

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5.1.2. Income sharing
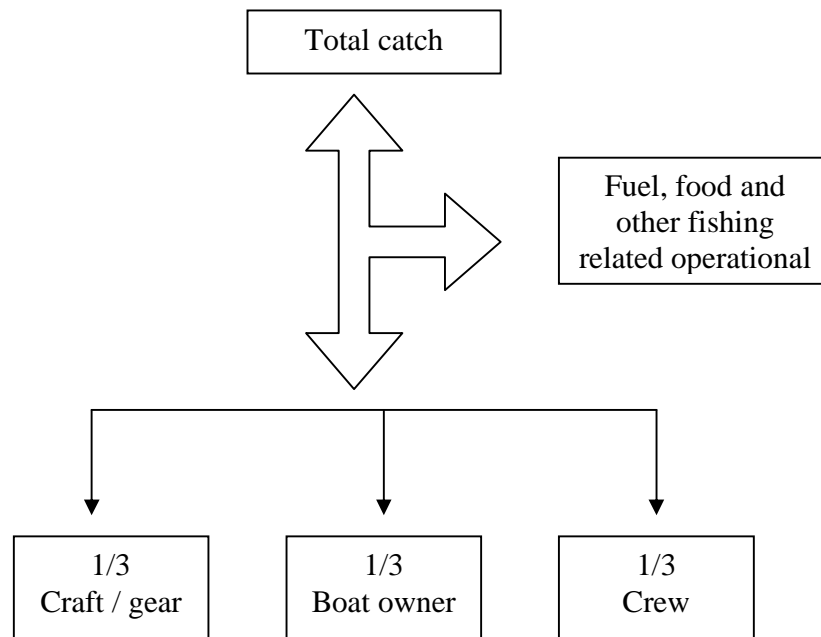
Fig 5.1 : Income sharing among fishers

The income sharing among the boat owners and the crews is somewhat a tenure agreement. First, they compensate their operational expenses, *i.e* for fuel, foods and beverages used on fishing trip. Then, the remaining amount would be equally allocated for the boat owner, craft/ gear, and for the crew. Accordingly, the boat owner having gears would receive 2/3 of the income excluding the operational expenses born by him. Normally, two crew are engaging in small scale fishery. One might be the boat owner. The other one is the crew member, who might be a close relative of the boat owner, such as a brother, brother – in – law, cousin, etc. In general, the fishing income for the boat owner is higher than the crew. This has been proven by the table 5.1 where the average fishing income is twice for FRP owner than the crew member.

5.2 Income – Expenditure status of fishing households

The income-expenditure status of three groups of fishers are completely different from each other. There's no doubt that their expenses are highly related with fishing income. The contribution of the fishing income to the total expenses was detected by Pearson correlation. The result shows 79.2 percent of correlation between fishing income and the total expenses. The value is significant at 0.05 level. This reveals that the total expenses of fishing households can be explained by the

fishing income solely up to 79.2 percent based on the 95 percent significance level. In other words, the fishing income determined the level of expenses up to 79.2 percent among small scale fishers in Southern province of Sri Lanka. The rest 21 percent would be on other sources of cash inflows including borrowings. Therefore, the fishing income is the dominating factor on their livelihoods. This also proven by the fig 4.1, 4.2, and 4.3, where their expenses fluctuate in-line with the fishing income within fishing groups of FRP, NMRT, and crew members. The unpredictable fluctuation and the zero income would drag them into vulnerability or so-called poverty traps. This types of unpredictable income and expenditure needs are features of households in developing countries (Dercon and Weerdt, 2006). In relation, it is worthwhile to strengthen their fishing income while seeking for the safe guarding measures to be resilient for income fluctuations.

5.2.1 Impact of the season on fishing groups

Fishing income heavily depends on the seasonal factors; wind, rainfall, monsoon, etc. The tested hypothesis are :

H_0 : There is no difference of income and expenditure over the seasons

H_1 : There is a difference of income and expenditure over the seasons

The test was carried out in group wise; FRP owners, NMRT owners, and crew members.

The test statistics carried out for the FRP owners reject the null hypothesis accepting the alternative hypothesis (H_1). It means, there is a significant difference for both fishing income and total expenditure according to the season (see the annex 3 and 4 for the interpretation).

On the other hand, both NMRT owners and Crew members are showing similar results. In both groups, the H_0 was rejected for the fishing income. That means the fishing income fluctuates or vary depending on the season; *warakan* or *haraya*. A clear impact of the season can be noticed. But, the level of total expenses do not vary with the season. It is in the acceptance region. So, the H_0 is accepted denoting that there is no difference of total expenses with the season.

Since, NMRT owners and crew members are low income earners (table 5.1), we can assume that; they are surviving at the subsistence level without enjoying a comfortable life. Though their fishing income comes down, they survive on other sources of cash inflows, may be on loans, drawings, etc to cover up their expenses.

The average weekly cash inflows and cash out flows of three categories are shown in table 5.1.

Table 5.1: Average weekly income – expenses of small scale fishers in Southern Sri Lanka

Fisher category	Average weekly fishing income (LKR)		Average weekly Total cash inflow (LKR)		Average weekly consumption expenses (LKR)		Average weekly total cash outflow (LKR)	
	Warakan	Haraya	Warakan	Haraya	Warakan	Haraya	Warakan	Haraya
FRP	8000 - 18000	2000 - 8000	10000 - 20000	5000 - 15000	4000 - 10000	2000 - 7000	10000 - 14000	6000 - 10000
NMRT	2000 - 4000	500 - 2500	4000 - 6000	1000 - 3000	1500 - 3700	1200 - 3800	4000 - 5000	2000 - 4000
Crew	3000 - 5000	1000 - 4000	5000 - 8000	2000 - 5000	1500 - 3500	1000 - 3000	4000 - 6000	2000 - 5000

Source : Survey data, July 2008 – Dec 2008.

The above table 5.1 shows the seasonal variation of fishing income, total cash-inflow, consumption, and total cash outflows over the three categories of small – scale fishers. The expenditure born from transaction motives such as food, non- food items, medicines, traveling, and other day-to-day transactive expenses were considered to calculate the consumption expenses. The following remarks could be drawn from the given values.

➢ FRP owners show a significant variation for fishing income and total income along the two seasons where the income are considerably higher in warakan and lower in haraya. But, the consumption expenses do not vary with the season. It remains unchanged at the subsistence level. Contrast, the cash outflows show a significant difference against the season. Therefore, the additional earnings would accumulate as savings, lending, and so on.

➢ Both fishing income variation as well as total cash inflow variation reflected in the NMRT group along the two season. But, the consumption expenses remain unchanged so as the

total cash out flows. Though the warakan is not fit for fishing, the NMRT owners can usher in a high income compared to haraya due to the high priced fish varieties.

➢ The crew too exhibits the same behavioural pattern. Their fishing income and total cash inflows vary with the season by a remarkable amount. But, the consumption expenses and the total cash out flows are slightly change over the two season.

Such conclusion gives certain hints about the level of vulnerability of fishing members. The FRP owners may possess a decent life assuring a higher income level than the NMRT and Crew. Hence, they are less vulnerable to being poor. On the other hand, the NMRT owners and crew live at a subsistence level, marginally fulfilling their day-to-day consumption requirements. Therefore, such groups are said to be vulnerable and easily get into poverty traps. The resilience for shocks would be zero for them. The same can be supported by the figure 4.7 where FRP owners have higher savings than other two groups. All theses facts annotate high possibility to been in poverty traps and vulnerability for NMRT owners and crew with lesser ability to be resilient for negative shocks that can be occured time to time in different severity.

5.2. 2 Income – Expenditure models

Since, the income / expenditures are not affected by the seasonal factors, a simple linear regressions for NMRT owners and crew were carried out. But, the FRP owners perform a significant expenditure variation and fishing income variation with the season. Therefore, a dummy variable on the seasonal factor was inserted to quantify the impact to the total expenditure. The dummy variable is denoted as 1 for the season and 0 for the off-season.

The given models are as follows.

5.2.2.1 Income – Expenditure model for FRP owners

When applied the linear regression command in SPSS, the model was;

For warakan (season)

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \ldots \ldots b_nX_n + dD + (b_4 + d) X_4D + e$$

For haraya (off-season)

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3\ldots\ldots b_nX_n + e$$

Where Y = total Expenses b_0, b_1, b_2...b_n are the corresponding co-efficient, X_1, X_2, X_3..X_n are the variables ; drawings, gifts, co-operatives, fishing income, bank loan, loan from friends, fixed assets income, and so on. D represents the dummy variable for the seasonality. X_4D is the interaction of fishing income and the season and e is the error term.

$$Y = 2762 + 0.809\ X_1 + 39.107X_2 + 7.239X_3 + 0.56X_4 + 1.507\ X_5$$

Y = Total Expenditure

X_1 = Drawings

X_2 = Gifts

X_3 = Co-operatives

X_4 = Fishing income

X_5 = Bank Loan

Adjusted R^2 = 0.911 = 91.1 %

According to the step-wise model construction based on the SPSS linear regression, the output presented five models. Of that, the fifth model was selected, which has the smallest standard error but the highest adjusted R^2 of 91 percent. It says, the model can be explained the total expenses of the FRP owners up to 91 percent. Only 9 percent are due to the random effects. This denotes a very powerful model, which fits for the real situation without any argument. The model shows five variables which are mostly affected on the total expenses of the FRP households *viz*; drawings, gifts, co-operatives, fishing income, and bank loans. The model is significant at 5 percent confidence level where the F – statistics has been significant for the model proving its acceptability.

The model explains; if all the income sources are unavailable, *i.e* at zero income level, the households incur an expense worth 2762 LKR weekly. If all the income sources remain constant except drawings, one unit increment of drawings would increase the expenditure by 0.809 units.

Same for gifts, where the expenses would increase by 39.107 units at *ceteris paribus* level and so on for the other variables, too.

Both income sources of fishing and drawings show a strong positive relationship of 75.6 percent and 79.7 percent to the total expenditure respectively. But the correlation between drawings and fishing income is 64 percent. It means, if the fishing is possible, the tendency for drawings is less. The seasonal factor is unimportant for the FRP owners. It was inserted to the model as a dummy variable of 1 and 0. But, it was accounted for non of the models. In fact, no matter it is *warakan* or *haraya*, the FRP owners' expenses are significantly depend on the above income sources.

5.2.2.2 Income – expenditure model for NMRT owners

The given model was :

$$Y = 239.8 + 1.7 X_1 + 0.854 X_2$$

X_1 = Drawings X_2 = fishing income

The F- test is significant at 5 percent confidence interval. The model can explain the income sources for the total expenses of NMRT owners up to 63 percent using the given parameters and the variables, having an adjusted R^2 of 63 percent. In that connection, it is difficult to satisfy with the given model pertaining to the income and expenditure data of the households. The model would have a different form other than a linear relationship, which is yet to be explored. Further, when we look at the two models given by the SPSS (see annex); the constant has been non significant for the second model after extracting a variable of fishing income. For the first model, the constant is highly significant having a large value. By this we can infer, that the influence of fishing income solely shown by the model 1 as the constant. Though the constant is not significant for the model 2, it would be included considering its significant behavior in model 1.

The following simple interpretations can be drawn from the light of the model. The household expenses are mainly depend on fishing income and drawings from formal financial institutes, especially from rural banks. If the drawings held constant, the additional one unit (LKR) of fishing income would increase the household expenses by 0.854 units. Also, if the fishing income remain

unchanged, the increment of drawings by one unit (1 LKR) would increase the expenses by 1.7 units. Moreover, zero income incidents would cause 240 LKR expenditure per week, which is even below the subsistence level of average fishing household in the Sri Lankan context.

5.3 Shocks and vulnerability

The two fishing communities in the two localities; Rekawa and Kalamatiya show a similar socio – economic variations. Hence, the nature of the vulnerability, exposure to risk and uncertainty can be assumed as same. In this context, the data were analyzed to detect the profound shocks and risks associated with the small scale fishery and the coping strategies, which are practiced and can be practiced by the fishing households.

5.5   Idiosyncratic shocks

The households were asked to rank the possible, mostly occurring idiosyncratic shocks based on their severity and frequency. The listed shocks were, Income fluctuation due to zero catch, inability to secure the operational expenditure, changes in weather (cant go to sea), inability to sail – harsh sea conditions, risk of fishing-related illness, risk of disability (arising from fishing), risk of death at Sea, damages / destruction of crafts /gears, crime /domestic violence / theft, epidemics, natural hazards (drought/ flood). The ranked data were analyzed by Kruskal – Wallis non parametric test. In order to get a clear picture on the ranking, one way ANOVA was conducted simply assuming that the data in ratio scale. Both gave the same results, but in detailed in the one way ANOVA. According to that, income fluctuation due to zero catch, inability to sail due to harsh sea condition, inability to secure the operational expenditure are the most severe shocks encountered by the fishing households, respectively. Damages, destruction of crafts and gears, changes in weather are the fourth and fifth risks respectively. Risks of disability, risk of death at sea are the least risk associated with fishermen. In this connection, it can be concluded as the zero income or catch fluctuation is the main cause which drags the household in to poverty. Harsh condition of the sea is problematic mainly for the traditional boat (oru) owners. The non mechanized traditional crafts (NMRT) cannot sail on bad weather where FRP owners can survive. Sailing in rough weather jeopardize fishers with a life threat, too.

Vignette : Shock of Death

> The bitter impact of death shock had been realized by Mr. Darlis, when he lost his son very recently. Darlis is a 67 years old retired fisherman. He was away from fishing due to his old age and naturally born disabilities due to 56 years of fishing life. His son, a young took his responsibility and sustained the whole family by engaging in fishing as a crew as well as an owner of NMRT. Due to the death of this young son, Darlis has to be in the sea once again even though he is not physically fit for the harsh activities of fishing. He has only a small boat; but has to feed the entire family, daughter-in-law, grand kids, and his wife. The death shock has affected badly on their lives. The income level as well as the consumption level reduced. They are always worrying about the future when the date Darlis unable to fishing.

5.4 Ex – ante coping strategies

5.4.1 Formal Institutes

In the study area, both Kalamatiya and Rekawa, the households are enrolled for at least one institute or organization (see fig 4.4). The survey reveals that none of household exclude from such memberships and 44 percent holds membership in only one organization and 40 percent in two organization.

5.4.2. Accumulation of wealth

Accumulation of wealth is highly practiced among every household. They usually urge to buy motor bikes, three wheelers, electrical equipment, etc. The wealth accumulation among surveyed households have been shown in the figure 4.5. Apart from that, almost all have an inherited land descended from their parents. The household can use this land as a collateral for formal as well as for informal credit sources. Other than that, stocks of cash, gold, jewelry, bank deposits, livestock, also possible wealth that has been accumulated. As per the figure 4.5, 65 percent of fishing

households are accumulating electric equipment where they can utilize while using as a collateral in the informal credit market, normally for village level money lenders.

5.4.3 Activity diversification

Activity diversification is an effective ex – ante risk coping strategy that can be adopted in every where. Since, the fishery is depending on nature, it accomplishes with many hindrances, risks and shocks, which would obviously negatively affect on the well-being of poor communities. In that respect, the activity diversification would eliminate the risk of dependency on one income source.

According to the fig 4.6 , the surveyed households are adapting different activities to lessen the dependency on fishery as the sole income generator to the household. Home gardening is the popular method (44%) where the households grow banana, chilies, okra, cassava, etc as an additional income source as well as to support the food requirement of the household. This concept has been initiated among fishers by non government organization (NGOs) and even the government under the concept of *"We plant to build the nation".* About 12 percent of households are having permanent job holders in the family. They bring a fixed income monthly. In the absence of fishing or fishing related activities, four percent work as labours and 8 percent migrate to other areas for fishing related activities on daily paid basis. Moreover, 8 percent are involving in businesses such as petty trading, hiring three wheelers, school hire, etc. But, still about12 percent are entirely depend only on fishery. They are more vulnerable for shocks rather than those who engage in other income generating activities.

5.6   Savings

Savings and investments have been identified as passive ex-ante risk coping strategies that helps to smoothen the household consumption level (Baulch and Haddinott, 2000). The same can be seen from the surveyed households. A seasonal variation can be noticed very clearly where in warakan the savings of all categories, FRP owners, NMRT owners, and Crew members are higher than in the haraya period. Also, FRP owners' saving ability is the highest among the groups. Though, a drastic fluctuation existing among the NMRT owners, crew members demonstrate a smooth line

without much fluctuations. It shows the lowest savings through out the period. Both categories perform a marginal rate of saving during the haraya (off-season). The FRP owners savings in warakan vary between 2500 – 6000 LKR where the NMRT is around 1000 – 3000 for the same period. The savings goes down to 1000 – 2000 and 250 – 1000 for FRP and NMRT respectively in the off-season. But, the crew members maintain their savings around 500 – 1500 LKR through out the period.

Anyhow, it is good to see that almost all the groups performs savings positively without going to zero in average. Therefore, it is possible to categorize savings as an ex-ante risk coping strategy for the entire fishing community irrespective of their role in the fishery.

5.4.5 Migration

Many fishermen, especially those who are having a small oru (NMRT) cannot go to sea in *warakan* season (April – September) due to the stormy weather. During that period, multi-day boats and other mechanized crafts can do fishing. Therefore, small boat owners migrate to other areas where multi-day boats are operating. Amend fishing nets, repair fishing equipment are the available temporary jobs for them. Mostly, the fishers in Rekawa and Kalamatiya go to Tangalle, Kottegoda, or Dondra harbours. They are paid 900 LKR per day (equivalent to 8 USD) with three main meals.

On the other hand, the shrimp fishers and lobster harvesters migrate to Kirinda, Amuduwa, and Tangalle. Lobster fishery is a lucrative fishery practicing in near shore of a rocky sea bed. The fishermen can earn about 2500 – 3000 LKR per kilo (equivalent to 22 – 30 USD) of lobsters without any problem. As a conclusion we can say, migration is a very good ex – ante risk coping strategy where it is profitable rather than waiting for an uncertain catch, which may be zero income or unprofitable.

5.4.6 Social networks

Social networks are helpful for fishing communities to lessen their distress on the occurrence of shock. Social networks are the mechanism that the individual can get the support of group

members when she / he is vulnerable and the group totally share the shock. The identified social networks existing in Rekawa and Kalamatiya are:

- ❖ Fishers' union – gear groups, crew groups
- ❖ NGOs - Ceylinco Grameen, Brac Sri Lanka, Seva Lanka, Plan Sri Lanka, Hambantota Indicated Coastal Zone Management Programme (HICZMP), JEP RUK (Rekawa, Ussangoda, and Kalamatiya), Forut, Janadiriya
- ❖ Women's fisheries societies

These social networks are very important in providing the accessibility to financial, physical, and human capital when the households are unable to possess those by themselves. It would reduce the possibility to be vulnerable to shocks as well as to be poor in future. Such net works may empower the individuals and build their personality and capacity to mitigate and survive at a shock. Further, such net works would share the negative shocks collectively and show the path to come up, especially moral strengthening can be expected. Such associations willing to provide opportunities to access resources and to be resilience for the forthcoming shocks. The importance of such safety nets at the group level has been investigated by Townsend, (2002) iterating *within group safety nets increase the within group insurance to smoothen the consumption level*.

5.5 Ex – post coping strategies

5.5.1 Profoundly practicing idiosyncratic risk coping strategies in the community

The ranking data explains the ex-post strategies that come to assist first.

The possible ex – post coping strategies were listed as 1- Mortgage / selling assets, 2 – Borrow from neighbor, 3 – Intra – community transfers / charity, 4- Sending children to work, 5 – Seasonal / temporary migration, 6 – Borrowing from banks/ financial institutes . According to the Kruskal-Wallis test, the most prominent ex-post idiosyncratic shock coping strategies are; borrowing from neighbours, selling/ mortgaging, borrowing from banks/ financial institutes. One way ANOVA means separation was conducted to detect the differences of means with the assumption that the values are in ratio scale. This test was resulted independent sub sets for the first three coping strategies which are the same as in Kruskal – Wallis. With this, it is possible to draw an inference where the households tend to borrow from neighbours, or mortgage properties in the occurrence of an idiosyncratic shock. Sending children to work is the least coping strategy shows the eastern culture of the country that the parents want to keep their children with them forever.

5.6.2 The collective risk coping strategies

The ranked tactics are 1- Revolving credit, 2- Insurance, 3- Loans from friends / relative. (both money and goods.), 4- Assistance from CBO, NGO, Government, Associations, 5- Gifts / Presents /Donations, 6 – Co-operatives, 7- Formal Financial institutes. According to the Kruskal – Wallis (non parametric) test; loans from friends / relatives, gifts/ presents/ donations, and co-operatives are the first, second, and third strategies respectively. Formal insurance is the least important. The chi –square test shows a significant difference between first and the least important practices. Since, this test cannot elaborate the relationship clearly and logically, the one way ANOVA was conducted. It depicts the same results but in a different way. There the difference between first and the second is negligible. There is a clear difference between second and third (*i.e.* Co-operatives). It too, mention that the formal insurance as the least important strategy for the households. The reasoning by the households were that the formal insurance charge a premium/ installment monthly. Since, the income of household fluctuate drastically, they are unable to pay certain installments. Such mistakes cancel the agreement claiming breach of the contract making them fed up on the agreement. Therefore, many are reluctant to enroll for such formal insurance mechanism.

5.7 Credit

It is intended in this section to understand the functioning of the credit in the Southern coastal communities of Sri Lanka, using information obtained from field studies carried out in Rekawa and Kalamatiya.

In every community, credit is a popular drive in the financial market in fund raising at a shortage of financial capital. This is also, applicable for poor, who are operating at the level of subsistence. Both systems are functioning to meet the households' transaction motives, precautionary motives and speculative motives in the surveyed fishing community. The existing credit sources are presented in the table 5.2.

Table 5.2: The formal and informal credit sources in the fishing community

Formal sources	Informal sources
Banks (private and public)	Village money lenders
Rural Banks operating in the village level	Fish merchants
Fisheries co-operatives	Village retail sellers
	Fellow fishermen
	Kinsmen

Source: Source : Survey data, February, 2008.

Informal credit sources

The informal credit sources are non-reported, non-legalized authorities in the fishing communities. Normally, most of the credit sources are tied with undocumented codes and rules. As an example the money lenders in the informal credit market play a significant role in providing financial assistance for the frustrated households. They demand collaterals that can be acceptable for any kinds of property, equipment, etc such as land, motor bikes, three wheelers, television, refrigerators, etc. Moreover, they charge a higher interest rate around 10 – 15 percent monthly. On the other hand, the boutique keeper and the fish merchant have a ting up behaviour. The fishermen are entitled to give the harvest to the fish merchants if the fishers are indebt. This would reduce their bargaining power and the fish merchant buy the catch at a lower price. But, as an informal credit agent, always they are there, willing to provide financial assistance at any sort of a risk.

Contrast, fellow fishermen and kinsmen play a different role in the informal credit market. This can be mentioned as a source of mutual insurance among fishermen. One who receives the "lucky catch" may earn a higher income for the day than the others. He would lend a part of his earnings to those who were "unlucky" on the same day. This is based on the trustworthiness because, fishermen knows the fishing income is entirely luck by chance. Therefore, it is common for fishermen to borrow from the lucky fishermen and return it when he is lucky. This type of income transfer is totally interest free and based on the trust, mutual understanding, honest, and friendship. In fact, the mutual insurance by means of informal, indirect credit is a consumption smoothing mechanism, which operates with a high degree of flexibility.

Formal credit sources

Presence of personal anonymity between lender and borrower is the major difficulty confronted in the formal credit market in rural fishing communities like in Sri Lanka. Lenders are obviously interested on clients who may adhere well to the terms and conditions of the credit agreements. The lenders always demand some sort of collaterals, such as land, building, gold (jewelry), etc. But, the range of items that can be introduced as collaterals in formal credit markets are narrower than in the informal credit market. In this connection, the fishermen said to be helpless because they are unable to possess such a solid and fixed collaterals. Not only the lack of collaterals, but also the highest risky nature of fishery makes the situation worsen when demanding formal credits. Fortunately, the government introduces certain special credit schemes, specially designed for fishing communities via government banks; Peoples bank, Bank of Ceylon, Rural Bank, etc.

As a formal credit source, the fisheries co-operatives plays a vital role for the fishing communities. The co-operatives *per se* raise funds and distribute among members by means of short term, long term, instant loans. Moreover, they promote members towards savings.

5.8 Mutual insurance

The mutual insurance among fishing community plays a remarkable role in the occurrences of risks and shocks. The main methods are revolving funds, charity, gifts, donations, etc. The cross sectional survey highlights 100 percent shock mitigation and sharing by man power. In the shocks of death, illnesses, injuries, craft / gear damages, accidents, etc, the neighbors and friends in close proximity extend their help by means of man power. Also, donations and charity purposes are reported for deaths, illnesses, and injuries. The crafts/ gear damages were overcome with the hands of friends and assistance of having a craft or a gear from kith or a kin who may have an extra.

Outcomes drawn from income, expenditure, and savings in the small-scale fishing community create a vivid picture on the possibility of mutual insurance. This would not be effective with homogeneous groups where all the members would face to a same kind of shock as well as in the

same living standard. In that case, formation of heterogeneous groups would do the job best. The same has been reported in the article of Dercon, and Weerdt (2006) dictating the efficiency and effectiveness of heterogeneous groups.

5.7 Fisheries Co – operatives

Co – operatives has become an important component in income smoothing mechanism in the presence of shocks. Therefore, it is worth to mention few words about the Fisheries Co-operative societies (FCS) and their functions to alleviate the vulnerability among rural poor. FCS are a source of social capital that facilitates access to all the sources of capital (financial, natural, physical, and human) (Amarasinghe, 2001). Hence, FCS would help to overcome and recover stress and shock enumerating in the fishing livelihood. Moreover, the surveyed results depicts FCS as a most dominant formal institute in the community contributing to the sustenance of fishing households very actively. The followings are the contribution that would extends over different facets as mentioned by Thakshila, (2008).

➢ Providing a source of insurance against risk – this insurance appear in different forms as mutual insurance, community insurance schemes, savings, and credits where the credits can be considered as an insurance substitute for the vulnerable households.

➢ Providing access to physical and financial capital – group action, group guarantees as collaterals in obtaining credits are available. The FCS provides craft/ gear at a low cost as a relief package or loan scheme.

➢ Providing access to human capital – awareness programes, capacity building, leadership, training programmes, pre – school for children

➢ Providing access to natural capital – safeguarding rights to access to fish resources, manage fishing schedule (specially for beach seine), satellite training.

➢ Increase the bargaining power of fishers against fish merchants – establish fish selling centers, transportation facilities with ice cabin, fish collecting centers, and intervene to give a good return for the member fishers.

In the study area, the statistics from fisheries district office, Tangalle (2006) has been documented about four fisheries co-operatives actively functioning in each study location, Rekawa and Kalamatiya. Also, 100 percent of the fishing households have been enrolled at least in one FCS. In that respect, their engagement with the FCS might be higher which had been proven through the results, too. Therefore, the highest involvement of FCS in the instances of shocks must be acceptable as an ex-ante as well as ex-post risk coping strategy among fishing households.

Coping Vulnerability among small-scale fisher in Southern Sri Lanka

Idiosyncratic shocks
1. Income fluctuation due to zero catch
2. Inability to sail due to harsh sea condition
3. Inability to secure the operational expenditure
4. Damages, destruction of crafts and gears
5. Changes in weather

Household

Ex-Ante Risk management

(Adopting)

Reduction
1. Accumulation of wealth
2. Activity diversification
3. Membership in formal institutes
4. Migration

Mitigation

(Reduce the negative impacts of the risk)
1. Revolving fund
2. Consumption smoothing
3. Insurance
4. Formation of social networks

Ex- post Risk management

(Coping)

Internal
1. Disposal/ mortgage of assets
2. Reduce consumption
3. Withdrawals

External
1. Mutual Insurance
2. Informal safety nets
3. Formal credit services

6.0   Conclusion and Recommendation

The study was mainly designed to assess the coping strategies practiced by the fishing community to shun the probability, to be vulnerable. Also, an attention was extended to glean an idea about their mechanisms practiced when they were trapped in the vulnerability. The obtained data were processed to draw a meaningful outcome to interpret the situation. Accordingly, the household expenses behave in- line with the fishing income, which is the dominating income generating activity for all FRP owners, NMRT owners, and crew members. It shows a strong positive relationship of 79.2 percent. Due to the risky nature and the ever fluctuating income, the households cannot cope up their weekly expenditure requirement only by fishing. The fishermen go for other sources as well. Regarding the FRP owners', expenses are significantly depend on the fishing income, drawings, gifts, loan from co-operatives, and bank loans. The relationship is simple linear with a strong positive relationship of 91 percent. Therefore, the FRP owners utilize the above mentioned sources to compensate their expenses with the absence or shortage of the fishing income. On the other hand, the NMRT owners possess a linear relationship between total expenses, fishing income, and drawing upto 63 percent.

In the small – scale fishery, the crew member receives only a 1/3 of the income excluding the operational cost from the total income. The boat owner, who belongs the nets/ fishing equipment receives 2/3 of the income. In fact, the boat owner receives higher income without any argument. Moreover, the fishing income is relatively higher in the season (warakan), just because of the high priced fish varieties that can be harvested. But, only mechanized boats can be operated. The extreme opposite is occurring in the off-season (haraya). In that connection, the income of NMRT owner is lesser than FRP owner and the crew receives the lowest. Hence, the most vulnerable groups are crew and the NMRT owners, respectively.

Since, the fishery is highly associated with risk and shocks, the profoundly occurring shocks for the fishing community in Southern province are; income fluctuations, harsh sea condition, inability to secure operational cost, damages/ destruction of crafts and gears are inevitable. The study highlights some ex-ante risk coping strategies. Becoming members of formal organizations/ societies, accumulation of wealth, activity diversification, migration, social networks are

important. The ex-post strategies are; borrowing from neighbours, selling/mortgage, borrowing/withdrawals from banks, and intra- community transfers/ charity. This finding can be related to the constructed regression models too. There, the FRP owners main financing sources are tally with this result. The same has been proven in the mutual insurance, too.

Recommendations

The safety net should comprise all the fishing groups. Then, the income transfers, risk sharing, reciprocal giving, mutual insurance would be helpful. Since, the provision from co-operatives, formal financial institutes are higher for the income smoothing, the households can be promoted on savings in such organizations as much as possible. The household can be motivated to save in the fishing season.

7.0 Reference

1. Agnes, R., McNiven, S., and Godquin, M. (2008). *Shocks, groups, and networks in Bukidnon,Philippines, Collective action and property rights*, working paper No 84. Washington, USA.

2. Alwang, J., Siegel, P.B., and Jorgensen, Sl. (2001). *Vulnerability: A view from different disciplines.* Ocial Protection Discussion paper, No. 0115. The World Bank: Washington, D.C. – can be downloaded from www.worldbank.org/SP

3. Amarasinghe, O. (2003[a]). *An analysis of the fisheries sector of Sri Lanka,* Ministry of Fisheries and Aquatic Resources: Colombo, Sri Lanka.

4. Amarasinghe, O. (2003[b]). *Modernization and change in marine small – scale fisheries of Southern Sri Lanka*, Navagama printers, Sri Lanka.

5. Amarasinghe, O. 2001. *Development in the fishery and the fishworker* – A study to assess the socio – economic influence of the fisheries development plan in Sri Lanka, International Collective in Support of fishworkers (ICSF), Chennai, India.

6. Baulch, B. and Hoddinott, J. 2000. Economic mobility and poverty dynamics in developing countries. *Journal of Development studies*. Routledge publishers, London.

7. Bay of Bengal News. 2004. Poverty alleviation in small – scale fishing communities, reproduces from *The State of World Fisheries and Aquaculture*, Fisheries department of the FAO, Rome; 2002 edition – Chapter 2.

8. Bhattamishra, R. and Berret, C B.2008. *Community based risk management arrangement*, Cornell University.

9. Bird, K. and Prowse, M.2008. Vulnerability, poverty, and coping in Zimbabwe, *World Institute for Development Economics Research (UNU – WIDER)*, United Nation University; No. 2008/41

10. Calvo, C. and Dercon, S. 2005. *Measuring individual vulnerability*, Discussion paper series, Department of Economics, University of Oxford, UK: No 229

11. Central Bank. 2000, 2002, 2004, 2005, 2006, 2007. Annual Report, Sri Lanka.

12. Chaudhuri, S. 2003. *Assessing vulnerability to poverty: concepts, empirical methods and illustrative examples,* Department of Economics, University of Columbia.

13. Coast Conservation Department.2003. *Coastal Zone Management Plan*, Ministry of Fisheries and Aquatic resources, Colombo, Sri lanka.

14. Deaton, A. 1997. The Analysis of Household Surveys: A Microeconomic Approach to Development Policy. Baltimore: Johns Hopkins University Press.

15. Department of Census and Statistics.2007. *Statistical Pocket Book-2007*. Ministry of Finance and Planning. Colombo. Sri Lanka.

16. Dercon, S, and Krishnan, P. (2000). Vulnerability, Seasonality and Poverty in Ethiopia. *Journal of Development Studies.* v36 (n6):25-53.

17. Dercon, S. 2001. *Assessing vulnerability to poverty*. Department of Economics, Oxford University, UK.

18. Dercon, S. and Weerdt, J. (2006). Risk sharing networks and insurance against illness, *Journal of Development Economics*, ELSEVIER, Vol 81, No.2.

19. Dercon, S. Haddinott, J., and Woldehanna, T. (2005). Shocks and consumption in 15 Ethiopian Villages, 1999 – 2004. *Journal of African Economies*, Vol.14. No.4: pp . 559 – 585.

20. Fafchamps, M and Lund, S. 2003. Risk-Sharing Networks in Rural Philippines. *Journal of Development Economics.* v7 1 (n2) :261-87.

21. FAO, Reducing fisher folk's vulnerability leads to responsible fisheries: policies to support livelihoods and resource management, *New directions in fisheries- a series of policy briefs on development issues*. Food and Agriculture Organization of United Nations, Rome.

22. Gaiha, R. and Imai, K. (2006). Vulnerability and poverty in rural India- Estimates for rural South India, Economics Discussion paper, *The University of Manchester*: UK. EDP – 0602

23. Gunawardena, TN. (2008). *Role of fisheries co-operatives in the development of fisheries sector in Southern Sri Lanka,* Unpublished thesis, University of Ruhuna. Sri Lanka.

24. Heitzmann, K., Canagarajah, R S., and Siegel, P B. 2002. *Guidelines for assessing the sources of Risk and Vulnerability*. Social protection unit, Human Development Network, The World Bank.

25. Kazianga, H, and Udry, C. (2006). Consumption Smoothing? Livestock, Insurance and Drought in Rural Burkina Faso. *Journal of Development Economics.* v79 (n2):41 3-446.

26. Ligon, E. and Schechter, L. 2003. Measuring vulnerability

27. Lybbert, T J., Christopher B. Barrett, Desta S, and Coppock, D L. (2004). Stochastic Wealth Dynamics and Risk Management among a Poor Population. *Economic Journal.* v1 14 (n498):750-777.

28. Mekong River Commission (MRC).(2006). Livelihood approaches and fisheries management in the Lower Mekong Basin, *Mekong fisheries management recommendation* No 5; The Technical advisory body for Fisheries Management (TAB). Vientiane, Lao PDR: July.

29. Ministry of Fisheries and Aquatic Resources.2005, 2006. Colombo 10, Sri Lanka.

30. Morduch, J. (2005). Consumption Smoothing Across Space: Tests for Village-Level Responses to Risk. In Stefan Dercon (ed.) *Insurance against Poverty.* Oxford: Oxford University Press.

31. Morduch, J. 1994. Poverty and vulnerability, *The American Economic review*, Vol 84. No.2; American Economic Association; p. 221 – 225. Also can download from the site

32. Morduch, J. 2004. Micro-insurance: The Next Revolution? In Abhijit Banerjee, Ronald Benabou, and Dilip Mookherjee (eds.) *What Have We Learned About Poverty?* Oxford University Press, forthcoming.

33. Moser, C.(1998). The Asset vulnerability framework: Reassessing urban poverty reduction strategies, *World Development,* 21(1): 1 -19

34. National Aquatic Research and development Agency (NARA). (2001). *Year Book, NARA*, Colombo 15, Sri Lanka. www.nara.ac.lk

35. Nomura, I.2007. Artisanal and small scale fisheries management regimes in Asia: Possible options towards responsible fisheries, *International collectives in support of fish workers*, Siam Reap, Cambodia. 3 – 8 May, 2007 can be found in (ftp://ftp.fao.org/FI/speeches/ICSF_2007/ICSFSpeech.pdf)

36. Rubio, M G. and Soloaga, I. (2004). Assessing the vulnerability of Agricultural households macro economic shocks: Evidence from Mexico. *Electronic Journal of Agricultural and Development Economics* (eJADE), FAO, Vol.1; No.1; pp 45 – 62.

37. Skoufias, Emmanuel. (2003). Economic Crises and Natural Disasters: Coping Strategies and Policy Implications. *World Development.* v31 (n7): 1087-102.

38. Townsend, R M. (2002). Safety nets and financial institution in the Asian Crisis: The allocation of within – country risk, "Macro economic policies and poverty reduction" conference, IMF, Washington. D.C. March 14 – 15, 2002

39. Townsend, R M.1995. Financial Systems in Northern Thai Villages. *Quarterly Journal of Economics.* v110 (n4):1011–46.

40. Udry, C. 1993. Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy. In Hoff, Karla, Avishay Braverman and Joseph Stiglitz (eds). *The Economics of Rural Organization.* Oxford: Oxford University Press for the World Bank.

41. Yami, M B. 2000. *Risks and dangers in small-scale fisheries: An overview*, International Labour Office, Geneva. Has been downloaded from http://www.ilo.org/public/english/dialogue/sector/papers/fishrisk/ssfrisk2.htm#_Toc494249320 on 8th of April, 2009.

42. http://en.wikipedia.org/wiki/Gini_coefficient on 2nd of May, 2009

43. http://www.fao.org/fi/oldsite/FCP/en/LKA/profile.htm on 8th of April, 2009.

44. http://www.fao.org/fishery/countrysector/FI-CP_LK/en   on 8th of April, 2009.

45. http://www.fisheries.gov.lk/Data/statistics%202007%20-%20Final.htm on 8th of April, 2009.

46.

Annex 01 – Questionnaire for the panel data survey (July 2008 – Dec, 2008)
Income and expenditure Sheet

Income	Value (LKR)	Category	Expenditure requirement	Value (LKR)	Category
Inland Fishery			Fuel		
Lagoon Fishery			Food (when fishing)		
Income from Fishing			Miscellaneous expenditures in Fishing		
From other family members' income from fishing			Purchase nets/gears		
Agriculture			Nets, crafts, fishing equipment repairs		
Livestock rearing			Licensing		
Rented / lease house/building income			Expenditures for other fishing activities		
Land rent / lease			Food expenditure in family		
Wage for daily labour			Food expenditure for external source foods		
Income from own business			Drugs (liquor)		
Small scale business			Cigars/ betel		
From casino			Parties		
From seettu			Clothes		
Samurdhi relief fund			Traveling		
Presents / gifts			Rent for house / land		
Saving withdrawals			Loan Interest		
Bank loans			Insurance installment		
Loans from fishery corporative societies			Loan payback		
Loans from friends			For news papers/ magazines		
Loans from relatives			Books and stationaries		
Paybacks from debtors			Pharmaceutical drugs / medicine		
Insurance income			Loans		
Pawn broking (mortgaging)			*Seettu*		
Loans from shops			Saving Accounts (Banks)		

For fuel			Donations		
For foods					

Annex 02 – Questionnaire for the cross – sectional survey

Socio – Economic Survey
PovFish Project – Hambantota

1. Name   :-   F.I. Division   : - ……………………….
2. Address :-   Landing Center : - ………………
3. Age   :-
4. Experience in Fishery : - ……… years
5. Your Role   : -   Boat owner (   )   Crew member (   )

N T R B	OFRP	M T R B	O R U	Other

6. What types of crafts/gears are you using?

	Warakan	Haraya	Ownership
Crafts :- 1.	…………………….	…………………….	………………...
2.	……………………	…………………….	………………...
3.	……………………	……………………..	………………...
Gears :- 1.	……………………	…………………….	………………
2.	……………………	…………………….	………………..
3.	……………………	……………………..	………………..

Annual Activity Pattern

………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………....

7. Are you involving in full time or part time   :- Full   / Part
   If part time; time spend on fishing   :- ………………… hours per day / days per week

8. Do you engage in other income generating activities (state earnings per week)

Source	Season (Rs)	off - Season (Rs)
i. Fishery (Lagoon / marine / inland)	....	....

ii Agriculture (Paddy, Home garden) ....

iii. Livestock (Cattle, poultry, goat, pig, fish) ....

iv. Self employed ....

v. Business (Shops, welding, carpentry, electric.) ....

vi .Job ....

vii. Pension / retirement benefit ....

viii. Old- age annuities ....

ix. Tenancy share ....

x. Paid labour ....

xi. Migrate to urban ....

xii. Other ....

9. Education   : -   No schooling   (   ) Grade 5 (   )   Grade 10 (   ) O/L (   )
A/L (   )   Above   (   )

10. Number of family members: -   Male ………..…   Female…………….

11. Children   : -   i.Below 5 years   ……………
ii Schooling   ……………
iii.After A/L   …………..

12. How many are engaging in fishery: -   Male ………..…   Female…………….

13. Job holders: -   Permanent (monthly or daily paid)   ………….....
Temporary   …………….

14. House Type   : -   i. Bricks and tile   (…......)
ii. Cadjan roof   (…......)
iii. Asbestos sheet   (……)
iv. Wooden   (……)
v. Clay (floor/ walls)   (……)

15. Household amenities :-   i. Electricity   ………..
ii. Telephone   ……….
iii. Pipe born water   ……….
iv. Durable goods   ……….
v. Luxurious equipment   ………
vi. Other   ……….

16. Inherent Properties (Asset Status) :-   <u>Amount</u>   <u>Value</u>

<div align="right">

i. Lands ………………….. …………………
ii. Boats ………………….. …………………
iii. House ………………….. …………………..
iv. Vehicle ………………….. …………………..
v. Buildings ………………….. …………………..
vi. Other ………………….. …………………..

</div>

17. Are you a beneficiary of any subsidies / incentives /relief packages ? Yes/ No

    What are those ?

Benefit	Agency	Type of receipt (cash/ commodity)	Amount (Rs)	Frequency
Food stamp Samurdhi ………….. …………..				

20. Are you a member of any village institute :- Yes / No

    . If Yes, state :-   From

    i. Co-operative association ……………   …………….

    ii. Funeral association   ……………   …………….

    ……………………

21. Do you have any bank a/c   :- Yes / No

    If yes , What are those ?

22. Insurance   :- Yes / No   i. Life   ……………   ii. Vehicle   …………...

                                         iii. Boat   …………...…   iv. Family   ……………

                                         ……………

23. Are you a member of revolving credit system :- Yes / No

    If yes; what type of a system   :- Money /Goods.   :- Rotating / Demanding

24. Rank the followings based on their severity (according to their impact on your livelihood / well being).

    i. Income fluctuation due to zero catch   (   )
    ii. Inability to secure the operational expenditure   (   )
    iii. Changes in weather (cant go to sea)   (   )
    iv. Inability to sail - harsh sea conditions   (   )
    v. Risk of fishing-related illness   (   )
    vi. Risk of disability (arising from fishing)   (   )
    vii. Risk of Death at Sea   (   )

viii. Damages / destruction of crafts /gears   (   )
ix. Crime /domestic violence / theft   (   )
x. Epidemics   (   )
xi. Natural hazards (drought/ flood)   (   )
xii. Other-(state)   (   )

25. State the frequency of occurring following incidents

Incident	Frequency per week	Cost
Death (fishing related)		
Parties/ Weddings		
Illness (fishing related)		
Injuries (fishing related)		
Damages (boat ,vehicle, gear)		
Accident		
Other (state)		

26. How do you act on such events met by others? (How do you cope with the following risks?)

Incident	Coping Mechanisms	Rank them in order of importance
Death	i. ii.	
Parties/Weddings	i. ii.	
Illness	i. ii.	
Injuries	i. ii.	
Damages (boat ,vehicle, gear)	i. ii.	
Accident	i. ii.	
Other (state)	i. ii.	

27. Rank the following risk coping strategies you are adopting at a shock.
    i. Selling of real asset   (   )
    ii Borrow from neighbor   (   )
    iii. Intra- Community transfers/ Charity   (   )
    iv. Sending Children to work   (   )
    v. Seasonal /Temporary migration   (   )
    vi. Borrowing from banks /financial institutes.   (   )
    vii. Other (State)   (   )

28. Rank followings according to the importance when you are in a risk/ shock (from outsiders)
   i. Revolving credit   (   )
   ii. Insurance.   (   )
   iii. Loans from friends / relative. (Both money and goods.)   (   )
   iv. Assistance from CBO, NGO, Government, Associations. (   )
   v. Gifts / Presents /Donations   (   )
   vi. Co-operatives   (   )
   vii. Formal Financial institutes.   (   )
   viii. Other (State)   (   )

29. What are your suggestions that can adopt by following parties in order to sustain at a shock?

 Individual ……………………………………………………………………………………

 Household ………………………………………………………………………………………..

 Village / community ………………………………………………………………………………...

 Government ……………………………………………………………………………………

……………………   ………………….
Signature   Signature
Field enumerator   (client)

 Date:-…………….   Contact No:-……………

Annex 03 - Test – statistics

T-Test - FRP

Group Statistics

	SEASON	N	Mean	Std. Deviation	Std. Error Mean
FISHING	1	11	11911.36	4726.66	1425.14
	0	12	3439.67	2469.15	712.78
TOTEXPEN	1	11	17588.18	9238.39	2785.48
	0	12	9898.75	3660.28	1056.63

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
FISHING	Equal variance assumed	6.785	.017	5.457	21	.000	8471.70	1552.47	5243.16	1700.23
	Equal variance not assumed			5.317	14.788	.000	8471.70	1593.45	5071.08	1872.31
TOTEXPE	Equal variance assumed	4.011	.058	2.668	21	.014	7689.43	2881.73	1696.56	3682.31
	Equal variance not assumed			2.581	12.843	.023	7689.43	2979.16	1245.36	4133.50

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				Mean	Std. Erro	95% Confidence Interval of the Difference	
										Lower	Upper
FISHING										4.68	375.12
										8.54	361.27
TOTEXI										8.53	292.14
	Equal varia not assum			.112	20.999	.912	116.80	041.97	050.09	283.70

Group Statistics

	SEASON	N	Mean	Std. Deviation	Std. Error Mean
FISHING	1	11	3986.82	1094.49	330.00
	2	12	2301.92	1581.10	456.43
TOTEXPEN	1	11	5637.64	2391.67	721.12
	2	12	5520.83	2605.43	752.12

T-Test-

NMRT

T-Test – Crew

Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
FISHING	Equal variances assumed	.960	.338	3.121	21	.005	2080.62	666.61	694.33	466.91
	Equal variances not assumed			3.076	18.028	.007	2080.62	676.38	659.75	501.49
TOTEXP	Equal variances assumed	.132	.720	1.597	21	.125	1902.91	1191.52	574.99	380.81
	Equal variances not assumed			1.590	20.324	.127	1902.91	1196.50	590.40	396.22

Annex 04 - Test Statistics Interpretation

Test - statistics   Interpretation

H_0 : The fishing income | total expenditure does not vary with the season (warakan | Haraya)

H_1 : The fishing income | total expenditure vary with the season (warakan | Haraya)

Test -   Two-tail t- test

Level of Significance = 5%. $\alpha/2 = 0.025$

Critical value   = 97.5

Degree of freedom = $(22-1) = 21$

FRP owners.

Fishing Income   Total expenses

5.454   5243   11700   2.7   1696   13682
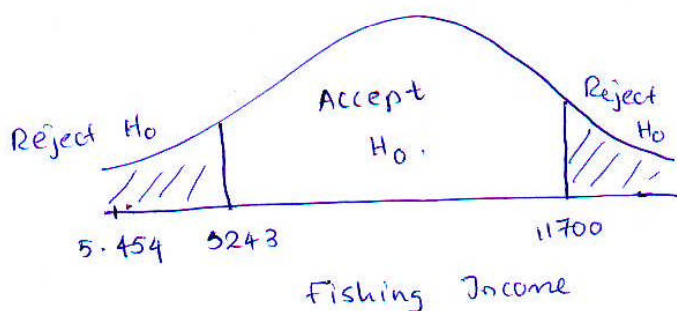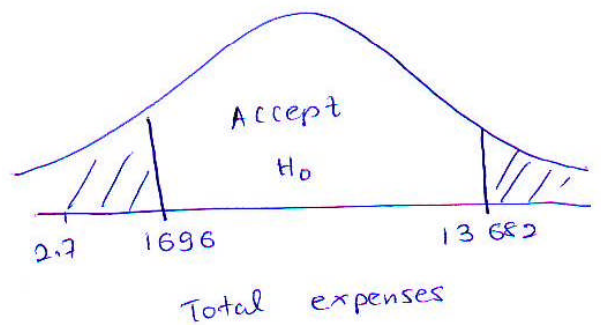
$t_c = t_{(0.975, 21)} = 5.457$ $t_c = t_{(0.975, 21)} = 2.668$

$t_c < t_{tab}$ $t_c < t_{tab}$

Reject H_0.   Reject H_0.

NMRT Owners.
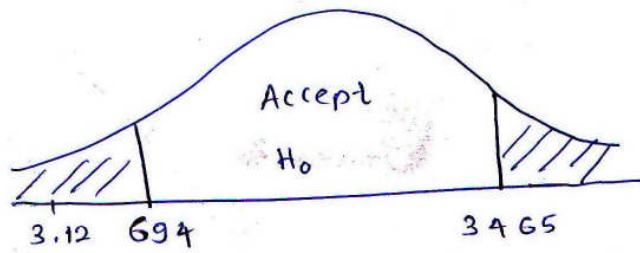
Fishing Income

$t_c = t_{(0.975, 21)} = 3.12$

$t_c < t_{tab}$

Reject H_0.
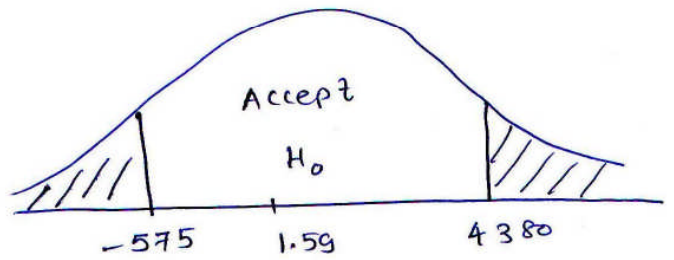
Total expenses

$t_c = t_{(0.575, 21)} = 1.597$

$-575 < t_c < 4380$

Accept H_0.

Crew Members.
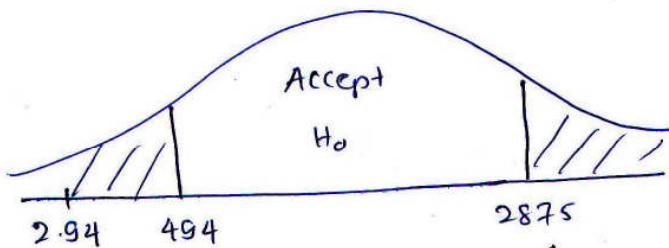
Fishing Income

$t_c = t_{(0.975, 21)} = 2.944$

$t_c < t_{tab}$

Reject H_0
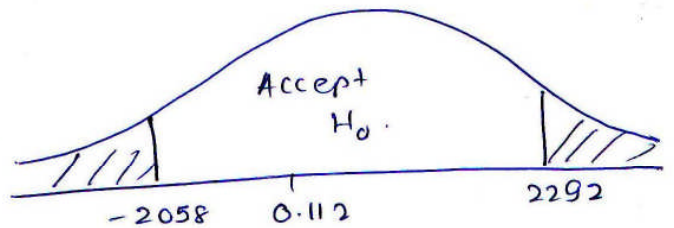
Total expenses

$t_c = t_{(0.975, 21)} = 0.112$

$-2058 < t_c < 2292$

Accept H_0.

ANOVA[f]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.52E+08	1	851842434.2	36.631	.000[a]
	Residual	4.88E+08	21	23254793.84		
	Total	1.34E+09	22			
2	Regression	1.04E+09	2	520278742.5	34.727	.000[b]
	Residual	3.00E+08	20	14981780.99		
	Total	1.34E+09	22			
3	Regression	1.11E+09	3	370109134.6	30.592	.000[c]
	Residual	2.30E+08	19	12098194.79		
	Total	1.34E+09	22			
4	Regression	1.18E+09	4	295805894.2	33.921	.000[d]
	Residual	1.57E+08	18	8720529.328		
	Total	1.34E+09	22			
5	Regression	1.25E+09	5	249614477.1	46.064	.000[e]
	Residual	92120720	17	5418865.858		
	Total	1.34E+09	22			

a. Predictors: (Constant), DRAWING

b. Predictors: (Constant), DRAWING, GIFT

c. Predictors: (Constant), DRAWING, GIFT, LOANCOOP

d. Predictors: (Constant), DRAWING, GIFT, LOANCOOP, FISHING

e. Predictors: (Constant), DRAWING, GIFT, LOANCOOP, FISHING, BANKLOAN

f. Dependent Variable: TOTEXPEN

Annex 05 - Regression Models

Regression - FRP

Regression

Coefficients[a]

| Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3217.956	1984.988		1.621	.120
	DRAWING	2.467	.408	.797	6.052	.000
2	(Constant)	2173.445	1620.201		1.341	.195
	DRAWING	2.407	.328	.778	7.349	.000
	GIFT	69.087	19.466	.376	3.549	.002
3	(Constant)	3088.956	1505.038		2.052	.054
	DRAWING	1.923	.357	.622	5.392	.000
	GIFT	64.566	17.593	.351	3.670	.002
	LOANCOOP	4.579	1.907	.278	2.401	.027
4	(Constant)	2985.911	1278.284		2.336	.031
	DRAWING	1.096	.417	.354	2.632	.017
	GIFT	39.415	17.285	.214	2.280	.035
	LOANCOOP	5.905	1.683	.359	3.510	.003
	FISHING	.494	.171	.358	2.891	.010
5	(Constant)	2761.510	1009.737		2.735	.014
	DRAWING	.809	.339	.261	2.388	.029
	GIFT	39.107	13.626	.213	2.870	.011
	LOANCOOP	7.239	1.381	.440	5.241	.000
	FISHING	.560	.136	.405	4.116	.001
	BANKLOAN	1.507	.436	.231	3.459	.003

Regression NMRT

Regression

a. Dependent Variable: TOTEXPEN

ANOVA^c

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64649929	1	64649929.25	10.670	.004^a
	Residual	1.27E+08	21	6058976.980		
				56.26	17.354	.000^b
				6.665		

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.580^a	.337	.305	2461.50
2	.797^b	.634	.598	1872.84

a. Predictors: (Constant), DRAWING

b. Predictors: (Constant), DRAWING, FISHING

Coefficients^a

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2817.774	795.504		3.542	.002
	DRAWING	1.660	.508	.580	3.267	.004
2	(Constant)	239.780	880.159		.272	.788
	DRAWING	1.703	.387	.595	4.402	.000
		.212	.546		4.034	.001

Excluded Variables^c

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	FISHING	.546^a	4.034	.001	.670	.999
	FIXEDASS	-.159^a	-.877	.391	-.192	.967
	OTHER	-.285^a	-1.665	.111	-.349	.997
	LOANCOOP	.080^a	.443	.663	.099	.996
	LOANFRND	.060^a	.299	.768	.067	.829
	RECEIPTS	.029^a	.160	.874	.036	.980
	SEASON	-.258^a	-1.481	.154	-.314	.983
2	FIXEDASS	-.034^b	-.231	.819	-.053	.916
	OTHER	-.020^b	-.123	.903	-.028	.754
	LOANCOOP	.056^b	.404	.691	.092	.994
	LOANFRND	-.024^b	-.156	.878	-.036	.813
	RECEIPTS	.032^b	.227	.823	.052	.980
	SEASON	.084^b	.493	.628	.112	.662

a. Predictors in the Model: (Constant), DRAWING

b. Predictors in the Model: (Constant), DRAWING, FISHING

c. Dependent Variable: TOTEXPEN

Annex 06 – Idiosyncratic shocks

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
VAL	200	4.51	2.29	1	8
VAR	200	4.50	2.30	1	8

Kruskal-Wallis Test

Ranks

	VAR	N	Mean Rank
VAL	1	25	36.66
	2	25	72.24
	3	25	104.60
	4	25	44.54
	5	25	125.68
	6	25	157.90
	7	25	170.96
	8	25	91.42
	Total	200	

Test Statistics[a,b]

	VAL
Chi-Square	128.866
df	7
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: VAR

Oneway

ANOVA

VAL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	675.475	7	96.496	50.280	.000
Within Groups	368.480	192	1.919		
Total	1043.955	199			

Post Hoc Tests

Homogeneous Subsets

VAL

Duncan^a

VAR	N	Subset for alpha = .05				
		1	2	3	4	5
1	25	1.96				
4	25	2.28				
2	25		3.40			
8	25		4.16	4.16		
3	25			4.68		
5	25				5.52	
6	25					6.80
7	25					7.32
Sig.		.414	.052	.184	1.000	.184

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 25.000.

Annex 07 – Ex – post risk coping strategies

NPar Tests

Kruskal-Wallis Test

Ranks

	VAR	N	Mean Rank
VAL	1	25	43.00
	2	25	24.00
	3	25	92.00
	4	25	128.00
	5	25	101.00
	6	25	65.00
	Total	150	

Test Statistics^{a,b}

	VAL
Chi-Square	102.137
df	5
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: VAR

Oneway

73

ANOVA

VAL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	299.900	5	59.980	62.770	.000
Within Groups	137.600	144	.956		
Total	437.500	149			

Post Hoc Tests

Homogeneous Subsets

VAL

Duncan[a]

VAR	N	Subset for alpha = .05				
		1	2	3	4	5
2	25	1.44				
1	25		2.20			
6	25			3.08		
3	25				4.16	
5	25				4.52	
4	25					5.60
Sig.		1.000	1.000	1.000	.193	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 25.000.

Annex 08 – Mutual insurance

NPar Tests

Kruskal-Wallis Test

Ranks

	VAR	N	Mean Rank
VAL	1	25	102.00
	2	25	158.00
	3	25	28.00
	4	25	100.00
	5	25	36.00
	6	25	73.00
	7	25	119.00
	Total	175	

Test Statistics[a,b]

	VAL
Chi-Square	126.573
df	6
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: VAR

Oneway

ANOVA

VAL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	509.200	6	84.867	74.725	.000
Within Groups	190.800	168	1.136		
Total	700.000	174			

Post Hoc Tests

Homogeneous Subsets

VAL

Duncan[a]

VAR	N	Subset for alpha = .05				
		1	2	3	4	5
3	25	1.60				
5	25	1.92				
6	25		3.40			
4	25			4.48		
1	25			4.56		
7	25				5.24	
2	25					6.80
Sig.		.288	1.000	.791	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 25.000.