

CHAPTER 7

7 Conclusions and Policy Recommendation

7.1 Conclusions

This study sought to identify a framework, which will work by integrating all the stakeholders within the Fisheries Industry in order to eradicate poverty of the fishermen who are below the poverty line. The study reveals that poverty level can be reduced through technological advancement and through proper monitoring policies adopted on the operations of the fisheries industry. The suggested framework would facilitate the fisheries industry to develop through constant research and development by integrating universities, research institutes and funding organizations.

The fishermen who are below the poverty line can be accommodated with a micro financing facilities such as “Grameen Credit” systems introduced by the Ceylinco in order to raise the living standards. There are other co-operative societies which can be introduced such credit systems to distribute the funds for the individual entrepreneurships.

The development in the fisheries industry from the history reveals the attitude towards technological development for the sustainability of the industry for future operations, but advancing the technology had resulted the decline of the coastal fishing industry. This again causes the increase in poverty living around the coastal line.

The field survey reveals the level income distribution and the technological advancement the rural poor people have achieved. But the literacy level reveals the opportunity that can move forward with the latest technology. The factors for the low income are the high price of the fuel, middlemen interference, low price for the production and cost of living.

7.2 Policy Recommendations

The high recommendation for the fisheries industry is to have technological framework as suggested to develop the sustainable industry through research and development. The integration of the Ministry of Science and Technology is crucial and carry out research for the innovation of new technology for the industry. The integration with all the stakeholders will be much more benefited in long-term development.

The Department of Fisheries has to play a major role in connection with research and development. Building of online statistical database is recommended for the entire industry to predict the future trend of the organization.

Its also recommend that the introduction to low cost equipment for the poor fishermen would facilitate the new way of thinking about the harvesting whilst the Department has to play major role in monitoring the fleet available in the and prevent from unwanted harvesting by foreign vessels as well as from the registered crafts.

Based on the findings of the research work, the strategies to overcome the poverty situation through technology are to integrate all the stakeholders to a framework where the knowledge and the resources could be transferred effectively. Therefore the policies have to be implemented through out the sector and should be monitored accordingly.

- Knowledge transfer from top to the bottom level of stakeholders.

Knowledge can be exchanged through the structured electronic applications, which are developed according to the framework. Each stakeholder will be allocated the virtual space where the responsibilities and the knowledge be available for the others immediately. A proper e-messaging system based on the priority will enable the required stakeholder transfer to inform others. Every stakeholder will minimize the communication barriers through participation.

- Awareness Building on Available Technologies

Regional knowledge Fisheries Officers with the assistance with ICT agency would be able to conduct awareness programs of the latest technology to the rural fishermen to make use of the technology.

- Involvement and Education about the maximum exploitation.

Awareness programs of the maximum exploitation can be conducted through electronic means easily from remotely and the online statistical production information which will be built in future would be able to demonstrate the crisis that the industry currently facing with maximum exploitation.

- Quality control awareness programs

Quality control awareness programs would enable the fishermen to minimize the waste and understand the value of the Product -Customer relationship with the quality. It would be able to demonstrate how other developed countries practice to satisfy the customers through value addition through quality control.



- Strategies for improving labour productivity

Proper value for the product and supporting with the appropriate infrastructure would be able to improve the productivity.

- Motivate programs for offshore fishing activities

Infrastructure is the most pressing issue when comes to the offshore fishing in Sri Lankan Fisheries Sector. Therefore a new mechanism such as Multi-day boats for the group of people who are registered in a particular village as small craft fishermen on a rotational basis and implementation of a quota system would benefit in long run sustainability of the industry. A profit sharing ventures within the village society under the monitoring system by the government would be able to make the fishermen engaged in the industry even in the off seasons.

- Technology forecasting to match the market requirement of the end product

The framework introduced herewith would be able to forecast the equipments and forecast technology, which will be suitable for the next generation through Research

and Development. The Framework will enable to transfer knowledge on current stocks, prices, technology and can match with the international standards and apply for the industry.

- The Sri Lankan Fisheries sector should be formulated into a policy framework, which can be incorporate key stakeholders where required resources can be transferred effectively and efficiently.
 1. Provide low cost instruments such as portable GPS, communication equipment such as mobile phones or PDAs for the fishermen who can plan the day-to-day fishing activities through live information.
 2. Provide information accessibility through internet or establish information access points near to the harbour of landing points where the fishermen can obtain the necessary information on fish grounds, current prices and weather reports before sailing for fish.
 3. Fishing craft must be registered electronically through the department can earn maintenance expenses.
 4. Department of Fisheries must have the appropriate equipments and the communication link such as satellite.
 5. Department of Fisheries must have the tracing system to find crafts and the number of turns provided for each craft. This will serve the purpose of maintaining the degree of harvesting and at the same time equal opportunity for fishermen to raise their income level.
 6. Provide research information to the online integrated system with the facts on fish distribution based on the temperature and chlorophyll content based on the sea geographical distribution.
 7. Accumulated Statistical Information on operation to the on line database to access by every one. This will ensure the investment on fisheries industry and future growth of the Research and Development.
 8. Introduce communication safety system for the community where the fishermen can engage in the industry safely. This can be implemented through Global Maritime Distress and Safety Systems (GMDSS).

7.3 Implementation Plan for the Next Five Years through finding

According to the study a strategic plan have to be implemented in the fisheries sector providing the necessary infrastructure at the correct place and right time in the Fisheries Sector in order to overcome the current pressing issues with the rural sector by integrating the relevant key stakeholders. The Strategic Plan can be implemented in five years time breaking according to the system implementation time. This will enable rural fishermen to change their lives through information, which will help in planning of time & other resources, and to have a better competitive price for the production.

Table 8: Five Year Strategic Plan for Implementing an Integrated Information System for the Fisheries Sector


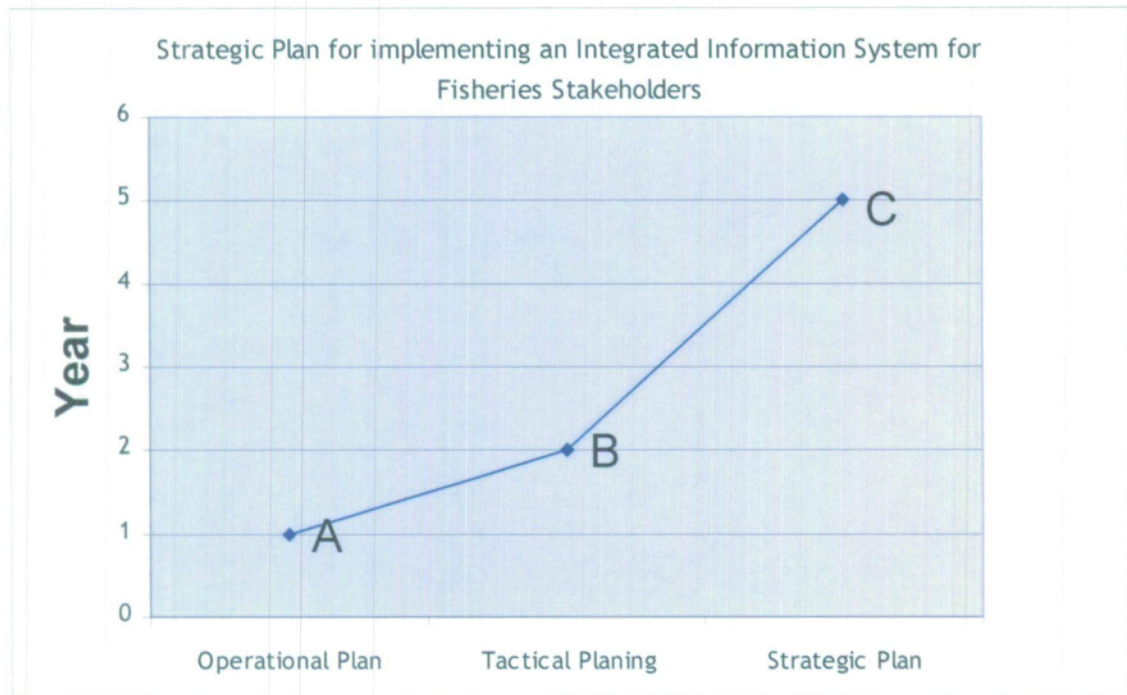
Year	Phase	Achievement	Technology
1	Operational Plan	A - Activate existing information system to integrate stakeholders  University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk	Available information online but in the Land.
2	Tactical Planning	B - Web enabled Integrated System operated within the accessible infrastructure	Available information online but in the Land either through cell phones or community based information centers
5	Strategic Plan	C - Connectivity through anywhere to access Information system	Connectivity through satellite to fishermen in boats with cell phone

Figure 7.1: Corresponding graph for the strategic plan.



The above solution is based on the latest technology available in Sri Lanka. Therefore still the capital investment is high in order to implement such technology. However through technological innovations low cost solutions can be achieved within the framework with the assistance of research institutions, funding organizations and through proper monitoring system. The benefit of such implementation would affect the future generation through,

- Raising living standards
- Sustainable growth in the industry

7.4 Agenda for Future Research

The research carried out to identify the current industry position with regards to the technology and poverty issues in rural fishermen in the Sri Lankan fisheries sector. The research was conducted mainly based on the quantitative and qualitative analysis. The data gathered from the people who are directly involved in the industry such as the rural fisherfolks in Tangalle Fisheries District. The information was collected and views from the Fisheries Institutions about their industry as well their current position in the industry. The research identifies the technology position and the current position of the people who directly involve in the industry in terms of the four components of technology and their implications in the industry performance.

This research has led to major opening for future research and development in the Sri Lankan Fisheries sector to gain sustainable development. The entire components in the supply chain of the industry have to be developed in terms of Technology and how the technology can be transferred immediately to the rural. It would help to manage the existing coastal fish stocks and exploit the Deep Sea Fish. This requires more research to minimize the waste and add value to the production until it reaches to the final customer.

This research can be extended for innovating hi-tech low cost communication equipments which can be given to bottom level people who can link and exchange information about the industry. It will further enhance the research opportunity to find out how effectively gather current production information and how it can be used for the future predictions.

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APPENDIX 1 - National Poverty Lines (PL) by district

	PL	PL	PL
District	1990/91	1995/96	2002
National	475	833	1423
Colombo	518	908	1537
Gampaha	489	875	1508
Kaluthara	494	866	1523
Kandy	485	850	1451
Matale	466	816	1395
Nuwara Eliya	494	841	1437
Galle	489	833	1466
Mathara	470	816	1395
Hambanthota	470	791	1338
Kurunegala	456	791	1352
Puttalam	461	841	1423
Anuradhapura	456	816	1380
Polonnaruwa	475	783	1366
Badulla	485	850	1409
Monaragala	480	791	1366
Rathnapura	494	833	1451
Kegalle	466	858	1437

Source: DCS (June 2004) Official Poverty Line for Sri Lanka

**APPENDIX 2 - Percentage of poor households based on the Official poverty line
by district**

District	2002	1995/96	1990/91
	<u>%</u>	<u>%</u>	<u>%</u>
Sri Lanka	19.2	24.3	21.8
Colombo	5	8.8	13.1
Gampaha	9.2	11.3	11.7
Kaluthara	17.7	24.6	27
Kandy	20.9	32.7	30.9
Matale	24.5	36.8	24.3
Nuwara Eliya	18.2	25.9	15.6
Galle	21.7	25.5	25
Mathara	23.2	29.5	23.3
Hambanthota	27.8	26.2	26.3
Kurunegala	21.2	22.6	22.8
Puttalam	24.5	25.8	18.6
Anuradhapura	17.2	21.9	20.1
Polonnaruwa	20.1	17.1	21.2
Badulla	31.5	35.8	26.8
Monaragala	32.4	48.4	27.4
Rathnapura	30.1	40	26.4
Kegalle	27.5	31.7	27.3

Source: DCS (June 2004) Official Poverty Line for Sri Lanka

APPENDIX 3 : Poverty headcount ratio National and by sector

	90/91	95/96	2002
	%	%	%
National	26.1	28.8	22.7
Urban	16.3	14	7.9
Rural	29.4	30.9	24.7
Estste	20.5	38.4	30

Source: DCS (June 2004) Official Poverty Line for Sri Lanka

APPENDIX 4 - Poverty Headcount ratio by district

District	1990/91	1995/96	2002
	%	%	%
National	26.1	28.8	22.7
Colombo	16	12	6
Gampaha	15	14	11
Kaluthara	32	29	20
Kandy	36	37	25
Matale	29	42	30
Nuwara Eliya	20	32	23
Galle	30	32	26
Mathara	29	35	27
Hambanthota	32	31	32
Kurunegala	27	26	25
Puttalam	22	31	31
Anuradhapura	24	27	20
Polonnaruwa	24	20	24
Badulla	31	41	37
Monaragala	34	56	37
Rathnapura	31	46	34
Kegalle	31	36	32

Source: DCS (June 2004) Official Poverty Line for Sri Lanka

APPENDIX 5 : QUESTIONNAIRES FOR THE STAKEHOLDERS

This Questionnaire Distributed in Sinhala among the fishermen

A questioner for the fishermen to find out the life style and the technology use for fishing activities

Name: ,Village:,Fish Landing Centre:

1. What is your educational qualification?
2. Number of members in your family?
3. What is the nature of your job?
4. What is your daily income?
5. How many dependents under you in your family?
6. Do you smoke?
7. Are you a liquor consumer?
8. Have you obtained any loans?
 - a. Loan amount
 - b. Installment
9. Your House condition
 - a. Damage ,Half built, Fully CompletedIf Fully Completed please provide the information on material used
10. How is your family health condition?
11. Do you spend your money on games or any other extra activities?
12. Where do you do fishing?
 - a. Coastal area fishing , Offshore fishing, Deep sea fishing
13. Do you have your own boat?
14. How many days you stay in the sea?
15. How do store your harvest?
16. Names of the equipments currently use for fishing?
17. Names of the equipments previously used for fishing?
18. What are the equipments used for communication while you in the sea
19. What is the condition of them?
20. If you have changed the equipment recently, what are the reasons for change?
21. How would you get to the fishing grounds whilst you are in the sea?
22. Do you get any training, advises from any experts in you area?
23. if yes in (22) how do you get them
 - a. From Government institution ,Private ,News Papers, Radio,Television
24. To Develop Fisheries in your area, please add your comments

APPENDIX 6 : Structured questionnaire survey on technology issues in the Current Fisheries Sector

1. CONTACT DETAILS OF THE INSTITUTION

- a. Name of the Institution
- b. Name of the Head of the division
- c. Address of the Institution
 - i. Office
 - ii. Regional office
 - iii. Telephone
 - iv. Email

2. BASIC DETAILS

- a. Year of establishment
- b. Main Role of the Organization
- c. Annual Investment on Research & Development
- d. Total employment
- e. Main Services in Relation to technology & Rural fisheries sector development
 - i.
 - ii.
 - iii.

3. EFFECTIVE FACTORS IN TECHNOLOGY:

- a. Marine Fisheries operations has been changed due to the following aspects
(Please rank in order of priority: 1- 4 and the indicate the level of measurement)

i. Increase in competition

Strongly Agree	Agree	Fairly Agree	Disagree

ii. Sophistication of customer needs

Strongly Agree	Agree	Fairly Agree	Disagree

iii. Nature of the Product

Strongly Agree	Agree	Fairly Agree	Disagree

iv. Availability of fish according to its economical value in different sea depth level

Strongly Agree	Agree	Fairly Agree	Disagree

v. Technology Transfer due to Globalization

Strongly Agree	Agree	Fairly Agree	Disagree

vi. High demand on Quality Product

Strongly Agree	Agree	Fairly Agree	Disagree

- b. What is the extent of contribution of technological, human & other resources in the fisheries sector in relation to the following activities?

i. Productivity improvement

Major	Significant	Minor	None

ii. Waste minimization

Major	Significant	Minor	None

iii. Introduction of new products

Major	Significant	Minor	None

iv. Quality enhancement

Major	Significant	Minor	None

v. Value addition

Major	Significant	Minor	None

c. Due to changes in economic & social Trends your institution will be focused on new technology to achieve the following objectives.

(Please rank in order of priority: 1- 4 and the indicate the level of measurement)

i. Generation of Investment Opportunity

Strongly Agree	Agree	Fairly Agree	Disagree

ii. Knowledge Intensive Economy

Strongly Agree	Agree	Fairly Agree	Disagree

iii. Generation of Employment opportunity

Strongly Agree	Agree	Fairly Agree	Disagree

iv. Sustainability of Fishing sector (Protect diminishing fish grounds and find alternatives through technology)

Strongly Agree	Agree	Fairly Agree	Disagree

v. Utilization of alternative/new equipments

Strongly Agree	Agree	Fairly Agree	Disagree

vi. Benchmark with some other successful country to achieve the excellence

Strongly Agree	Agree	Fairly Agree	Disagree

d. In which ways and to what extent your institution adheres to structure & manages under new technological development? (Please rank in order of priority: 1-5 and indicate the level of measurement)

i. Business expansion & Diversification (introduction to new fish, more involvement in off sea fishing, Open new canning factories because currently we import cans etc.)

High	Medium	Low	Very Low/Non

ii. Application of Information & Communication Technology (ICT)

High	Medium	Low	Very Low/Non

iii. Integrate other institutions as a policy to exchange knowledge and R& D activities

High	Medium	Low	Very Low/Non

iv. Innovation and R&D

High	Medium	Low	Very Low/Non

v. Capability and Capacity building of the institution itself and strengthen the other stakeholders

High	Medium	Low	Very Low/Non

4. ISSUES OF TECHNOLOGY

a. Which aspect of Technology, Technology Transfer & Adoption do you believe are required for the Fishing Industry

i. Technology forecasting

High	Medium	Low	Very Low/None

ii. Technology Valuation

High	Medium	Low	Very Low/None

iii. Acquiring and absorbing Appropriate Technology

High	Medium	Low	Very Low/None

iv. Gap analysis for the existing technology

High	Medium	Low	Very Low/None

b. Which aspect of Technology Information Base/Source do you believe are required for the Fisheries Sector

i. Facilitations of Technology Information Base/Sources

Major	Significant	Minor	None

ii. Dissemination of Technology Information

Major	Significant	Minor	None

iii. Usage of Information Communication Technology

Major	Significant	Minor	None

c. How to integrate key stakeholders such as government, public, Private, NGOs and other organizational roles for bridging the gap in rural fishing sector through innovative technology?

i. Innovation and R&D

High	Medium	Low	Very Low/None

ii. Technology Development, Management and Transfer to the appropriate entities within the Fisheries Sector

High	Medium	Low	Very Low/None

iii. Evaluate & Monitor Technology Impact on Fisheries Sector

High	Medium	Low	Very Low/None

5. Level of technology capability

a. Availability of Technology levels in your Institute/Organization

b.

High	Medium	Low	Very Low/None

