Project factsheet information

Project title	Mobile Portal for Fisheries Community Services
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Country of implementation	Democratic Socialist Republic of Sri Lanka ISO code: LK
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Partner organizations	None
Total budget approved	AUD 40,000.00
Project summary	In Sri Lanka, over 600,000 people are directly employed in fisheries and over 3 million people are dependent on this sector. Every other person in country uses a mobile phone, but this huge potential hitherto remains untapped to provide requisite information services to the fisher folk. In this pilot project, Mobile/Web-based Service Portal that could provide a wide spectrum of service enhancements to meet needs of the fisheries community has been developed by means of two sub-systems. Firstly, a SMS/Web based Trading Portal that facilitates identifying a better market for harvested fish and completing marketing process yielding benefits to the fisher and the consumer.
	Secondly, an Info-Server Portal that could provide fishermen not only with market related information, but also with other important information such as weather conditions, locations of fish, etc. Some of these information provisioning services demand expensive and sophisticated equipments. However the operational platform that we have deployed makes it possible channeling such information to affordable mobile telephones.
	Finally, we propose sustainability measures for the system together with future directions for further development.

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Project Summary

In Sri Lanka, ICT infrastructure is relatively well developed, but this technology has not been harnessed to improve the productivity, safety and profits in fisheries and alleviate poverty of the people engaged in the fisheries sector. As every other person practically uses a mobile phone, there is great scope to provide information to the fisher folk concerning weather, location of fish, domestic and overseas demand for fish, price fluctuations, supplies, etc.

Therefore our team helps harness this technology and establish necessary ITC infrastructure and train people engaged in fisheries sector so that they have ready access to set vital information through mobile phones. This would not only ensure that they get the highest possible harvest but also the best possible local/foreign price for their fish. This would result in increased catch, higher income and increased national fish production, improving the nutrition of people.

The fisheries sector of Sri Lanka, one of the major contributors to the national GDP, is expected to be expanded through a 10-year Fisheries Sector Development Policy Framework formulated by the Ministry of Fisheries and Aquatic Resources (MFAR) in Sri Lanka. NIFNE (Ocean University of Sri Lanka), with its mandate to providing training and education in Fisheries and Nautical Engineering, intends to operationalise certain innovative concepts using ICT targeting the fisheries community affording tangible benefits to them.

In Sri Lanka, over 600,000 people are directly employed in fisheries and over 3 million people are dependent on this sector. At present, this sector contributes 1.5% of GDP and

according to the 10-year development plan it is envisaged to increase this up to 5%. Every other person in country uses a mobile phone, but this huge potential hitherto remains untapped to provide requisite information services to the fisher folk. In this project, SMS/Web-based Service Portal that provides a wide spectrum of service enhancements to meet the needs of the fisheries community in Sri Lanka has been completed. Two main categories of needs as articulated by the fisheries community have been addressed and facilitated through this initial phase of the pilot-project. Firstly, a Mobile Trading Portal that facilitates identifying a better market for the harvested fish and completing the marketing process yielding benefits to the fisher and the consumer. Secondly, an Info-Server Portal that provides fishermen not only with market related information, but also with other important information such as weather conditions, locations of fish, etc. The development of Mobile Trading Portal system has been completed during the first half year of the project duration as it is with utmost importance for concerned fisher community. Then during the second half year of the project was dedicated to development of Info-Server Portal system.
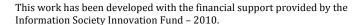
Justification

Unavailability of firsthand market information such as demand for and supply of different varieties of fish and price fluctations of fish in domestic and international markets to fishermen at right time has created a problematic situation in the local fisheries industry where the middleman plays a central role and reaps unfair profits. As a result, the fisherman who goes to the sea under risky conditions as well as the consumer who needs the fish as a source of cheap protein are affected and do not derive due benefits. Therefore, issues related to profitability of fisheries, safety in fishing and offering fish to the consumer at an affordable price constitute high priority concerns and need to be addressed promptly.

For the provisioning of relevant and up-to-date information for the aforementioned target groups, in this project, widely available mobile telephony networks have been used. Motivation for the selection of this technology is its availability and accessibility to all irrespective of socio-economic layers that the targeted groups are belonging to.

In a knowledge economy today, competitive advantages could be achieved mainly through access to the right information at the right time. However the sophisticated technology and equipments to provide such information service demands are very expensive. Therefore this project aims at overcoming such difficulties by innovatively tapping a hitherto untapped potential of widely available low cost and localized technology, i.e. SMS available on mobile telephony, with local language text interfacing in providing requisite information services to the fishers and related stakeholders. Application of SMS technology for trading in general and for fisheries industry in particular is a novel and innovative approach in local context.

Promising service enhancements in fisheries industry have been noticed within the project duration that could scaled-up the idea in the long run at national and then at international levels. As a result the solution ensures to avoid the unfair involvements of middlemen in fish trade so that the benefits will trickle down to the fishermen and to the consumer communities.

Fig. 1 *Traditional Fish Markets in Local Fisheries Harbors*

Project objectives

There are two main objectives as included in our grant agreement as below.

1) Development of a Mobile Trading Portal System
2) Development of Info-Server System

However in order to achieve these two high level objectives, list of sub-objectives have been identified and reported together with their achievement status and brief assessment comments on them in the table below.

Table 1   Objectives and Assessment on their Achievement

Objective	Achievement Status	Comments
Objective 1: Stakeholder Group Selection	Achieved	Selected fisher communities attached to Operating Center Nodes Established. Also their family members (wives and children) were included as they got more free time and interest on this technology.
Objective 2: Requirement Elicitation for Fisher Community Portal Service System	Achieved	We have completed several workshops, meetings and field visits and have made observations on fisheries trade and related practices in order to get a better understanding on requirements for the Fisher Community Portal Service System.

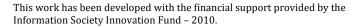| Objective	Achievement Status	Comments
Objective 3: Surveying Candidate Technologies for Proof-of-Concept Implementation of the Fisher Community Service Portal	Achieved	Investigations for candidate technologies in the market for system implementation and also for possible third party service integrations were completed. It was decided to use open source solution as much as possible for future sustainability.
Objective 4: Establishment of agreements with third party service/technology providers	Removed On-going (3rd Party Service integration)	As our technical team configured an Open Source SMS gateway with the connectivity from Sri Lanka TeleCom-Mobitel, need for an establishment of agreements with third party technology (SMS Gateway) provider was not necessary. But negotiations are going on with other possible service integrations such as courier services, payment gateways and to interface weather/risk alters, etc.
Objective 5: Design Fisher Community Service Portal System	Achieved	Following three-tier software architecture and Object Oriented Development approach, a full-fledged Fisher Community Service Portal System was designed in compliance with ISO-OpenEDI Phases of Business Collaborations that have been also recommended by UN/CEFACT[1].
Objective 6: Development of Fish Trading Portal System	Achieved	SMS/Web-based Fish Trading portal system has been developed on open source software.
Objective 7: Development of Info-Server Portal System	Achieved	SMS/Web-based Info-Server portal system has been developed on open source software.

[1] UN/CEFACT's Modeling Methodology (UMM) – User Guide, http://www.unece.org/cefact/umm/UMM_userguide_220606.pdf (Last visit on 31.07.2011)

Objective	Achievement Status	Comments
Objective 8: Capacity Building and Training Programs	Achieved (will be continuing on demand)	Several training sessions and awareness programs with the objective of preparing target/related group to use portal system. Further customizations with the user participation are on going.
Objective 9: Dissemination of Knowledge	Achieved (Continuing in our future research activities)	Among completed knowledge dissemination activities seminars at NINFE, Workshops conducted in the field, Outreach Stall at "Dayata Kirula[4]" national exhibition and few reach publication national and international forums are prominent.
Objective 10: Establishment of Operating Center Nodes	Achieved [Continuing for future expansion needs)	The original idea of setting-up two Operating Center Nodes at fishing harbors; one at Kudawella and the other at Dondra has been extended by inclusion of Tangalle fishing harbor through the Main Operating Center at Ocean University's Tangalle branch.

Fig. 2 *Interactions with grass-root level Stakeholders*

Our objective of adopting the participatory development is that all involved partners from different stakeholder groups would then contribute to success of the project and also to ensure its smooth operations by under taking various responsibilities and roles as well.
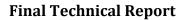
Project implementation

Project objectives	Activities	Timeline	Overall assessment
Objective 6: Fish Trading Portal System	Activity 1: Trading Party Registration Module	June to August 2010	Relevant Trading Party information is registered through this module. Although the initial registration is required via web connection, much of the necessary update and the amendments are facilitated even through SMS communication. This is a web-based portal, developed using MySQL Database Management System (DBMS) and php, javascript, ajax. Majority of interfaces have completed on Joomla designing environment. However, we noted getting fisher community stakeholders to operating centre with necessary technical facilities even to complete this online registration is not that easy due to their attitudes and other engagements. Therefore we are to run in parallel automated as well as manual registration with printed forms by physically meeting them in the field and then upload them to system.
	Activity 2: Product Registration Module	July to September 2010	To register both Preliminary Product and Auxiliary Product Profile information a web-based portal connecting MySQL DB was developed. Although users are not allowed through this portal to add new products definitions in relevant categories, they can upload such requests to the system through Internet or SMS communication. When this repository get populated through this module with all relevant product profile information, there is a huge potential of being used not only in fish trade related application but also in wider usage ranging from academic/research to other different industry application and adaptation.
	Activity 3: Trading Offer Registration Module	August to October 2010	Resulting registered product profile information from Product Registration module can be used through this module to compose and then to register different offers from sellers. The web-based implementation and its functionalities are very much identical to above Trading Party and Product Registration modules expect in this Offer registration, main done through SMS interactions.
	Activity 4: Trading Demand Registration Module	September to November 2010	This is exactly equivalent to Trading Offer Registration in the way it was implemented and its functionalities but here, Demand from buyers are composed and then registered.

Objective 7: Info-Server Portal System	Activity 1: Weather Info Module	November 2010 to February 2011	Using this module, data entry operators could upload weather information using web-based interfaces. In current version of the system, facilities are available to upload weather information both in Sinhala and English.
			With the same module subscribed user can receive weather information according to their preferences.
			With the future plans we have with this project, there are possibilities of integrating weather information from third party such as Metrology Department on an agreement. Through such integration weather information could be automatically updated to the system without any delay that may cause in present set-up.
	Activity 2: Fish Market Info Module	December 2010 to March 2011	Similar to Weather Info Module, we have developed web-based Fish Market Info Module to upload national and international fish market related information to the system. As in the above module, depending on subscribed user preferences, national and international fish market related information could also be received by the user on their mobile phones.
			Further as in the above, in our future plans we are to look for possibilities of getting these information sources also integrated to our system to provide accurate and timely information on agreements (for instance from Central National Fish Market, etc).
	Activity 3: Third Party Service/Product Info Module	January to April 2011	As we also explained under Lessons Learnt from Project Implementation section, there are bunch of direct and indirect parties for smoother operations in this industry. This develop module provide mechanism to upload such third party Service/Product information and their suppliers information.
			Then subscribed users in need for such third party service could query this third party service registry and get relevant information on to their mobile phones.

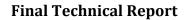**Fig. 3** Dondra Nanasala Tele-center where to setup Operation Center Node 1

Fig. 4 Kudawella community center where to setup Operation Center Node 2

Project outputs and dissemination

Project outputs	Status	Assessment	Dissemination efforts
Output No. 1: Trading Party Registration Services	Completed	Unavailability of a registry for fisher community even with basic required information to facilitate their business collaboration and related service, demands us to develop Trading Party Registration module. Through these services not only fish-buyers and fish-sellers but also third party auxiliary service providers could request for registration with the Mobile Portal System. After receiving the recommendation on verified Trading Party Information from Operation Center Nodes, management at Main Operating Centre could grant access by activating users.	This Trading Party Registration Services are available on web portal, http://220.247.247.71/Fishery/ under "User Registration" option. These services are mainly expected to be access through the network of Operating Centre Nodes. [Note 1]: We have also summarized all project output listed in the table in our published research papers. Moreover, we have planned disseminating further technical details in our future publications in relevant forums and in the context of our students' postgraduate work. [Note 2]: We have also planned sharing completed software modules in a public domain such as http://www.sourceforge.net at the completion of the project after

Project outputs	Status	Assessment	Dissemination efforts
		scaling-up and fine tunings.	
Output No. 2: Trading Offer Registration Services	Completed	Although few of the service/product offers are available on scattered sites on Web, it was realized relevance and importance of having central repository/registry to register fish trade related offers. In our Trading Offer Registration module, there have bunch of service enhancements been achieved. Among them parameter setting-up for automatic Offer update (for instance parameter to price tag decrease and quality depreciation with time) could be mentioned. Another service enhancement achieved is that Supplier you update registered offer through SMS requests.	This Trading Offer Registration Services are available on web portal, http://220.247.247.71/Fishery/ under "Trading Offer Registration" option. These services are mainly expected to be access through Suppliers mobile phone. However web-based interface has also been deployed. * [Note 1] and [Note 2] also applied here.
Output 3: Trading Demand Registration Services	Completed	Although few of the service/product demands are available on scattered sites on Web, it was realized relevance and importance of having central repository/registry to register fish trade related demands. Very much similar to above, in our Trading Demand Registration module, there have bunch of service enhancements been achieved. Mainly via SMS messages Buyers can get updated (for instance price, quality, quantity, etc) with their published demands.	This Trading Demand Registration Services are available on web portal, http://220.247.247.71/Fishery/ under "Trading Demand Registration" option. These services are mainly expected to be access through Buyers' mobile phone. However web-based interface has also been deployed. [Note 1] and [Note 2]
Output 4: Contract Negotiation Services	Completed	During our field visits and interactions had with target groups it was revealed that no utilization of technology for contract negotiation for deals. Through the Contract Negotiation Module, we have implemented SMS-based interaction facility for buyer and seller to complete deals.	Contract Negotiation Services are available on the trading portal system. Resulting status of published Offers as well as Demands could be found on above two portals. These services are mainly expected to be access through Sellers' and Buyers' mobile phones. [Note 1] and [Note 2]

Project outputs	Status	Assessment	Dissemination efforts
Output 5: Weather Information Services	Completed	There are several weather information portals on the internet. However, access to localized weather information (with community preferences such as their local languages and region specific weather information in sea) via mobile telephone network is not possible. In order to close this gap, we have developed this Weather Information Module through which subscribed users can receive selected weather information and related weather notifications on to their mobile phone.	This Weather Information Services are also available on web portal, http://220.247.247.71/Fishery/ under "Weather" option. These services are mainly expected to be access through Fishermen's mobile phone. However web-based interface has also been deployed for interested public community. [Note 1] and [Note 2]
Output 6: Fish Market (Price) Information Service	Completed	Regarding fish market information, current practice among fishermen mainly is to through middlemen in contact. However we have realized that these second hand information and not accurate and complete. In order to overcome this situation a Fish Market (Price) Information Module has been developed. Information such as current demands and price fluctuations could be received to subscribed-user mobile phone through his module.	This Fish Market (Price) Information Services are also available on web portal, http://220.247.247.71/Fishery/ under "Fish Market" option. These services are mainly expected to be access through Fishermen's mobile phone. However web-based interface has also been deployed for public. [Note 1] and [Note 2]
Output 7: Auxiliary Service / Products Information Services	Completed	The fisheries industry is heavily dependent on several other auxiliary services/products such as fishing equipments, ice supplies, mechanical and electrical maintenance services, etc. However, access to information such as availability, prices, etc of these services is hardly accessible to fisher community in need. The Auxiliary Service/.Products Information module maintains central catalog of these third party service providers and make provisioning of request information mainly via SMS conveniently.	This Fish Market (Price) Information Services are also available on web portal, http://220.247.247.71/Fishery/ under "Auxiliary Service Providers" as well as "Information Service Subscriptions". These services are mainly expected to be access through Fishermen's mobile phone. However web-based interface has also been deployed to make wider availability. [Note 1] and [Note 2]

Project outputs	Status	Assessment	Dissemination efforts
Output 8: User Manual for Mobile Service Portal System	Work in progress	For smother operation of deployed portal solution, it has been recognized the importance of having user manual for available services. We have made necessary arrangements to make these user manuals to be available on Internet as well as to distribute hardcopies among the user community.	This User Manual will also be available on our web portal, http://220.247.247.71/Fishery/ under "User Support" with visual illustrations for easy understanding.
Output 8: Research Publications and Knowledge Dissemination	Completed	Several research contributions in the forms of research papers, presentations and posters have also been achieved in parallel within the project activities. In addition to the above, Ocean University of Sri Lanka has taken initiatives to include most of the findings and technological provisioning in fisheries sector explored through this project also in their formal curriculum. Intension is to popularization of new technological advancements and for capacity building among skilled personnel produced by the Ocean University.	These research contributions have been published in national and international forums including ones listed below. 1) ICORE 2011[2] 2) ICTer 2011[3] 3) Dayata Kirula 2011[4] As we are to continue further research and development activities initiated under this pilot project, more research publications and knowledge dissemination activities will be arranged as available provisioning permits us.
Output 9: Trainings & Workshops Target Group	Completed	Targeted stakeholder group's participation has been recognized with utmost importance. Therefore form the very beginning of the project, several field visits, formal and informal meeting, workshops and training programs have completed successfully. Further project management appointed community coordinator, Mr. E.H.M. Wasanatha to work as the link between project team and user	List of some activities completed under this output category have also been detailed out below.

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[2] http://www.icore-uum.net/index.php

[3] http://www.icter.org/UCSCConf/index.php/icter/icter2011

		community.	

Project outputs	Status	Assessment	Dissemination efforts
Output 10: Press Conference	Completed	Having notice less awareness on technological potentials among engaged community in this sector as well as general public, at the end of the project we organized very success media conference representing all southern region media personnel.	We are looking forward for more space in media for activities and community services from Ocean University in Sri Lanka and in particular regarding the Mobile Portal System for Fisher Community Services completed in ISIF sponsorship.

In section below, we have included some of pictorial illustrations of deployed Mobile/Web based Trading Portal system on the selected technology together with some of knowledge dissemination and social interactions that we engaged in.

Few Screen Shots of the Deployed System

- Fish Variety (Mandatory)
- Offered Quantity (Mandatory)
- Expected Price (Optional)
- Quality at offer placement(Optional)

Fig. 5 Trading Offer Registration Request & Acknowledgement via SMS by Sinhala Supported Mobile Phone
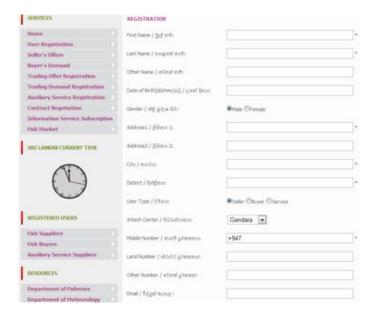
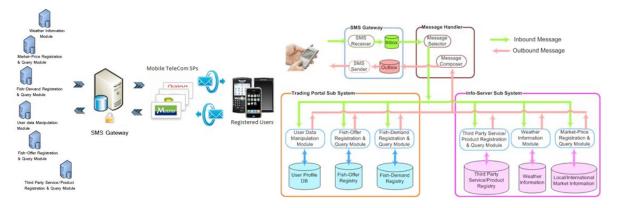**Fig. 6** Trading Party Registration Portal – Section of the Web Form (see http://220.247.247.71/Fishery/)

Fig. 7 Overall Portal-System and Development Architecture

<u>Knowledge Dissemination and Social Interactions</u>

Fig. 8 *Press Conference with the participation journalists from Southern Region*

Fig. 9 *Knowledge Disseminations and Interactions with International Community at ICORE 2011*

Lessons learned from project implementation

Mobile Trading Portal Development project team was engaged in fisheries industry domain analysis, survey on available hardware and software technological platforms for the development of proposed solution since the submission of ISIF grant application. In this section we have summarized some of the important lessons learnt with respect not only to technical but also social aspects. For be successful deployment of the proposed our solution and for suitability in its long run these findings has to be taken into consideration.

1. Fish Trading Process Domain Knowledge:

    I.   **Streamlining of conventional trading practices.** Having studied and observed common fish trading procedures in several locations, we have observed that there is considerable room for streamlining of those processes in order to get increased productivity and efficiency by introducing of proposed technologies. Although this is possible through the technological platform that we have developed, getting full spectrum of stakeholder groups on board is somewhat harder task to manage by Ocean University of Sri Lanka in isolation. Therefore intervention from relevant government authorities and other organization are very much needed.

    II. **Involvements, relationships and dependencies with the Middlemen.** Middlemen in most of the situations not only buy the harvest but also act as a provider of many other services including different financial service (providing loans, etc)/different payment models. Even though it is possible to get excluded middlemen with the proposed solution, we felt it is appropriate to get them also on board rather than excluding totally as most middleman is a prominent character and not easy to get rid in these collaborations.

2. <u>Multiparty Involvement</u>:

One of the initial lessons learnt from the project is the involvement of a multitude of direct and indirect parties engaged/interested in Fish Trade and related activities. These different parties were indentified and categorized as Primary Actors, Supportive Actors and Off-stage Actors/Service Providers. In the project, registration and profile management services are implemented and also populated mainly with selected target group data. Sub-system providing these additional and complete functional services if deployed island-wide then the system with a huge potential that could be utilized for many different applications as it could function as a rich and complete information-base providing many different analytical reports and multi-dimensional interpretations.

3. <u>Widely accepted/practiced Fish Trading Processes</u>:

The Trading Portal System to be deployed in the project is the development of services to facilitate Fish Trading processes. Through interactions with the target groups attached to the selected centers established in Fishing villages and through first-hand observations made during our field visits, we were able to understand and to document current Fish Trading scenarios, ad hoc procedures followed and inter-dependencies among activities and actors.

4. <u>Limitations/Difficulties in Fish-Trading and Fisher Community</u>:

During our solution development and deployment, we were informed by the selected stakeholders groups with their difficulties and poor conditions in the industry. We learnt that most of these deprivations could readily be removed with the introduction of modern technology, proper coordination and by educating the community. Through this project, through our future proposals and through engagements with relevant authorities these issues could be rectified. Few of these issues listed below,

  I.   Difficulties to access critical/important information in time (i.e. weather, market related, etc)

 II.   Integration/interoperability issues with auxiliary fish trade related services (packing, transportations, etc)

III.   Coverage issues with Mobile Telephony Service Providers

IV.   Unavailability of supportive services (financial, vessels maintenance, etc)

 V.   Issues with fish harvest and harvesting practices (catching un-grown fish, difficulties to access sophisticated equipments, etc)

5. <u>Preparedness/Willingness to Technology Acceptance and Business Innovations</u>:

Also we noted mainly in aged user groups lethargic attitudes towards adoption innovative business models in place of legacy procedures and acceptance of technological advancements. Much of these situations we could be able improved through education and demonstrations. However, we learnt it is important to include some of these aspects to country's formal education as well through which we hope considerable attitudes change can be easily achieve, if taken-up as government policy decision.

6. <u>Information Logistics</u>:

In local context, the fishermen who fish in risky conditions are not finding a better market for their harvest. This is mainly due to the unavailability of information through appropriate channels at correct time. Provisioning accesses to right information in right time is the remedy for this condition. In this project we have identified critical and relevant information to the target groups. These information categories include Safety Critical, Market Related, Entertainments, Family Interactions, etc. We have implemented these services that could be accessible by fisher community via affordable channels such as Mobile Telephony as well as through Web.
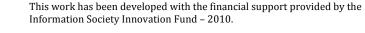
7. <u>Open Source Development Environment</u>

As a policy decision within the project, it was decided to use open source software solutions wherever possible. This is mainly due to the facts such as huge cost and security concerns associated with most of well-known proprietary software development platforms. Server and most of our workstations runs Fedora operating system while open source, Apache and MySQL have been selected for Web-server and Database-server. For the system development open source technical platform such as php, javascript, and ajax were used as these are sufficient and appropriate for the proposed Proof-of-Concept implementation.

8. <u>SMS Gateway</u>

In order to get avoided dependency to a particular Mobile Telephony - Third Party Service Provider (MT-TPSP), we have selected Open Source SMS Gateway and customized to meet our requirements in the Proof-of-Concept implementation in the pilot project. However, actual connectivity for channeling SMSs received from a MT-TPSP. This situation resulted several technical configuration issues with the HSDPA Modem to which technical support only available for a popular proprietary Operating System. Our technical team was capable enough to find solutions for all such issues with technicalities.

Anyhow, for the performance and system scaling-up possibility we may have to compare with services from these third parties in real SMS traffic environment in large user interactions. If these third parties can offer better service in this context, we may have to get into agreement with them in future.

Project management and sustainability

NIFNE is the sole project management and controlling authority for system development activities and for working out project sustainability issues. Project management is mainly achieved through regular meeting with project team members and selected stakeholder groups and other forms of interactions such as teleconferences, eMails and also through off-line conversations. The fundamental philosophy adapted with the objective of making the project a success is the participatory development. With this idea, we are to achieve the maximum contributions from all stakeholder groups and also their readiness to take responsibilities during development as well as at the system operation.

We were interacting with target stakeholder groups via existing community organizations such as Fisheries-Cooperative Organizations, Nanasala Tele-centers and other Social Organizations. At this stage of the completion of initially proposed pilot project, our expectations are these organizations and their membership those who partner, take the responsibilities for maintenance and further development requirements together with NIFNE's guidance and support.

Impact

With the introduction of proposed Mobile Portal solution in this pilot deployment, we have seen the real potential of achieving several benefits with the positive impact on target communities. Listed below are some of the areas such benefits are possible as we realized with our test runs and user interactions.
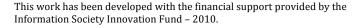
1. Market Expansion

As all fish offers uploaded to a central Offer Registry such as one we have deployed, there is huge potential of been contacted by prospective buyers not only from regional communities but also from island-wide as well as foreign countries. With such promising market expansion, there would be chances for getting better prices for the catch together with competitive advantages.

2. Smart Fish Trading Culture

Even with the small community that we engaged-with in this pilot deployment of our solution we have notice how people are ready to get shifted to Smart Fish Trading Culture where traditionally it was considered in often cases as at lower social dignity levels.

3. Innovative Business Models for Entrepreneurs

As we have attempted the development of our trading platform in compliance with global standards such as UN/CEFACT's recommendations and ISO Open-edi Phases of a Business Collaboration, there is potential of being integrated to the system several other national and international trading parties. With this potential local SME and Entrepreneurs could developed many different innovative business models. For instance integration with courier and payment gateway with our system could facilitate a business that delivers traditional food dishes not only to local urban consumers and also to interested consumer communities very much possible in Diaspora. Another situation that has huge potential of devising innovative business models is the centrally collected and published fisher community needs and requirements in a repository. Such a web-repository makes provisioning for dispersed service providers to get in contacted even with new businesses in fish sector.

4. Co-operative Buyer/Seller Trade Engagement

As we are collecting all Fish Offers as well as Fish Demands in a central repositories, there are several possibilities for trading party matching and then facilitation for deal completion. For instance Demand for a huge fish quantity (say, Tuna 750 kg from a buyer) could ready be met with group of matching supplies (say, Tuna 400 kg, 200 kg, and 150 kg from three different sellers). Reverse of this situation also possible. This has positive impact on strengthening Co-operative like virtual trading units in this digital market.

5. Access to Sophisticated Technology/Equipments

Another huge positive impact possible through this mobile portal system is provisioning information such as locations of fish availability that only could be received through high cost and sophisticated equipments. Ocean University of Sri Lanka has plans for integrating such technologies into our system.

Overall Assessment
Even from the very initial stages of the project activities, all involved parties and stakeholders were with the understanding of the importance of availability and provisioning of services through appropriate channels in correct time. However, besides lack of skills and unavailability of off-the-shelf trading solutions to meet local needs, and many other issues in the real environment, we have recognized. Through the project in this nature afore said skills and trading solutions could be developed. But the issues we have recognized during of studies and work carried out during the project activities, need intervention of governmental and other relevant authorities for total success.

It was interesting to note here that all involved parties and stakeholders very clearly understood the importance of the project work and also to need to scale-up the proof-of-concept implementation in this pilot this project. Within the constraints in financial margins, we have identified and set-up three operation centers in fisher villages with necessary basic infrastructure requirements. This is slight extension to the original plan for having only two operating centers. Further, we have developed necessary skills of selected stakeholder groups in order to run the centers while utilizing information and trading services that have been deployed in their day-to-activities.

With the formal in informal feedback we have received our overall assessment is this type of trading/information portal solution deployments are with great potential however in order to overcome some of the issues in relation to practical situations, we have to look for assistance and endorsements relevant governmental and other related organizations community organizations.

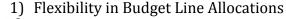Skill Development and Capacity Building Programs

One of the assessments that we have reached during the project activities that we have completed so far is difficulties with present generations (mainly with aged community) in this industry to find time to take-part in skill development and capacity building programs. However as way out of this situation at least in times to come, we have selected and get involved future generation to take-up in this industry. Our expectation is that when they are to start their carrier in this industry, they are equipped with necessary technological awareness making maximum benefit in their day-to-day activities in the industry.

Fig. 10 *Several sessions to educate and equipped the community to tap benefits from technology advancements.*

Recommendations
With the experience that we have obtained so far, we would like to make following recommendations to the ISIF and its funding partners.

1) Flexibility in Budget Line Allocations

Through our first hand interactions with the targeted stakeholders, we came across situations where necessity pops up for slight changes to the original project plans. We appreciate very much if relevant authorities allowing such needs upon provision of acceptable justifications. For instance in our project after negotiating and analyzing ground situation, we understood the relevant and importance of have LCD type displays at the vicinity of fisher community and traders.

2) Reuse of Best Practices and Solution in Different Domains

Although in the original proposal we targeted Fisheries Industry, completed solution in this nature could easily be deployed in many other domains. Since we have some ideas on such possibilities and we definitely look forward for financial support from ISIF similar funding partners.

3) Extension for Infrastructure Services

Another important issue that we were facing is the limitation with some necessary service extensions. For instance for this project one of the fundamental requirement if Mobile Telephony coverage and availability could be pointed out as most important issue for full potential usage of Mobile Trading and Related Portal Service.
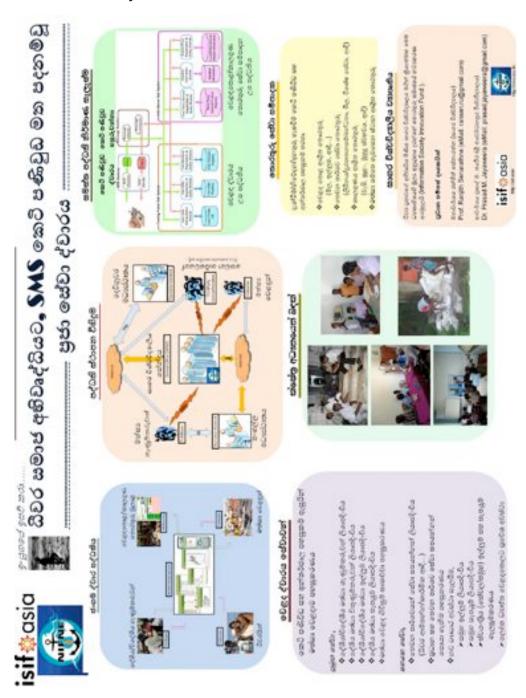
4) Auxiliary Service Provisioning and Integration

During our system study we were demanded by the fisher community for provisioning wide spectrum of auxiliary services through the available technology and integration. However we have tried our best to meet these requirements within constraints mainly with time and costs but further improvements for these services and their integrations are very much needed. Our team interested in working with funding partners and other relevant authorities to improve the prevailing situation with difficulties for all user categories. Under these auxiliary services relevant to the sector we have been working for this project, we could name few such as, Fishing Boat Maintenance, Fishing Equipments Trading, Transportation, Payment Gateways etc.

Post Session –Deyatakirual 2011[4]

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[4] Deyata Kirula 2011, http://www.news.lk/home/17331-president-visits-deyata-kirula-exhibition