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Faculty of Biosciences, Fisheries and Economics

Impact of Small-Scale Aquaculture on Rural Livelihood

A study on how an aquaculture project affects the livelihood choices of poor people

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Abstract

Nepal is a poor country where the problems of poverty and food insecurity is very much evident. Aquaculture has been identified as one of the major sectors that could bring about the changes in the lives of poor communities through employment, food security and income. Currently, the Government of Nepal has identified and recognized the contribution of aquaculture towards poverty alleviation and food security, and the development in the fisheries and aquaculture has been emphasized, providing special attention to better productivity and production enhancement. This research is conducted to find out the impact of small-scale aquaculture project on the livelihood choices and how the poor people maximize their resources in the long run.

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Introduction

Nepal is among the least developed countries in the world. Poverty is widespread in the country with 1/3 of the population below the poverty line of USD 100/year. Malnutrition rates in Nepal is among the highest in the world and more than 50% of all districts of Nepal are food-deficit (Edwards, 2013). “The 2013 Human Development Index’s (HDI) Multi-Dimensional Poverty Index”, a report by UNDP, revealed that 44% of Nepalese people live in multi-dimensional poverty (Edwards, 2013). Thus, the problems of poverty and food insecurity is very much evident in Nepalese context. Since Nepal is a developing country, there are many people who struggle to get even the basic needs of human life. From lack of food security to lack of income for fulfilling the basic needs, different communities in Nepal have been facing severe problems relating to their daily livelihood, health, education etc.

Aquaculture has been identified as one of the major sectors that could bring about the changes in the lives of poor communities through employment, food security and income(Edwards, 2000). Aquaculture is a new and dynamic sector of agriculture in comparison to other sectors of Agriculture in Nepal (APP, 1995 in Shrestha & Pant, 2012), although fisheries are deep rooted in Nepalese customs and traditions. Aquaculture started in Nepal in 1940s with the introduction of Indian major carps in ponds. Further introduction and success of other species like common carp in 1950s was followed by monoculture practices in 1960s and gained popularity in private sector. Significant progress was seen in the 1970s with the introduction of three exotic Chinese species viz. silver carp, bighead carp and grass carp. The major breakthrough in Nepalese aquaculture has been the breeding of these three species in captivity, and this success was followed by success in the polyculture system of production in ponds. But the actual development of the practice was seeing from the early 1980s with the execution of Aquaculture Development Project supported by the Asian Development Band and UNDP (FAO, 2005).

Fish farming is currently very popular among the Nepalese farmers. However, there are few evidences which show the impact of fisheries and aquaculture development on communities with

high return on investments in comparison to other sub-sectors of agriculture (Mathema, 1992; FFP, 2002 in Shrestha & Pant, 2012 p.6). Currently, the Government of Nepal has identified and recognized the contribution of aquaculture towards poverty alleviation and food security, and the development in the fisheries and aquaculture has been emphasized, providing special attention to better productivity and production enhancement (MoAC, 2009; NARC, 2010 in Shrestha & Pant, 2012 p.6). The fact that Nepalese government has launched a major investment programme to improve the production of fisheries in Morang district also emphasizes the prospect of fisheries and aquaculture in poverty alleviation and food security. Morang district, under the 10-year Prime Minister Agricultural Programme, was declared a “Fisheries Zone” in 2017. The government has invested Rs. 176.8 million to dig additional fishponds on five hectares of land to promote commercial fish farming and has granted a subsidy of Rs. 300,000 per hectare for farmers to dig ponds. Apart from Morang district, the government had also allocated Rs. 370 million in the fiscal year of 2017 to promote Bara as a fishery hub under the Prime Minister Agriculture Modernization Project. The number of farmers undertaking fisheries and setting up fish farms in the region has increased over the years due to high returns. Under the super zone scheme, the project will help farmers establish fish nurseries, dig ponds and establish post-harvest centres (“Fish farming gets govt boost”, 2017). These evidences suggest that aquaculture/fish farming has been identified as a major means to improve the income of the poor people.

The Nepalese aquaculture sector is just in its early phase now, thus it is entirely based on the artisanal fisheries. Although the demand is very subsequent, the production of wild fisheries is declining, and aquaculture is just in its starting phase. About 60% of the fish consumed in Nepal is imported from India. However, fish farming/ pond aquaculture is gaining its popularity and most of the production of fish in Nepal is through pond aquaculture (Edwards, 2013).

To analyze the potential of the aquaculture in Nepal and to see the impact it has been creating in the short term, I chose to study the “Resilient Livelihoods and Sustainable Food Security” project in Nepal. The Resilient Livelihoods and Sustainable Food Security project comes under the concept of Intentional or Interventionist development. Interventionist developments are the directed and focused processes where development projects and efforts are initiated and implemented by government and non-government organizations to assist the poor people (Morse

& McNamara, 2013). The projects are usually time and resource bound, yet the result and the gains from these projects are assumed to continue even after the completion of the project. Interventionist development asks for an external intervention when the communities or the groups are not able to initiate any development works on their own. The interventionist development forms the core of the Sustainable Livelihoods Approach (SLA). The SLA can be seen implemented in many recent development programmes implemented with a goal to reduce poverty and vulnerability and to improve food security and income, especially in small- scale fishing and aquaculture based communities (Allison & Horemans, 2006). Thus, this project will be analyzed within the context of the SLA theory.

The Resilient Livelihoods and Sustainable Food Security project has been running in Kanchanpur District that lies in the Western Part of Nepal since 2013, targeting the uplift of the marginalized communities in terms of food security and income generation in a sustainable manner. The people or the group involved in these projects are mostly very poor, not only from economic point of view but also in broader sense of access to education, health, opportunities, social status etc. For my research, I have chosen 4 different groups with different backgrounds involved in pond aquaculture. The aim of my research is to find out how the aquaculture project is impacting the livelihood choices of the people in the short-run for the long-run gains and what could be its impact in the long run. In order to address this issue, I will try to answer the following questions:

- 1) What changes, both direct and indirect, can be seen from the project as for now?
- 2) How is the project affecting the livelihood strategies of the people now?
- 3) How is the project enabling the people/groups to be sustainable after its end?

Background- the Project and the Project sites

This section provides information about the project and the 4 different sites that were studied for this research.

The Resilient Livelihoods and Sustainable Food Security project

This project started in Nov 2013 with an aim to support the poor, marginalized and vulnerable communities in their livelihood. The main focus groups of this projects are the freed Kamaiyas (bonded labors), Dalits (lower caste who are considered untouchables) and the communities who are vulnerable to disasters (NNSWA, 2017). This project was initiated by Nepal National Social Welfare Association (NNSWA). Established in 1990, NNSWA is located at the far-western region of Nepal and it has been running various integrated community-based development programs in the region (NNSWA, 2017). NNSWA has been supporting four different aquaculture groups under this project. However, along with aquaculture, it has also been supporting the members of the groups in agriculture and cash crops (viz. sugarcane, lemon, banana, mushrooms etc.) farming as alternative income generating activities. Under this project, each aquaculture site has been cultivating 5 kinds of fish viz. Common Carp, Silver Carp, *Bhakura* (Catla), *Naini* (*Cirrhinus mrigala*) and *Rohu* (*Labeo rohita*) (NNSWA, 2017).

Parsa Tal Group (1st Group)

Parsa Tal is the name of the pond which is located at the center of Dhakka Chandar village in Belauri, Kanchanpur, Nepal. This pond was a common fishing ground for the people living around it. The area of the pond is around 9143.01 sq. m. For last 15 years, this pond had been used by the people living around it as a common resource to catch the wild fishes. Currently about 30

households are involved in the aquaculture activities in this pond. The people involved in this site are the inhabitants of the area where this pond lies.

These people of this site belong to the “Tharu” community which is one of the indigenous communities of southern part of Nepal. Almost all of the household’s members belong to lower class income level group who are heavily dependent on agriculture for their living. Prior to being involved in the aquaculture, their main source of living included farming (renting farming lands from other people, growing crops and dividing the harvest). Apart from these, some people were also involved in other kinds of works like carpentering, construction works, working as helpers in household of other people etc. Since most of the people from these households are illiterate and uneducated, they had neither any opportunity nor any skills to pursue any professional career for making a better living. Because of their poor economic level and lack of education, they were subject to exploitation from the other members of the society and their employers resulting in getting minimal wages or working without any wages or salaries. They have no access to proper education, health care, and have a low status in the society.

Rara Karnali Group (2nd Group)

Rara Karnali Tal is the name of the pond located at Karnali Tole, Belauri-3, Kanchanpur. This pond was established in 2017 on a part of wet farming land and aquaculture production has been going on in it since then. The area of this pond is around 9712 sq.m. Currently around 45 households are directly involved in the aquaculture activities in this pond.

People involved in the aquaculture activities in this pond are the local residents of the area, comprising mostly of farmers and labor class workers. People from all kinds of caste and ethnic backgrounds are mixed in this aquaculture group. They are mostly farmers and laborers who belonged to lower class income level. Most of the people are fully dependent on farming for their main source of income. Apart from farming, they are also involved in activities like carpentering, constructions, working as household helpers etc. Some of them also travel to nearby cities of India during offseasons to search for work. Majority of them are illiterate or uneducated, having no any

academic skills to excel in professional career. These families have no proper access to education, health care or any kind of social security, and they had been living a poor life .

Amrit Mahila Group (3rd Group)

“Amrit Dalit Mahila Machapalan Krishi Samuha” is the third group of the aquaculture project which I studied. This group is located at Bandha Tal, Belauri-3, Kanchanpur. The pond in this site is an artificially created pond where 28 families are directly involved in aquaculture activities. The area of the pond is about 1690 sq. m. This group was created with the focus of uplifting the status of the people who are considered ‘untouchable’ in the society.

This group is solely comprised of women from those communities who are considered untouchable in the society. The members of the group are the local residents of the area. They belong to communities who have been dominated and discriminated in the society for a long time. Majority of these people lie below the poverty line. They have been deprived of opportunities like education and health care and have been frowned upon in the society. These people have been deprived of the very basic needs of a human life. Most of the members of this group are dependent on daily labor works for their survival. Some of them who have farms also are involved in agriculture. Most of them do not have any academic qualifications or professional skills. Thus, they have very limited choices for running their daily lives. In this case, the aquaculture has been a good alternative for income generation.

Shova Tal Group (4th Group)

Shova Tal is the name of the pond located at Belauri-5, Kanchapur district. It is a natural pond where fish farming has been going on for a long time. The area of the pond is about 80,000 sq.m. Currently about 89 families are involved actively in aquaculture in this pond. The people in this group are the residents of the area. Aquaculture started in this pond in 2002. However, in 2013, this pond was formally included in the Resilient Livelihoods and Sustainable Food Security project.

Some members of this aquaculture group come from the ‘bonded labors’ background, who were freed by the government (Villanger, 2006). These people were landless people who were working as bonded labor for generations, providing themselves as laborers to their masters in order to pay a loan they took or debt they inherited. Other members come from the group who lost their land and home to natural disasters like floods and landslides. These people were rescued by the government and they were settled around the area of this pond in 2000 A.D. Each family was allotted 5 Kattha land by the government (1 kattha = 3645 sq. ft in Nepal). The next thing was to provide these people with some job opportunities. Most of these people belong to poor families who had no proper education or any professional skills. Before their settlement, the around the pond had little human settlement. Thus, there were not many job opportunities for these people. Moreover, the land allotted by the government to these people was not enough to feed these people throughout the year, especially for those who had big families. Aquaculture has been the only alternative for these people for income generation.

Methodology

This section deals in detail with the methods used to collect the data and analyze them. First, I will describe the research approach, which is followed by the techniques used for data collection. After that, I will describe the methods of data analysis and discuss the limitations of the methods used. This is then followed by a discussion on the validity and reliability of the data and finally ends with the reflection of my own role in the field.

Research Approach

This research is based on the qualitative research strategy and incorporates the interpretivist approach. According to Pulla & Carter (2018), interpretivist view tries to study and understand the meaning behind the human behavior and their interaction in the society. Willis (2007) writes that the main aim of the interpretative research is to understand a particular situation, rather than establishing the universal laws or rules. It is more appropriate when the research is subjective, and the variables cannot be easily measured in numerical terms. Therefore, the interpretivist approach was selected for this research since this research is about finding the impact of aquaculture in the livelihood of the people in the far-western region of Nepal.

Research Methods

In experimental research, primary data are collected through the course of experiments but in case of qualitative research, surveys are performed and then data are collected through observations or direct communication with the respondents (C.R.Kothari, 1990). This research is based on the use of both primary and secondary sources of data. The main source of data have been the primary

data which was collected at the field of study through observations and interviews. Various books, journals, research papers and other articles by different authors and researchers have been referred to as secondary sources for developing the theory in this research work.

In order to collect the first-hand data from the people involved in the aquaculture project, interview guides were prepared, and semi-structured interviews (SSI) were carried out. The SSI is a kind of interview technique which is carried out by employing a mix of open-ended and close-ended questions. Questions are often followed by *why* and *how* questions. The main idea of the SSIs is to provide flexibility to the respondents in their answers so that they can hover around the main agenda, and possibly could delve into some unseen issues (Adams, 2015). In such interviews, researchers use a basic checklist that would cover all relevant topics in the research questions (Alshenqeti, 2014). The following steps were used in the SSI: drafting the interview guides, selecting the respondents and arranging interviews and carrying out the interviews (Adams, 2015). All the data collected from this research are in accordance with the Norwegian Centre for Research Data, ensuring that no personal or sensitive data were collected during the research.

The first step thing to do was to prepare the Interview guides. Interview guides are the list of the questions to be asked in the SSIs. These questions are open-ended and give flexibility to the respondents in their answers. These questions do not have a static ‘yes or no’ responses. For this research, interview guides were prepared with the help of my supervisors and thoroughly checked so that they cover most portions of the study. The interview guides are provided in the Appendix section.

After drafting the interview guides, I went to the sites where the projects were operated. I first got in contact with the members of NNSWA at their main office in Mahendranagar. They helped me to access the areas where the projects were operating. I was assisted by a member of NNSWA to reach each of the 4 sites of the project.

The selection of the respondents was based on *snowball sampling* method. A snowball sampling is a convenience sampling method which is undertaken when it is difficult to access target respondents directly by the researcher. In this method, the researcher finds the future respondents

through the link or relationship of the existing respondents (Naderifar, Goli, & Ghaljaie, 2017). From NNSWA, I got the contact of a member of each of the aquaculture groups and further through those members, I came in contact with other group members. About 14 people were interviewed during this research study, consisting of members from the different aquaculture groups and NNSWA. These include 5 members from Parsal Tal group, 2 members from Rara Karnali Group, 2 members from Amrit Mahila group, 3 members from Shova Tal group and 2 members from the NNSWA. Interviews were carried out at the aquaculture sites where I talked to and walked around with the members of those different groups observing the project and the works being done. These interviews were carried out face to face with the respondents and their answers and responses were properly noted in a notebook.

Analysis

For the analysis of the collected data, various methods have been used. One of the methods used is 'coding'. Coding refers to the process of classifying the collected data, information, and observations into meaningful and cohesive categories (Allen, 2017). Using the coding method, a matrix has been developed. This matrix was developed by dividing the four different aquaculture sites on the basis of their capitals (viz. Natural, Social, Financial, Human and Physical) and putting in the pros and cons of each of the capitals for each of the sites. This matrix would help to immediately identify the strengths and weaknesses of each aquaculture group.

Similarly, another method used for analysis is 'textual analysis'. It is a methodology that requires understanding the languages, symbols and pictures in the texts. This understanding is required to grasp how people make sense of and communicate (Allen, 2017). This method has been used to study different articles, books, reports and the respondents' answers to understand and connect the theory with the real-life situations and settings at the field.

Limitations with the selected methods

There certainly are some limitations and disadvantages of the SSIs. Adams (2015) has pointed out that SSIs are “time-consuming, labor intensive, and interviewer sophisticated.” The interviewer needs to be smart and needs good knowledge in the related field. Identifying the respondents and arranging interviews is also time consuming.

Similarly, analyzing the data after the interview is equally arduous. Another drawback of SSIs is it is extremely difficult to arrange a huge number of respondents if we are dealing with large number of sample population. Thus, the precision of the result could be far from reality if the population is too big. They are however very much beneficial for small group surveys (Adams, 2015).

Certain factors did prove to be a hindrance during this research. As it was my first time conducting such research, I did find it very challenging and tiresome. Recognizing the potential informants was hard as I did not know them personally and maintaining contacts with them beforehand was impossible.

At times, I faced difficulties in extracting information from some of the informants properly, especially the female respondents. They were a bit hesitant to speak to me initially, and even when they agreed to be a part of the interview, they were not able to express themselves openly. I also felt some kind of language barrier problems with some of the informants. Some of the respondents were not very fluent in Nepali and me not knowing their community language created communication barriers to some extent. Moreover, these groups or communities hardly kept any formal records of their past harvests or productions. Most of the quantitative data regarding their income and sales from the project is based on approximation.

In addition to that, transportation was major problem during this research. All of the sites of the projects were located at inner parts of the village and public transportation was rarely available. I could not travel freely among these different sites. I had to be assisted by a member of NNSWA each time I had to travel to these sites.

And as mentioned above, it was my first experience conducting such kind of interview. The inexperience might have caused me to miss out on some relevant information from the field work.

Validity and Reliability

Validity, in research, is related with truthfulness and accuracy of the findings (Le Compte and Goetz 1982: 32 cited in H.I.L. Brink, 1993 p.35). A valid study should show the true picture of reality. Campbell and Stanley (1966 cited in H.I.L. Brink, 1993)) have defined two main types of validity, viz. 'internal' and 'external'. Internal validity refers to the extent that the findings are near to the reality. External validity is the extent to which those reflections are applicable across the groups (H.I.L. Brink, 1993). Reliability is related with the consistency of the results. It is the stability and repeatability of the findings as well as researcher's ability to accurately collect the data (Selltiz et al 1976:182 cited in H.I.L. Brink, 1993). Reliability requires the same results to be yielded over repeated testing periods, when same or similar methods are used the same or comparable subjects.

The data collected from my research are fairly representative across the different groups and can be generalized among them. During the interviews, a saturation point was reached where the same kind of information was coming from each informant. Also, the number of participants in the interview were fairly enough considering the size of each aquaculture group. The information collected from the interviewees were not just based on their individual experience but also based on the experiences of the group as a whole. In this way, I was able to get general information on the members who could not directly participate in the survey. The similarity among the members in terms of economic status, social status, level of education and other factors also helps in validating the data and ensures reliability. Since most of the members of the aquaculture group belong to same kind of socio-economic status and same ethnic communities, the data collected from the sample population can be generalized upon the group without having to interviewing every member individually.

Role of the researcher

In qualitative research, the role of the researcher is to try to get access to the feelings and thoughts of the participants. It is a tough task since it involves asking the participants about their personal things and experiences. As a researcher, one's primary role is to protect the respondents and their information or data. It involves articulating the participants about safeguarding mechanisms and following relevant research ethics (Sutton & Austin, 2015). As a researcher, my first and foremost role was to keep the anonymity of the respondents. Similarly, it was also my responsibility to provide them easiness and convenience while gathering information from them. It is my role to safeguard their data and make sure they are not misused in the future, and this survey causes them no harm in any form.

During the interviews, I could feel the informants being more respectful and cautious at the beginning. Their frequent referral of 'Sir' towards me made me feel the positionality difference between myself and the respondents. The positionality of researcher involves different aspects of the research (Lian, 2019) and is one of the most important factors determining the type to data collected (Caplan, 1993 cited in Lian, 2019 p.4). Coming from a very similar setting to the areas of the projects and growing up around similar kind of people, it was not difficult for me to go to these people and communicate with them. However, the fact that I was an 'outsider' in their area and on top of that I was "a university student coming from Europe through the NNSWA to conduct a research about their work" certainly made them feel my position to be bit higher as compared to themselves in terms of education and power relations. This factor could play a great role in the kind of response I would get from them and could greatly affect my research. To reduce such differences, I had to spend considerable amount of time talking to the interviewees. Understanding that some of them might not be acquainted with giving interviews and thus might not be able to express themselves properly, the interviews were carried out in their natural environment and they were allowed to respond in their own way and language for their convenience. Similarly, during

the interviews, the members from NNSWA who were assisting me in the field were requested to keep away so that the respondents could be free while providing responses to the questionnaires.

Theoretical Framework

Meaning of Sustainable Livelihood

The concept of Sustainable Livelihood was initiated by Brundtland Commission on Environment and Development. It was introduced to link the socioeconomic and ecological structure in a very adhesive and policy-relevant structure. This concept was further expanded by the 1992 United Nations Conference on Environment and Development (UNCED), which also advocated achieving sustainable livelihood for poverty alleviation (Krantz, 2001). According to UNDP (1997, cited in Krantz, 2001 p.6), sustainable livelihoods could serve as ‘an integrating factor that allows policies to address development, sustainable resource management, and poverty eradication simultaneously.’

The very common notion people generally connect with sustainability is the ‘Environment.’ However, there is more to sustainability than just the environmental factor. The multiverse of sustainability is not so easy to put into a diagram. However, in the most common way, it has been depicted as the intersection of three circles in a Venn-diagram, which symbolize the environment, the economic and social system. Although the Figure 1 below shows each circle being the same size indicating all the factors are of equal importance, the importance of each factor may vary depending on one’s perception or context.

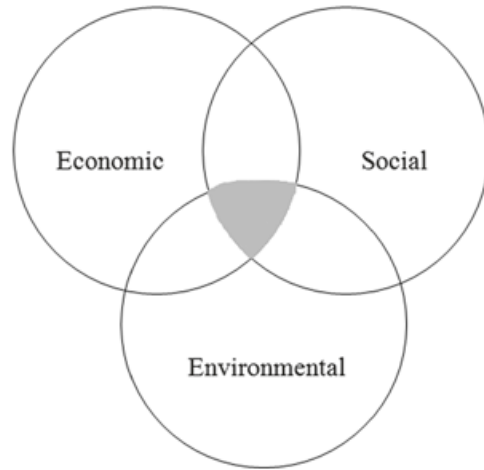


Figure 1: Venn diagram showing three pillars of sustainability (Morse & McNamara, 2013)

For instance, some might view the economic factor to be the most important in which it dominates the other two remaining circles. This is considered as ‘weak sustainability’ since the environmental factor is being sacrificed in this sustainability. Whereas some might view the importance of the environment as the most for the sustainability, and its size should be remained unchanged. It is considered ‘strong sustainability’. While giving more importance to the economic and environmental factors, sometimes the social factor is often neglected in the sustainability discourse. Thus, this is a weak representation of the sustainability and the importance of the factors (Morse & McNamara, 2013).

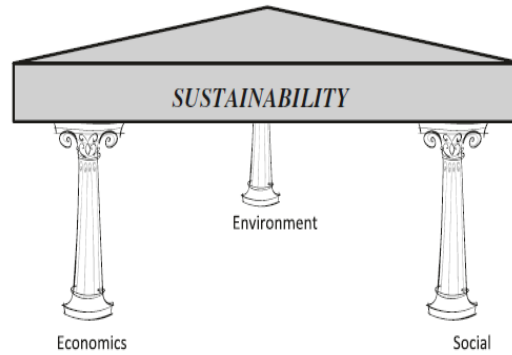


Figure 2: Sustainability as a 3 cornered table supported by 3 pillars (Morse & McNamara, 2013)

A bit different concept of sustainability can be shown in the Figure 2. In this figure, sustainability is resting on its three main pillars representing social factors, environmental factors and economic factors. This representation holds the assumption that all the 3 pillars are equally important for sustainability to hold and failure of any of the pillars leads to downfall or failure of the sustainability. However, one concern regarding this representation is that the pillars might not always be of same size. Some have even argued that the economic pillar could be represented a bit stronger than the other two pillars (Morse & McNamara, 2013).

Although the concept of sustainability can be presented only to a limited extent in a graphical presentation, it certainly helps to understand the multiverse of sustainability and their interdependency. The main focus of sustainability has been on the livelihood. Usually when sustainability is talked about, it is more attached with just austerity and abstinence and rarely with the concept of gradual growth of quality of living. However, sustainable livelihood is not only about surviving; it is more related with improving the living standard and making the resources available to the people without compromising the future. Therefore, sustainable livelihood encapsulates the concept of survival as well as enhancement of the living condition of the people and their enjoyment of the life(Morse & McNamara, 2013).

Sustainable Livelihood Approach (SLA)

The concept of livelihood dates to the mid-1980s in the work of Robert Chambers. When the conventional development concepts failed to yield desired results, the concept of “Sustainable livelihood” was developed to enhance the efficiency of development cooperation. It formed the basics of the Sustainable Livelihood Approach (SLA) (Kollmair & Gamper, 2002). The SLA is one of the major analytical frameworks that deals with changing dimensions of poverty and well-being. It establishes a typology of assets which are deployed by poor individuals, families and communities for their well-being under dynamic conditions. The main feature of this approach is the “attempt to set the analysis of livelihoods within a framework which encompasses policy and institutional processes at various levels, as well as micro-level conditions and determinants of livelihood.” (Norton & Foster, 2001 p. 12)

Different Approaches of SLA

Along with the Department of International Development (DFID), UK, other agencies such as CARE and UNDP have also defined and used the SLA. Although there are certainly many common points between the approaches of these agencies, we can also find some distinctions in their respective approaches. The most common thing that can be found in the approach of these agencies is that their ideas of sustainable livelihood is based on Chambers and Conway’s definition of livelihood (Carney et al., 1999).

“A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term.”(Chambers & Conway, 1992 p.6)

I am going to discuss about different approaches by these agencies.

CARE's Approach

CARE is an international organization focused on helping the poor and vulnerable people. Its primary framework used throughout its works consists of the livelihoods approach, referred as Household Livelihood Security or HLS (Krantz, 2001). The livelihood approach has been seen as an effective method for improving the inter-sectoral coordination which helps in making its works and impact effective. This approach has been considered both flexible and sufficient enough to address the problems of large scale poverty as well as context-specific constraints (Carney et al., 1999).

It uses Chambers and Conway's definition of livelihoods and recognizes the three fundamental attributes of livelihoods: the possession of human capabilities (education, skills, health etc); access to tangible and intangible assets; and the existence of economic activities. The livelihood strategy a household pursues is determined by the interaction between these attributes. CARE's definition of household livelihood security has advocated for capacity-building development approach, in which people are more active and responsible for building their own livelihoods than being passive and receiving external help (Krantz, 2001).

CARE's livelihood approach has been used in both rural and urban contexts. Through this approach, three non-mutually exclusive categories of livelihood activity have been identified, which are appropriate at different points in the relief-development spectrum, which are as follows:

- Livelihood Promotion (includes improving the resilience of households)
- Livelihood Protection (helping prevent the decline in livelihood security)
- Livelihood Provisioning (direct provision of essential needs like food, water, shelter etc. during emergencies)

As mentioned already, as these categories are non-exclusive, each activity will have an element of other activities. A livelihood promotion strategy will always have a 'protection' element as well, that takes care of the areas of vulnerability and ensures protection of improvements in livelihood security (Carney et al., 1999).

CARE's emphasis is the improved capability of the poor and vulnerable people which enables them to secure their livelihoods. Thus, 'empowerment' is a fundamental dimension of CARE's approach. CARE distinguishes two levels of empowerment: personal empowerment and social empowerment (Krantz, 2001).

Personal empowerment indicates the development of skills and confidence of the people i.e. the human capital in order to alleviate any constraints in the economic sphere. This encompasses formation of groups to initiate saving activities, to enhance the existing income-generating activities, or to recognize and start- new profitable activities. An essential part of the strategy is addressing the gender relations within the household and the community.

Social empowerment focuses on the broader concept of social group. Social empowerment involves establishing and strengthening the existing, representative, community-based organizations for boosting up the capacity for the members of the community so as to plan and implement prioritized development activities emerging from participatory needs assessments, with an aim to enable the communities to develop their own principles and structures of democratic representation and governance (Drinkwater and Rusinow, 1999 cited in Krantz, 2001 p. 17)

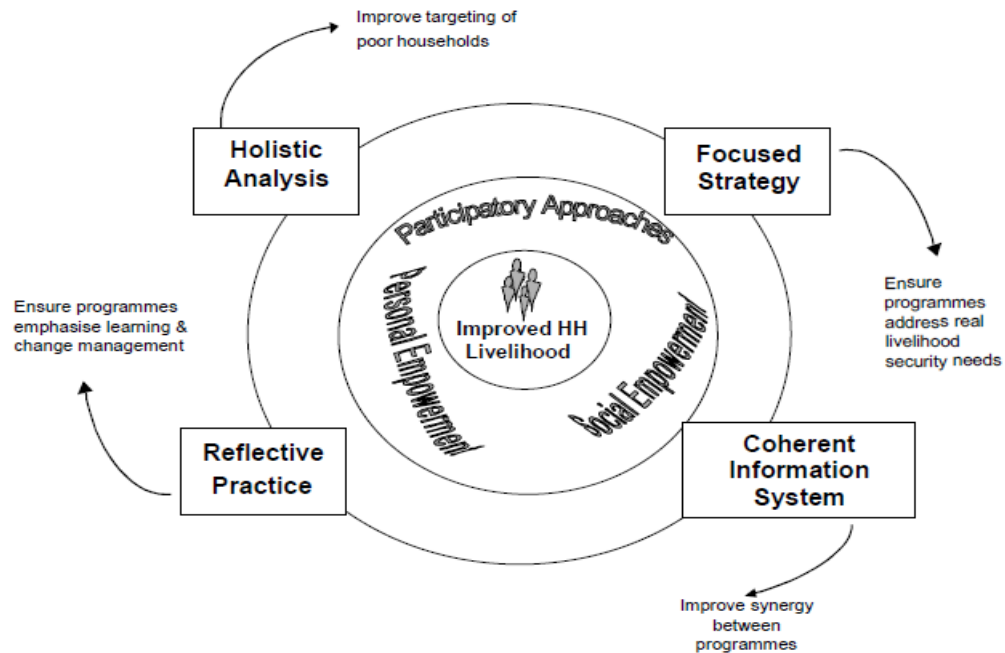


Figure 3: CARE's programming principle for livelihoods approach (Carney et al., 1999)

Figure 3 shows the core programming principles of CARE's approach and emphasizes on the dynamic and iterative nature of the programming procedure, and on the value of learning so as the household security focus ensures better overall programme quality (Carney et al., 1999). It aims to operationalize its approach via a dynamic and interactive programming process that include following steps:

- Using secondary data to identify potential geographic areas which are concentrated with poverty;
- Identifying vulnerable groups and the livelihood constraints they have been facing;
- Collecting analytical data (holistic analysis guided by CARE's overall livelihood model, Figure 4), taking notes of trends over time and recognizing the indicators that will be monitored; and
- Selecting the set of communities for program interventions (Carney et al., 1999)

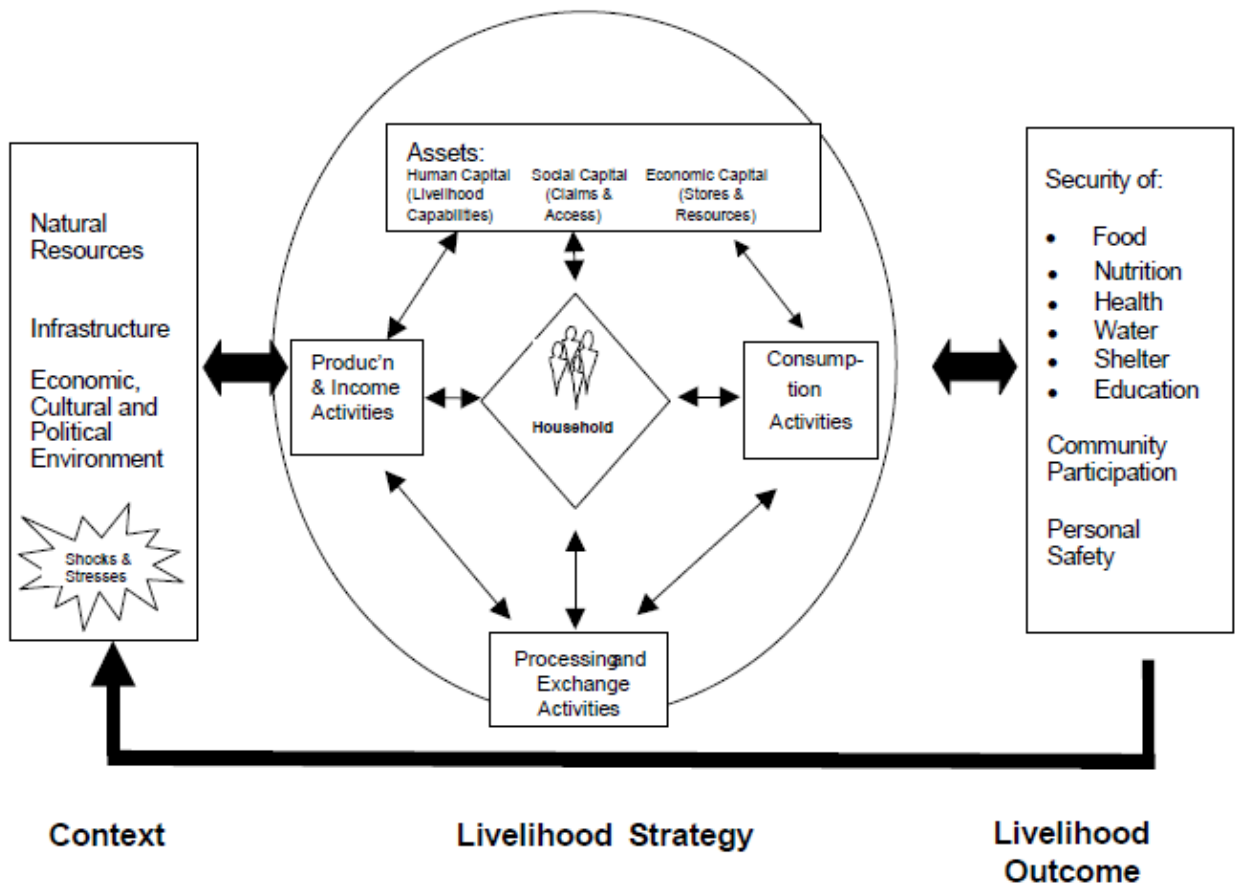


Figure 4: CARE's Livelihood Model (Carney et al., 1999)

UNDP's Approach

The sustainable livelihoods agenda is a part of UNDP's overall sustainable human development (SHD) mandate, adopted in 1995. Issues like poverty eradication, employment and sustainable livelihoods, gender, protection and regeneration of the environment, and governance are included

in it. Although various strategies are being pursued by UNDP for poverty reduction, the SL approach forms one of the most effective approaches. It offers both a conceptual and a programming framework for reduction of the poverty sustainably . ‘Livelihood’ refers to the combination of means, activities, entitlements and assets which the people use for livelihood. The assets are further defined into five categories namely natural or biological (i.e. land , water, the flora and fauna etc.), social (i.e. family, social relationship, community, social networks etc.), human (health, education, labor etc.), physical (i.e. the infrastructures such as roads, clinics, markets, schools etc.) and economic (i.e. jobs, savings, credit). Sustainability depends on how people use these asset portfolios in both short-term and long-term basis(Carney et al., 1999). Sustainable livelihoods are those which have the following characteristics:

- Are able to cope with and recover from shocks and stresses;
- Are economically effective;
- Are ecologically sound; and
- Are socially equitable

The UNDP’s approach to sustainable livelihood incorporates the poverty issues, governance and environment. It employs an asset-based approach stressing the need to fathom adaptive and coping strategies to analyze the various asset types. Some other important emphases of UNDP are:

- Focus should be on strengths, as opposed to needs;
- Micro-macro links should be taken into consideration and actively supported; and
- Sustainability is constantly assessed and supported (Carney et al., 1999)

UNDP operates at national level most often and carries out some specific programmes and activities at village and district levels. It introduces the SL approach initially at national level through discussions with the government counterparts, and then implements it as a distinct

approach in the micro levels. A methodology has been developed by UNDP for facilitating the design, implementation and evaluation of SL programs which consist of following steps:

1. Carrying out a participatory assessment of the risks, assets and indigenous knowledge base found in a particular community as reflected in the coping and adaptive strategies pursued by people.
2. Analyzing the micro, macro and sectoral policies influencing the livelihood strategies of the people
3. Assessing and determining the potential contributions of modern science and technology that would complement the indigenous knowledge systems to improve livelihoods
4. Identifying social and economic investment mechanisms that assist or hinder existing livelihood strategies
5. Assuring that the above first four stages are integrated in real time, so that this process is a part of overall programme of development, rather than being just a series of individual isolated events (Krantz, 2001).

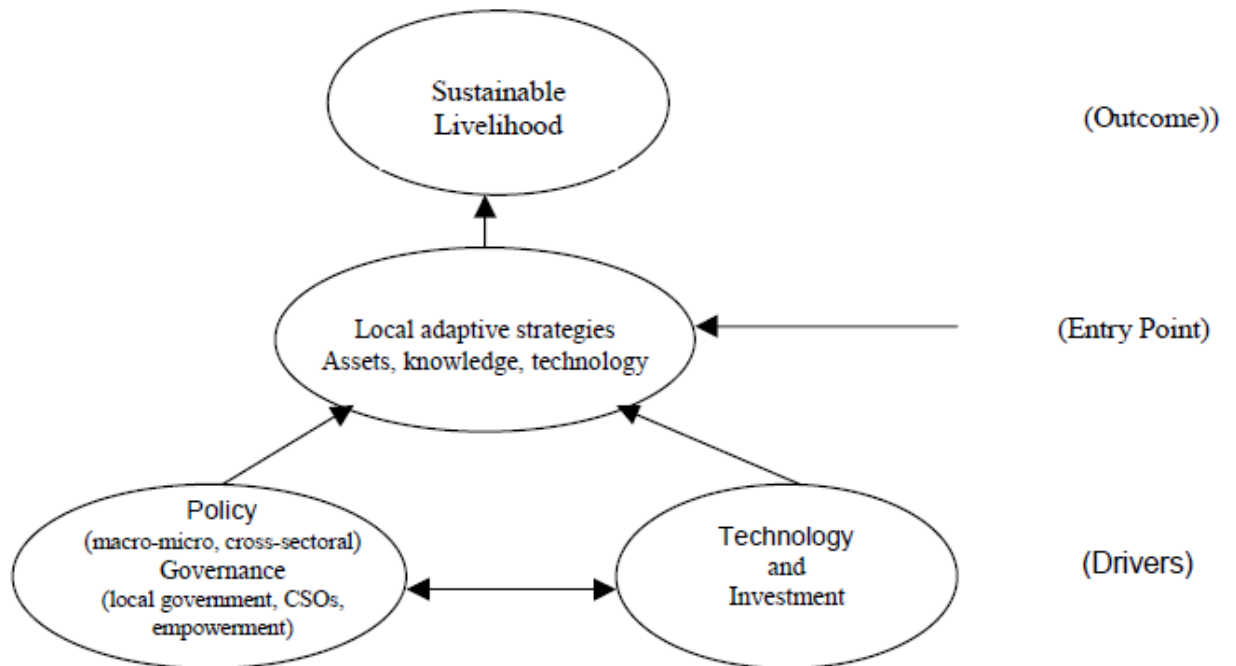


Figure 5: UNDP's approach to promoting sustainable livelihoods (Carney et al., 1999)

The SL approach serves UNDP primarily as a programming framework to construct a set of integrated activities in order to enhance the sustainability of livelihood among the poor and vulnerable groups by bolstering the resilience of their coping and adaptive strategies. Despite of this being an open-ended process, introduction of improved technologies as well as social and economic investments are also emphasized. The policies and governance issues that have negative effects on livelihoods are also addressed. The different support programmes are implemented as specific SL programmes usually at a district level (Krantz, 2001).

DFID's Approach

The Sustainable Livelihood Approach (SLA) was developed by the British Department of International Development (DFID) and has been integrated in DFID's programs for development cooperation. The adoption of SLA is expected to contribute towards DFID's aim of poverty elimination in poor countries (Kollmair & Gamper, 2002). DFID has been widening and adopting sustainable livelihood approaches over a long time. Initiative started from the rural side of the organization gradually extending towards urban livelihoods. DFID suggests different ways of implementing livelihood approaches, however, there are six underlying principles or core concepts to all these approaches (Carney et al., 1999).

First of all, the core of SLA is people centered. The focus of this approach are the people rather than the resources. Sustainable poverty reduction is only possible when the development agents work with the people in the context of their livelihood strategies, social environment and adaptability. Thus, detailed and in-depth analysis of their livelihood is necessary. Second, SLA incorporates a holistic view to understand the stakeholders' livelihood with all the facets through a manageable model with an aim to identify the constraints faced by the people. Third, SLA is not a very static approach. It is very dynamic to make changes and adjustments for better understanding of people's livelihood. Fourth, it builds on strengths and as such it recognizes everyone's inherent potential so as to realize their potential and eradicate their constraints. This contributes to their robustness and ability for achieving the objectives. Fifth, the SLA links the macro and micro levels since people are affected from decisions from the macroeconomic level to microeconomic level; thus, SLA tries to reduce the gap between these two levels. And finally sustainability in livelihood prevails when there is able to withstand the shocks of various factors, no dependency on external factors for support and ability to maintain long term productivity of natural resources (Kollmair & Gamper, 2002).

SLA is a multiple capital approach where sustainability is measured in terms of various capital and examination of vulnerability context(Morse, Mcnamara, & Acholo, 2009). It is found upon the notion that of interventionist or intentional development, whereby government or non-government organizations implement development projects and programmes to help the needy people (Morse & McNamara, 2013). SLA has suggested 5 principal assets (or capitals) for development which are discussed as follows:

Natural Capital: It includes all the natural resource stocks such as air, water, genetic resources etc. which are gifted by nature. The livelihood of people greatly depends upon the natural resources found around them.

Human Capital: It refer to the skills, knowledge, labor force including the good health and physical and mental capacity of the people.

Economic or Financial Capital: It includes the economic assets such as cash, credit/debit, savings and the financial resources that people use to achieve their livelihood.

Physical Capital: It includes all the physical infrastructures and producer goods to support the livelihood of the people. Non-availability of the physical resources could create major hindrances in the development and daily livelihood.

Social Capital: The exact meaning of “Social Capital” and its aspects are still a matter of debate, however, in the context of SLA it refers to the social relationships, social claims, affiliations, associations and status. These are the social resources upon which people draw in seeking for their livelihood outcomes(Kollmair & Gamper, 2002).

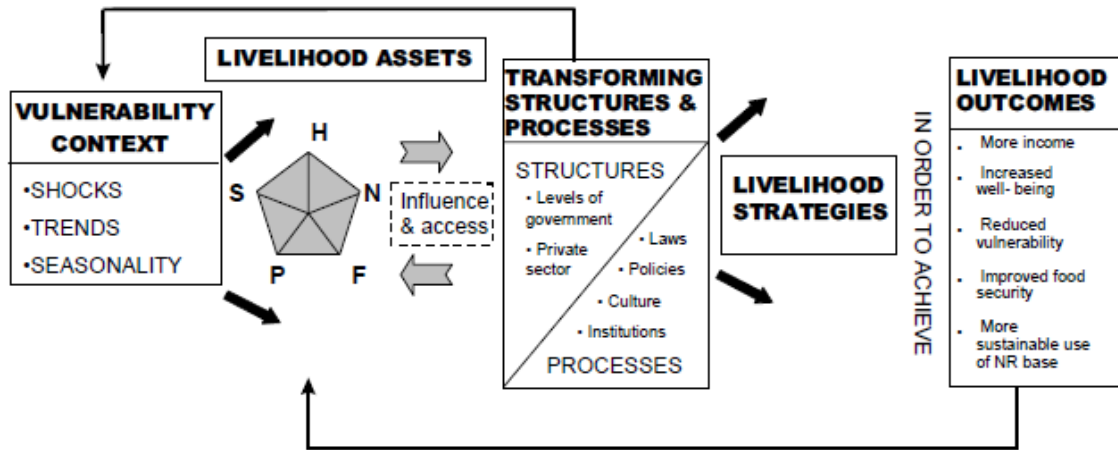


Figure 6: The Sustainable Livelihoods Framework (SLF) (Carney et al., 1999)

The SLA framework is an important instrument to investigate about the livelihood of the poor people and visualizing the main factors of influence. However, it is just a simplified model which does not represent the full diversity and dimensions of livelihood. For that, a qualitative and participatory analysis is required (Kollmair & Gamper, 2002).

The SLA framework depicts the conditions that the stakeholders operate in for their livelihood. It shows the stakeholders are operating in certain vulnerability contexts, within which they have access to certain assets (or capitals). These gain their meaning and value in the existing social, institutional and organizational environment. This context influences the Livelihood Strategies for the self-defined beneficial Livelihood Outcomes (Kollmair & Gamper, 2002).

The Vulnerability Context is the external environment in which people exist. It comprises of Shocks (i.e. human, livestock or crop health, natural calamities, economic fluctuations, political events etc), Trends (i.e demographic trends, resource trends, trends in government), Seasonality (i.e of prices, products, opportunities). These are external factors which are usually outside the control of the stakeholders (Kollmair & Gamper, 2002).

Transforming structures and processes represents the institutions, policies, organizations and legislation that help to shape the livelihoods. They operate at all levels and effectively determine access, terms of exchange between different types of capital, and returns to any livelihood strategy (Shankland, 2000; Keeley, 2001 in Kollmair and Gamper, 2002 p. 8).

Structures are the private and public organizations “that set and implement policy and legislation, deliver services, purchase, trade and perform all manner of other functions that affect livelihoods” (DIFD, 2000 in Kollmair and Gamper, 2002 p. 8). Lack of well working structures leads to hassles in sustainable development and asset creation. Unlike other approaches which assume the lack of resources to be the cause of livelihood problems, SLA assumes there is lack of access to and control of existing resources which are sufficiently at disposition (Kollmair & Gamper, 2002).

Processes encompass determining the way of operation and interaction of the structures and individuals. They may serve as incentives to make choices, responsible for access to assets and may enable stakeholders to transform and substitute one type of asset through another (Kollmair & Gamper, 2002).

Livelihood strategies comprise of the combination of activities and choices undertaken by the people to achieve their livelihood goals. They are the dynamic process which help people to combine the various activities to meet the needs at different times, geographical locations or economic levels. They are directly dependent on the asset status and transforming structures and processes which can also be seen in the above framework. Changes in asset status might trigger change in the strategies depending on the policies and institutions at work (Kollmair & Gamper, 2002).

Finally, livelihood outcomes are the results or achievements of livelihood strategies. The result could be visible in qualitative or quantitative form such as more income, increased well-being, reduced vulnerability, improved food security etc. The outcomes help in understanding the output of the current configuration of factors within the livelihood framework. They also demonstrate the factors that motivate the stakeholders to act as they do and what their priorities are. They could also give us a hint of how people are likely to respond to new opportunities and which performance indicators are to be used to assess support activity. Livelihood incomes have direct influence on the assets and they change the levels of the assets dynamically offering a new starting point for other strategies and outcomes (Kollmair & Gamper, 2002).

Results

In this section, the observed results of each site from the research are discussed in detail.

Parsa Tal Group (First Group)

The pond was a common resource which was used by people living around as a common fishing ground. But in 2017, these people decided to manage the pond and use it in a better way for their income generation and thus the idea of aquaculture emerged in the community. The first challenge was to secure the pond. About 30 families from this community came together and formed a group to legally register this pond as “Parsa Tal” and start their aquaculture activities. Prior to the legal registration, people with farmlands around the ponds would try to encroach the pond, claiming it as a part of their private land. With the help of NNSWA and local authorities, the pond was legally registered, and its borders were clearly defined. This also ended the problem of encroachment of the pond by other people.

The second challenge was that these people had no knowledge about aquaculture. They knew how to catch wild fishes in the pond. The chairman of the group approached NNSWA, and after going through some processes, NNSWA got involved in teaching how to carry out aquaculture activities.

The main players in aquaculture in the Parsa Tal are the women of this community. Prior to the aquaculture project, some women started collecting money each month and making savings in their own name. They formed a group named “Aama Samuha” (mothers’ group) and started making saving of whatever amount they could each month. When the idea of aquaculture emerged, the women were enthusiastic about getting involved and they have been the greatest contributors to the aquaculture development in the Parsa Tal ever since. Since the male of the households had to go outside their community to work and earn a living for their family, the women took it on them to prove their worth in the families. However, they had no knowledge about the aquaculture

at all. The NNSWA, with the help of local agriculture development service office, organized a 3-day training in aquaculture, which taught about basics of aquaculture including how to select fishes, how to make food for the fishes, and what type of fishes could be cultivated and other things. Since the pond was shallow, NNSWA helped this group by bearing the cost of digging the pond deeper, increasing the heights of edges of the pond, and buying and installing the electric motor pump sets to secure continuous supply of water. A small portion of the pond was further separated for growing the fingerlings. At a certain size, the fingerlings were transferred to the bigger pond where they would grow further. When everything was set to start the aquaculture production, NNSWA also provided fingerlings and fish food. The start of aquaculture in the group also contributed to the development of other things. Along with aquaculture, they also started horticulture/vegetable farming with the help of NNSWA. They received training on growing different food crops and cash crops from NNSWA. Similarly, in order to utilize the pond and aerate the water, they also started rearing ducks. And in this way, the start of the aquaculture also contributed in more managed initiation of horticulture and animal husbandry as alternative source of income.

The most noticeable change that could be seen in this group was ‘women empowerment’. These women who would feel uncomfortable to come outside their houses and even talk to each other became the front runners in the management and sales of the aquaculture. “We used to feel uncomfortable to even talk to each other” said a female informant (Informant3,2019). When asked upon why they felt uncomfortable, another female informant replied “We are uneducated and were mostly confined to our households. We had no say in things related to outside of our households. We were even shy to walk outside on the roads” (Informant5, 2019). “But after the start of this fish farming, things are changing for us. We women are working for this project and doing everything by ourselves” said another female informant (Informant4, 2019). “We are going outside and selling fish ourselves. We also went to an agricultural exhibition last year and got rewarded for our work” said another informant with a smile on her face (Informant2, 2019). From being confined to their households and labor jobs with no say in anything in the society to equally contributing to run their households and leading the operations of the aquaculture, they have come a long way.

Another contribution of the aquaculture project on the group has been the spin-off effects. The start of the aquaculture also gave initiation to food and cash crops farming and animal husbandry (Informant1, 2019). Along with the training on aquaculture, these people also received training on farming of different food crops and cash crops. “We were given also given training on farming by the NNSWA and the district agriculture office” (Informant2, 2019). When asked upon what kinds of crops would they grow before the start of the project, an informant replied “We used to plant mainly paddy and wheat during the year. But after getting training, we have also started planting crops like sugarcane, and different vegetables on different seasons” (Informant1, 2019). “Production from our farms has gone up after the project. There is regular supply of water for the crops now” said another informant (Informant5, 2019), reiterating that the electric motor-pump sets primarily used for filling up the pond has also been used to irrigate their fields and farms. Similarly, they also started poultry farming of ducks in order to help the water in the pond move around. “Both of the idea and these ducklings were provided by the NNSWA” (Informant4, 2019). “If the water sits still in the pond, the fishes will not get the oxygen. These ducks move around and aerate the water. Thus, the fishes can breathe better.” (Informant1, 2019)

Economic benefits and food security are inseparable part of the effects of this project on the group. The production and sales of the fishes from the pond, along with the production and sales of the cash crops and food crops and from the poultry has contributed significantly on the income generation of the people. “Last year we sold approximately 300 kgs of fish” (Informant1, 2019), which was their first batch of sales after undertaking the project. And in addition to that, they also had additional earnings from the sale of crops and sale of eggs from the ducks. With improved income came the food security. People from these groups are able to feed themselves and their families properly now, thanks to the income generation from the project and food productions from their agricultural activities.

One very important effect of the project on these people has been the ‘confidence’ it has instilled in these people. These people who had no prior knowledge on aquaculture before are leading as an example today. “We feel like we can start our own hatchery if we receive training on it” (Informant2, 2012). “This project has made us realize that even we can move forward and achieve something in life. This project has given us new confidence” said a female informant (Informant

3, 2019). “The main leaders in this group are these females only. And they have been working for this project with full responsibility. They have made groups and divide their responsibilities among themselves. They are taking care of their home as well as this project. They have developed new confidence after being involved in this project” (Informant1, 2019). This shows that the project has instilled people with confidence.

Similarly, other changes like unity among the group members and helpfulness among each other has been promoted. People are working in cooperation for the group, they are dividing the tasks among themselves and taking care of their responsibilities (Informant1, 2019). Any weak member of the society is taken care of by the group. Facilities like minimal interest loans is provided for any needy member of the group. “We have been helping each other during needy times. For someone who needs money urgently, we provide him/him loan at a very low interest rate at around 2% from the group fund” (Informant1, 2019).

Table 1: Summary of assets and livelihood strategies of Parsa Tal group

Capitals	Parsa Tal
Natural	Pros: Water stays through out the year, agricultural lands nearby Cons: Could be flooded during rainy season
Physical	Easy access to road, market nearby, fishing tools and water pumpset provided by NNSWA No private ownership of pond. Fair enough infrastructures
Social	Communal harmony in society, members of same community, no hinderances from social viewpoint
Human	Lack skilled manpower; knowledge through indigenous experience and some training.
Financial	Financially very weak. Dependent on outside help for proper management of the fish farming
Livelihood strategies	Fish farming Agriculture Cash crops farming Animal husbandry Foreign employment

Rara Karnali Group (2nd Group)

Before the aquaculture project, this land was unproductive agricultural land, which belonged to seven different persons living in the same area. Due to poor agricultural productions, they jointly decided to convert the land into a pond for fish farming. However, they had neither resources nor knowledge of how to fish farm.

To make the use of the land for aquaculture activities, these owners of the land, along with other people from the community, formally created a group and then approached NNSWA for the help. The officials of NNSWA visited the site and after formulating a plan with the group members, a pond was finally dug. The pond was further divided into a big and small pond. The big pond was for fingerlings, and the small pond was for the fish to grow up, while the big pond would be vacant for new batch of fingerlings.

The ownership of the pond is divided among seven persons, however about 45 families are directly involved in the aquaculture activities. All the cost of digging the pond was born by the NNSWA. Along with digging the pond, the NNSWA also provided this group with trainings on aquaculture, with electric motor pump sets, and nets to catch the fish. Electricity was made available around the area of the pond for electric fencing in future. In addition, a small house was also constructed by NNSWA for the collection and storage of the fishes and vegetables where they would be sold.

However, things have not turned out as expected for this group, as they have encountered a major problem in their operation of the aquaculture activities. From the start of the rainy season, the water fills the bigger pond for eight months but for next four months, it dries out completely. During this dry time, these people have to carry out their activities in the smaller pond only. Using the electric motor pump sets proved to be very costly for these poor farmers with the electricity charges costing around Rs. 1000 each day (approximately 9 US Dollars) . Because of this, this group has not been able to take full benefit of the aquaculture project. The annually expected turnover from the pond, if operated for full year without the problem, is around Rs. 1,600,000 in

which Rs. 1,200,000 is the expected profit (the Per Capita Income of Nepal by the end of 2018 according to World bank is \$1033.9 and \$1 equals to Rs. 120.68 today) . “The engineer who supervised the initiation of the project has told us that we could make up a profit of Rs. 1,600,000 annually. But we are expecting Rs. 1,200,000 from it” (Informant6 , 2019). However, as said before, the potential has not materialized.

Nevertheless, knowledge of aquaculture was not the only benefit from being introduced to NNSWA. Along with the aquaculture, these people also received knowledge and trainings on agriculture and vegetable farming. NNSWA taught these people to grow different kinds of food and cash crops and also gave them an opportunity to take their farming to a professional level. With the help of NNSWA, the people from these groups are also growing different kinds of seasonal crops like wheat, barley, bananas, lemons and selling them in the market. Although these people have not been able to take the full benefits from the aquaculture, they have surely felt the positive spin-off effects of the projects in terms of their improved productivity and sales of the agricultural products.

The start of the aquaculture project has certainly brought a number of changes in the lives of the people involved in it. The first and the foremost thing this project has helped is with the food security and economic benefits. Although the project hasn't been operating for a full year, they have been able to operate it for 8 months and within these times, they have been able to get some economic benefits from the sale of the fish. “There is good demand of fish here” (Informant6, 2019) who also said along with the fish, they have also been able to improve the productivity of their agricultural products and getting benefits from it. “Even though we haven't been able to take full benefit from the fish farming, we are still producing different crops and selling them in the market” (Informant6, 2019). Today, the group members with farming lands are producing different seasonal food and cash crops and they are selling them in the market. This has increased their income and helped in providing their families with proper food and nutrition. “Now every month, I am getting additional income of Rs. 8,000 to Rs. 9000 from the sale of vegetables. I don't have to worry about what to feed to my family” said another informant (Informant7, 2019) reiterating that the project has had a major contribution in their income generation and food security.

Another benefit of the project has been the social changes it has brought in the society. Before the project, all the group members were working individually by themselves. There were still the various ‘social disparities’ that a typical Nepalese society has, prevalent in the society. However, with the start of the project, people came together and started to work for a common cause, which has promoted the cooperation and love in the society. “We all are equal in the group. Doesn’t matter if someone is blind or deaf or anything; every member has respect for one another, and we do not discriminate people on basis of any differences” (Informant7, 2019). The group members today are helping each other in time of needs, without caring about their caste or ethnicity or social status.

This project has installed new confidence in the people of this group. Despite of facing different problems in the aquaculture, they are very much positive towards fish farming and they are confident that with time they will be able to operate this project in its full potential. “We have high hopes from this project that it will yield good result in the long run” (Informant7, 2019). They are very much hopeful of getting huge benefits from this project and expect this project to run for a long period of time. This “Never Back Down” attitude these people have developed is also one of the effects of the project.

Table 2: Summary of assets and livelihood strategies of Rara Karnali group

Capitals	Rara Karnali
Natural	Pros: Suitable location, enough rainfall throughout the year, farming lands around Cons: Sandy deposit; water dries out fast; dry for 4 months in a year
Physical	Pros: roads accessible; market nearby for small scale production Cons: Electric pumpset too costly; need solar pumpset no convenient means of transport; private ownership of pond
Social	Good social relations members belong to different communities unity among themselves
Human	Lack skilled manpower; knowledge through experience and some training.
Financial	Financially very weak need external assistance until fully managed
Livelihood strategies	Fish farming Agriculture Cash crops farming wage based labour Foreign employment

Amrit Mahila Group (3rd Group)

In order to improve their status and start the aquaculture activities, a group was formed named “Amrit Dalit Mahila Machapalan Krishi Samuha” on 27th April 2018. The leader of this group had a plot of land which was rendered useless for farming. Therefore, she decided to use this land to dig up a pond and use it for fish farming. However, she did not have enough resources to start things on their own. With the hope of getting help, this group formally approached NNSWA for their assistance, to which the NNSWA complied. Members from NNSWA studied the site intended

for the pond, which lies around the wet land and nearby a bigger pond. The site was approved for aquaculture and a pond was dug, and aquaculture initiated. They were also provided with trainings on aquaculture and stuffs like nets, weighing scales and an electric motor pump set. Similarly, a road was also constructed with the help of NNSWA to access the pond conveniently.

Although the duration of the operation of the project was too short to determine any benefits from the fish farming in monetary terms, there have been some signs of positive effects of the project.

The initiation of the project led to formation of the unified group of women who were determined to bring changes in their lives. These women who had been under the shackles of cruel traditions and social discriminations, living a poor life, finally started dreaming of a better future for themselves. Living under the unjust behavior of the so called 'bigger castes' in the society, these people were subject to various kinds of exploitations. From getting exploited in various terms to no one paying a heed to their problems, they had been living a poor and dominated life. However, the start of the project brought unification among these people and things have been changing since then. An informant told me about an incident about how their group helped one of member of their community. "We had bought a goat and given it to one of the poorest members of our community. But unfortunately, the goat was stolen. She took this matter to the elders of the village and even to the police regarding this matter, but no one paid any attention to her grief. With no help from others, we took the matters into our hands and decided to help her with whatever we can. All the members of our group went to the police station and pressured them to look into this matter seriously. Later on, the police were able to catch those thieves and they were made to pay up the price of the goat, as well as extra fines." (Informant7, 2019). The members of this group think that their unity has helped them get some recognition in the society now.

When asked upon if there is any kind of discrimination and discouragement from other members of the society regarding the aquaculture project, she replied that previously some people tried to discourage them from being involved in the project. But since the project has already started and they are able to see some progress from it, even the people from the 'higher castes' are coming to see how they are doing and are giving advices on how to improve their products from the project. This shows that people are now developing positive attitude towards these people in the society

because these women are starting to show that they can also do something in life. The start of the project has given these people some hope about a better future for themselves. “We are already having demand for our fish” (Informant8, 2019), who also said that different restaurants and hotels were already demanding their fish. “If things turn out to be positive, we will make this pond even bigger by combining it with another pond” (Informant8, 2019), pointing out at another pond lying right next to the current pond. “We are even thinking of engaging our husbands in this project once it starts to grow” (Informant9, 2019) whose husband has gone to India in search of job opportunities. They are very much determined to become self-reliant without having to beg for help from others in the society, which they believe would be possible with the successful operation of this project. “We are certainly seeing small changes in the society now” (Informant8, 2019), They might not have become economically sound from the benefits of the project; however, there have been signs of some changes in their social scenario because of this project.

Table 3: Summary of assets and livelihood strategies of Amrit Mahila group

Capitals	Amrit Mahila
Natural	Pros: Suitable weather; located near a big pond water stays throughout the year
Physical	bit far from market; no convenient means of transport roads aren't built properly; only one pumpset which is not enough private ownership of land
Social	belong to the untouchable group social problems still exist unity among themselves some changes starting after group formation
Human	Lack skilled manpower; mostly illiterate and uneducated knowledge through experience and some training.
Financial	Financially very weak; major weak point need external assistance until fully managed
Livelihood strategies	Fish farming Agriculture for some who own land plots wage based labour Foreign employment

Shova Tal (4th Group)

This pond had been used by a private contractor for fish farming before these people were settled around the area of the pond. Later on, the pond was handed over to this group with an aim to provide them income generating opportunities. The Shova Tal is a natural pond whose area is around 8 hectares, making it the biggest pond among these four sites. These people got training on fish farming from the NNSWA and few other governmental (district agriculture office) and non-governmental organizations (JTE) and their aquaculture activities formally started in 2002 AD. After some time, they began to see the results of their efforts. “From about 2003 to 2007, the average annual income from the project was around Rs. 8,00,000. However, things started to go bad for them after the flooding in 2008 in Kanchanpur district”(Informant10,2019). The mass flooding in 2008 caused damage to the pond, which has adversely affected the aquaculture activities. The Shova Tal lies on a lower ground surrounded by a community forest, which has a very sandy soil. The edges of the pond are open, and the flood brought silt from the surrounding area and deposited it in the pond. Due to this, the pond became shallow and the water dried out very fast, which has had severe impact on the aquaculture in the pond. Currently, the major portion of pond has sandy deposits and almost holds no water at all. Only a small portion of the pond is still in use for fish farming, but the benefits they get from it is way less than what they were having before.

The NNSWA has provided them with electric motor pump sets, fish nets and weighing scales. Along with that, fish selling points has also been constructed for this group. Similarly, the linkage of roads to the pond has also been possible with the help of NNSWA, for a convenient access to the pond. In addition to that, a community hall has also been constructed for the frequent meetings of the group.

Although the NNSWA has provided them with electric motor pump sets, the cost of using the pump sets is beyond the financial capacity of these people. “Even if we fill up the pond today, by tomorrow morning this pond will already be empty” (Informant11, 2019). Moreover, they do not have the proper system of drainage of water through inlet and outlet points, which they could use

to trap the water in the pond during the rainy season. Although this pond held the potential to become a game changer in the lives of these people, they have not been able to take full benefits from it. However, they continue to operate their aquaculture activities and are hopeful that things will turn right in the near future.

The start of the aquaculture has brought various changes in the lives of these people today. These people who were living a miserable life as bonded labors finally got an opportunity to work for themselves after being involved in the aquaculture production. This has brought about income security for these people. They learned to work in a group and improved the coordination and mutual feeling in the society. Today everyone in their community has been support for one another, working together for mutual gains.

Another gain from this project has been the income and food security among the members of the group. They have been able to get good income after the start of the project. Although there have been ups and down with the aquaculture activities, it has had spin off effects on other sectors. “About 25% of the people from the group have stopped working for others now and are involved in their own business today” (Informant11, 2019). After getting involved in the project, these people not only got training on fish farming, but also on improving their agricultural production. The NNSWA also gave them training regarding various seasonal food and cash crops and taught them to manage their agricultural production in more professional way. Thus, they have also been growing and selling different seasonal crops like sugarcane, lemons, banana which has helped to raise their level of income.

In the same way, these people have also been able to get better income from other professions, and they owe it to the aquaculture project as well. The income from the aquaculture provided them some financial stability, and people were able to utilize their time to learn other professional skills like carpentering, plumbing, wiring, building. “When this project was yielding good income, people did not have to solely depend on their labor jobs for sustenance. The income from this project was enough for their daily sustenance. During this time, they invested their time in improving their skills in their works and also learned technical works like plumbing, wiring, carpentering. So, when their skills improved, their bargaining power also improved and when you

are skilled, people will certainly employ you. Thus, this way they were also able to get better earnings from their other jobs” (Informant1, 2019). This has helped them to get better remunerations from their existing jobs as well, with a better bargaining capacity. This has ensured that these people are not exploited and underpaid by their employers or clients. Some members have also started their shops at home. All these different factors have helped them get better income.

Another positive effect of the project has been the improved status of women in the society. With the start of the project, most of the women from these families stopped doing labor jobs outside and instead started to work in the project and their own agricultural activities. Some of them are also learning other skills like sewing and tailoring. “Women have almost completely stopped going for labor works and are involved in the project instead. They are looking after the fish as well as working in their own farms producing different crops. Some of them are also learning skills like sewing and tailoring. Because of this, they are also earning money for the family and they do not have to depend fully on their spouse on monetary matters” (Informant11, 2019) who also told that they are also learning about investing the money. With their similar contribution as their male counter parts in the income of the family, the women are getting better recognition and status in their own family. They have also started their own mutual savings and now are also learning about making investments. With the start of the project, the women are also moving forward in life.

Another important effect of the project has been these people realizing the importance of education in life. Dealing with different people and participating in different training programs have made them realize how important education is to excel in life and to open the doors of opportunities in life. As a result of that, many people from the community today are sending their children to schools. “I want my children to have better education and want them to excel in life. I don’t want my children to suffer like we have done. So, I am sending all my children to English medium schools everyday” (Informant11, 2019).

The start of the aquaculture has instilled confidence and hope for a better future into the life of these people. They are very much determined to make the use of the pond for aquaculture and other activities through combined efforts of the group. They are also planning to develop the area

into a touristic center. “We are planning to develop this area as a tourist centre. We have also discussed the plan with NNSWA and other authorities and have prepared a blueprint for further development of things here” (Informant 12, 2019). They have further planned to utilize the pond for activities like boating, fishing points, setting up a view tower, opening up a resort and home stay services. They are very sure that all of this can be possible with proper management of the aquaculture project and getting full scale benefits from there. Therefore, for all these plans to materialize, it is very important to solve the existing problems of the aquaculture in the pond and manage it properly.

Table 4: Summary of assets and livelihood strategies of Shova Tal group

Capitals	Shova Tal
Natural	Pros: Natural pond, huge size, suitable weather Cons: Water dries out fast in major portion; only natural source of water is rainfall
Physical	roads aren't convenient, but being constructed electric pumpsets are too costly no convenient means of transport; market is far
Social	belong to the same community good social relations unity among themselves one for all and all for one
Human	Lack skilled manpower; mostly illiterate and uneducated knowledge through experience and training.
Financial	Financially very weak; major weak point need external assistance until fully managed
Livelihood strategies	Fish farming Agriculture and cash crops farming wage based labour; home business Foreign employment Tourism

Discussion

Capital	Parsa Tal	Rara Karnali	Bandha Tal (Amrit Mahila)	Shova Tal
Natural	<p>Pros: water stays through the year, agricultural lands nearby</p> <p>Cons: Could be flooded during rainy season</p>	<p>Pros: Suitable location, enough rainfall throughout the year, farming lands around</p> <p>Cons: Sandy deposit; water dries out fast; dry for 4 months in a year</p>	<p>Suitable weather; located near big ponds; water remains throughout the year; flooding problems have stopped as well.</p>	<p>Pros: Natural pond, huge sized; suitable weather</p> <p>Cons: Water dries out fast; soil erosion from nearby forest causes sandy soil deposits; no other source of natural water except rainfall</p>
Physical	<p>Easy access to road, market nearby, fishing tools and water pumpset provided by NNSWA. No private ownership of pond. Fair enough infrastructures</p>	<p>Pros: Roads accessible; market nearby for small scale production</p> <p>Cons: Electric pumpset too costly; need solar pumpset; no convenient means of transport; private ownership of the</p>	<p>Bit far from market; no convenient means of transport available; roads aren't built conveniently; only one pumpset available which is not enough. Pond is built on private land, so not so</p>	<p>Roads aren't convenient, however are being constructed; electric pumpsets are too costly, require solar pumpsets; no convenient means of</p>

		pond divided among 7-8 members	secure for the group	transport; market is comparatively far.
Social	Communal harmony in society, members of same community, no hinderances from social viewpoint	Good social relations; members belong to different communities; unity among themselves	Belong to the so called “untouchable” group in the society; still face some of those problems; however, things are changing after their group formation	Good social relations; no hinderances from other communities; members belong to same community; one for all and all for one
Human	Lack skilled manpower; knowledge through indigenous experience and some training.	Lack skilled and educated manpower; knowledge through indigenous experience and some training.	Members mostly uneducated; lack skilled manpower related to fisheries and aquaculture; just have knowledge through training and personal experience	Most of the members are uneducated and lack proper skills and knowledge in the aquaculture field; just have knowledge through training and experience;
Financial	Financially very weak. Dependent on outside help for proper	Weakest in financial part; members belong to lower class financial group; need external assistance	Major weak point; financially very poor; totally reliant on external	Weakest point; members belong to low income group; need external

	management of the fish farming	until it is fully managed	assistance for their operation.	assistance for management and operation of the fisheries
Livelihood Strategies	<ul style="list-style-type: none"> • Fish farming • Agriculture • Cash crops farming • Animal husbandry • Foreign employment 	<ul style="list-style-type: none"> • Fish farming • Agriculture • Cash crops farming • Foreign employment • Wage based labour 	<ul style="list-style-type: none"> • Fish farming • Vegetable farming for some members who have sufficient lands • Wage based labour • Foreign employment 	<ul style="list-style-type: none"> • Fish farming • Tourism • Cash crops farming • Wage based labour • Home business (small shops)

*Cash crops farming has been a major contributor of alternative income generation

Contribution of aquaculture projects to livelihoods

The “Resilient Livelihoods and Sustainable Food Security” project started with the focus on the marginalized groups for uplifting their income level and food security. From the study of the four groups, it can be said that the project has been able to achieve its goal to some good extent. The main focus of this study was to find how this project is enabling these groups to make short-term choices to maximize their welfare in the long run. For that it is necessary to understand how the project has brought changes into the lives of these people by affecting their livelihood strategies and how it is directing their lives towards self-sustenance in the long run by suppressing their vulnerabilities.

In terms of the direct and indirect effects of the project, it has enriched these groups with the required capital assets, especially human, financial and physical capitals and to some extent social capital as well. This project has enriched the human capital of these groups through various trainings in not only aquaculture, but also in farming and animal husbandry. Most of these people had no any prior knowledge on aquaculture and their knowledge on agriculture was also limited to their experience coming through generations. Through this project, these people got knowledge on how to start aquaculture and how to better utilize their farms for the improved production of various crops. The NNSWA has also been continuously monitoring their progress and have been providing important suggestions and feedbacks to these people. This has been helping them to get a better knowledge about their works.

This project has had a major contribution on the financial capital for these people, which is the most important factor for running this project. This project allowed these people who had no resources to start an aquaculture project on their own, to engage themselves in aquaculture only because of this project. All the costs required for the initiation of the aquaculture in these sites were borne by NNSWA, including digging the ponds, which would require high expenditure. Similarly, cost of other activities like building the edges higher, constructing the inlet and outlet points, and trainings of these people were also borne by NNSWA. The NNSWA has provided subsidies on fish foods. A bag of fish food that would generally cost Rs.11,000 is available to these people for just Rs. 1000. The groups involved in this project have to make expenditure only for the operational activities of the project.

Similarly, this project has also provided these people with physical assets required for its operations. The motor pump sets, fish nets and weighing scales were provided to these groups by NNSWA. Similarly, in Parsa Tal, Rara Karnali and Amrit Mahila group, the ponds are located in the middle of farming lands. Therefore, the task of making these ponds accessible through roads have also been done under this project. In addition to that, electricity has been made available around these sites. Under this project, community halls have been constructed where people from these group hold frequent meetings and discuss about their future plans for the project. Similarly, fish selling points have already been constructed for Shova Tal and Rara Karnali. In Parsa Tal, a duck house has been constructed at the edge of the pond.

The aquaculture project seems to have affected the livelihood strategies of the people involved. These people had limited livelihood options paying them with earnings barely sufficient to fulfill their nutritional requirement. This project has opened up new strategies, leading to livelihood outcomes such as diversification of sources of income and improved food security. Increased income has had direct effects through sale of fish and indirect effects through spin-offs like food and cash crops farming, animal husbandry and improved skills in other sectors of works). Increased income and increased productivity from the farming has brought food security for many of these people, who today can fulfill their food requirement without much of worry. This project has given them a platform to learn new things and skills and helped them to utilize their resources for improving their lives. These people who were dependent on others throughout the year for jobs are also being self-employed and working for themselves. Although most of these people are still involved in their previous jobs, this project has helped them to reduce their over dependency on their previous jobs, through alternative incomes and providing a stronger bargaining power. This has also reduced the exploitation these people had to undergo in their jobs.

The consequences of this project can also be seen in the social aspect where people are working together for their mutual gains. The 'individuality' in their society is being replaced by 'unity', and together they are achieving much more than before. The changes in the social scenarios can be seen specially with the women being the leading figures in the operation of the Parsa Tal group and the women in the Amrit Mahila group being able to establish their position in the society.

Relation to the theory

I tried to study the impact of the project on the life of the people based on the DFID's Sustainable Livelihood Approach (SLA). The DFID's approach to sustainable livelihood is based on Intentional or Interventionist development in which development programmes are implemented by various governmental and non-governmental institutions to help the poor people. These programmes are bound for a limited time and with limited resources, however, the results or the gains could be seen on the target group for a prolonged time even after the completion of the project (Morse & McNamara, 2013). The kind of development of that has been going on in these 4 aquaculture sites can be related to the Intentional or Interventionist development where an NGO (NNSWA) has intervened and implemented the "Resilient Livelihoods and Sustainable Food Security" project into the life of these poor people.

In this research, I have tried to divide the capital resources of each aquaculture sites on the basis of DFID's SLF in order to identify their strengths and weaknesses in these bases. For that, a matrix has been developed by categorizing the available resources for each aquaculture site on the along with their various strengths and weaknesses.

These capital assets are certainly vulnerable to some external shocks and trends that are beyond the control of the people involved in the project. A very good example would be the depletion of the natural capital of the Shova Tal due to flood. This pond which had been giving good production of fish until 2007 A.D was severely impacted after the floods in 2008. The floods of 2008 deposited silt from around the area into the pond. It has made the pond shallow and caused the water to dry out very quickly. Thus, only a very small portion of the pond is operational for fish farming throughout the year. Similarly, technology has also impacted their operational effectiveness in some groups. Specially in the Rara Karnali and Shova Tal, where there is the problem of the water drying out, the use of existing technology is not sufficient to solve their problems. The water pump sets running with the electricity is not sufficient for solving their problems and they are in a dire need of some cheaper and more effective means

instead. Solar power pump sets have been identified as alternative means, however, there is no certainty if these would be available to them soon. Another factor these people are vulnerable to is the financial aspect. If the NGO that has been running this project pulls out of the project, these people do not have enough financial capital to sustain by themselves in the present context.

Similarly, the Sustainable Livelihood Framework (Figure 6) has been referred to identify the different livelihood strategies and to understand their impacts on the lives of these people. It has been found that these people involved in the aquaculture project are not dependent on only one kind of activity for their livelihood. Instead of depending on just one kind of activity, these people are focusing on different income generating activities. Along with the aquaculture, most of the members of these groups are also undertaking food crops and cash crop farming as an alternative source of income. Those people who do not have lands of their own for farming are involved in some skill-based jobs like carpentering, plumbing, wiring, building jobs etc. Similarly, some people are also doing their small-scale businesses, like shops and sewing and tailoring works. The group in Shova Tal are even planning to use the pond for recreational activities like boating, sport fishing, setting up a resort in the area of their pond making it a tourist attraction etc. This shows that despite of the project focusing primarily on the aquaculture, people are also having other activities as source of livelihood in the short run.

These people are also diversifying their assets in the short-term for a long-term gain. An example of this would be 25% of people involved in Shova Tal forgoing labor jobs to work in the project. These people certainly lost the income they would get from their labor jobs i.e. their financial capital, however, their involvement in the project further increased the active human capital. In the same way, the women from Parsal Tal also devoted their time towards the project instead of going out for labor jobs, and they have been the center of the operations at their aquaculture project. These people from Parsa Tal don't have their fish selling points around their pond yet, neither they have their own vehicles to take the fish to the markets. However, these women are going to the markets on foot, carrying fish around in baskets and buckets and selling them. This shows the lack of physical infrastructures are somewhat compensated by the increased human capital.

This project has brought changes in the social institutions, especially in the familial aspect. This project has helped to defy the 'male dominant' concept of the society and reiterated that women are also equally important for the family. This project has a major contribution towards the

empowerment of women in the society, specially from these communities where their status is considered lower than their male counter parts. The women in these groups are contributing equally and sometimes even more than their male counterparts in the project. They are planning the operations by themselves, taking up responsibilities and fulfilling them, and executing the sale of the fish and agricultural products in the market and earning money by themselves. The same women who were shy to come out of their houses are today going to different trainings, learning new things and leading the operations of their project. The same women who were discriminated and exploited by other members of the society are standing up for their rights and bringing changes in the social scenario of their community. The same women who had to depend on their husband to fulfill their daily needs are earning money by themselves and providing necessities for their families. These types of changes are the positive changes that cannot be measured in monetary terms, but their impact remains huge in the lives of these people. And we can certainly say that these social changes are there to stay in their society and lives for a long time.

There have been institutions from governmental and non-governmental sectors that have been supportive of the project. Organizations like JTE (Joint Team of Experts) and District Agriculture Office have been providing trainings to these people on fish farming and been giving relevant advices to them. Similarly, in 2018, Rs. 8,00,000 was provided by the District Agriculture Office to the Shova Tal group which used to dig another pond. Similarly, the municipality office also provided this group with Rs. 2,00,000 in order to construct roads linking to the project site. These things suggest that there have been favorable policies from the government for supporting the people involved in the aquaculture projects.

With the increasing demand for fish in the local markets and lack of adequate supply, the people involved in this project are very sure of this project benefitting them in the long run. Even in the current scenario, they are always having people asking them about the fish from their ponds. (Informant8, 2019) told “Even now people are frequently calling and asking if the fish are ready for sale. They also come to this pond to see the fish and tell us they will immediately buy these fish when they are ready to be sold.” Similarly, one of the informants believes that the demand is so high that whatever amount of fish they produce will be sold instantly. “If we announce that we will be taking out fish for sale today, people will immediately gather around this pond and all the fish will be sold within couple of hours” (Informant6, 2019). When asked upon if the demand for their fish will be high enough to sell all the fish they produce when their project starts running at full scale, another informant from Shova Tal replied “Daily 12 quintal of fish

is imported through India border into our markets, and those are dead fish. We have the potential to supply live fish in our markets, and people will obviously prefer our fresh live fish to the dead fish. So, we have no worries about the demand of fish in the market. Whatever we produce will certainly be sold” (Informant10, 2019). Thus, each group has seen the increasing demand for the fish in the local markets and with successful operation of the project, they hope to get high benefits from their productions. “Once we solve the existing problems of this pond, this project will last for atleast 25-30 years” (Informant6, 2019). When asked upon how long does he think the project would last for, (Informant11, 2019) believes all the future plans they have made for their pond can be achieved through successful operation of aquaculture and making huge income from it. This project has instilled the hope and positive mindset in the members of this group. All the people involved in the project are very much excited about the project being fruitful to them in the long run and are working enthusiastically towards the achievement of their goal. These people who have had hard times managing the basic necessities of life are now dreaming of a better tomorrow for themselves. The project have given them the confidence and the positiveness they need to progress in life. Although, they might not have reached the full potential of their project as of now, they have somewhat experienced the positive effects that this project has brought in their life. Despite having different problems regarding the project, they are very confident that this project will be able to uplift them from their current socio-economic status and it will be fruitful to them in the long run. They are also planning to increase the scale of aquaculture in the long-term future. Some of them believe that they have the knowledge to sustain and run the aquaculture without any outside help, but only after the current status of the aquaculture is improved and the existing hindrances are solved. Until then, they are dependent on the NNSWA and other organizations for their operation of the project.

The NNSWA has played a very important role in the lives of these people through this project. Credit of all the benefits of the project certainly goes to NNSWA for it has been the organization which has been the torch bearer for these people towards sustainability. Despite all these, there are certainly few things that show the limitations of the NNSWA in this project. The NNSWA certainly has limitations in providing all the necessary assets to these projects that would help them to be self-sustainable in the near future. When asked upon when would the problems of Rara Karnali and Shova Tal be solved and if they would be provided with the alternative and cheaper source of water i.e. solar pump sets, the officials of NNSWA didn't have an exact answer to this question. “We have been looking at the option of having the solar powered pump sets for the needy sites, and hopefully we will manage to get them soon” (Informant13, 2019).

Similarly, almost 11 years after the flood caused depletion in Shova Tal, the problem hasn't been solved completely. Although efforts are being made in other sectors of this project, the main concern somewhat seems to be neglected for a long time now, from a neutral point of view. According to (Informant13, 2019) "NNSWA has been identifying other additional groups in different areas of the district and planning to start new aquaculture project on those areas". Although it would be a very good thing to start new projects focusing on new people for their upliftment, I think that main focus of NNSWA currently should be towards solving the problems of the existing aquaculture sites first, so that they could be self-sustainable as soon as possible. This would put an end to the financial burden of the NNSWA towards these current sites that would otherwise be stretching forever until their self-sustenance, and thus NNSWA would be able to focus on the new projects in a better way. Similarly, another limitation of NNSWA to be noted is its dependency on grants and aids towards its functioning. NNSWA is a non-profit organization and most of its operations are run through the grants and funds provided by national and international agencies. If in any case, the national and international organizations associated with the NNSWA stop providing funds, most of the projects and programs run by NNSWA could be sabotaged immediately.

Limitations of the study

There are certainly some limitations and weaknesses regarding the research I conducted. There was a time constraint and financial constraint due to which I wasn't able to engage myself at the field for as long as I wanted. I had no idea about the locations of these sites nor there were any public means of transportation to reach these sites. I was solely dependent on the members of NNSWA to take me to these sites and I had to adjust to their time for reaching these sites and taking the interviews. I would have liked to stay there a bit longer, travel to the sites independently and talk to some more people from the groups. I also feel like travelling by myself without any help from NNSWA and contacting the groups directly instead of through NNSWA would have been better for my research. It would make my study more informal for the people and they would be able to express themselves much better. Knowing that I had contacts with the organization that had been running their project, there was always a chance

of some 'information hiding' by these groups. Also knowing that I was doing this research for my Degree and would present the information by them in the University, some members were hesitant and shy to respond to my questions properly. It was only after spending some time with them and convincing them that they would remain anonymous in my reports, they became ready to respond to my queries. The presence of the members from the NNSWA during the interview was also a kind of hindrance because I could feel they were a bit cautious while answering my questions.

Implications of the findings

From this research, I have come to understand the importance of aquaculture in transforming the livelihood of poor communities. This research has helped me to understand how aquaculture could be an important factor in changing the lives of rural and poor communities in Nepal. The findings of this research help to understand the importance of diversification the resources to maximize the gains in the short run. The diversification of resources among the limited livelihood choices is an important strategy that can be applied to minimize vulnerability and maintain sustainability in life. Through this research, it has been evident that livelihood is always vulnerable to external factors that outside our control. It is not possible to completely eliminate the vulnerabilities; however, our livelihood choices determine the extent to which we are vulnerable to those external factors.

Similarly, another learning from this research is the importance of understanding the changes in the qualitative context. Sometimes changes might be abstract or not possible to measure in numbers, yet their implications could be very important in one's life. Especially small changes in the social scenario could have a huge implication in shaping up a one's life in the future. This research also puts light into the indirect effects or spin-offs of any project and helps to realize the importance of such effects in diversifying the livelihood choices.

In addition to that, we can also understand the need of risk analysis before initiation of any such projects. Taking the Rara Karnali pond as an example, we can know that a thorough study

of any proposed site for a project needs to be done to find out any potential risks that might compromise the operation of the project.

Conclusion

From this study, it can certainly be concluded that the “Resilient Livelihoods and Sustainable Food Security” project has certainly been beneficial for marginalized group of people involved in it. It has certainly made positive differences in the lives of these people in terms of income generation, food security and changes in the social scenarios. This project has given hope to the people for a better future and has awakened their self-confidence and awareness about themselves. It has helped the poor communities to diversify their resources into different livelihood choices such that it minimizes the risks and maximizes the short-term gains. This project has helped the people to get economic benefits and food security in the short-term and is also contributing towards the enrichment of assets of the involved groups in the short run. Although the short-run benefits seems to be coming along for the involved groups, the long-run benefits of the project is still not secured. Despite of having good potential of long-term benefits, any sudden change in the present scenario or any shocks or trends in the present could hamper the operation of the project in the long run. Especially, the involved groups are not self-sufficient in their operations of the projects and are dependent on the NNSWA for financial and technical assistance. Due to any unforeseen reasons, if these groups are deprived of the assistance of NNSWA, the operating projects might halt at its current state or at worst, might come to an end. Thus, it would be wrong to be assured that these projects would be going on in the near future as well in case of any unforeseen events.

One way to understand the importance of this project and its effects on the lives of the people is to imagine a scenario where this project did not exist at all. These people, whose life has changed so much because of the project, would probably remain in their status quo had this project not come in their lives. They would probably be having the same miserable life as before with none of the changes to be seen in their life that has come due to this project. The operation of the project has not been perfect, and it has had its limitations and problems, however, it has certainly done better for the people than anything else.

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Informant4 (2019, personal interview, February 10)

Informant5 (2019, personal interview, February 10)

Informant6 (2019, personal interview, February 11)

Informant7 (2019, personal interview, February 11)

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Appendix

Interview guide for the research

1. What was your socio-economic status before the project?
2. What was the status of your food security?
3. How did you earn your living?
4. Were you involved in any aquaculture activities before? How much of knowledge did you have regarding the aquaculture?
5. Were there any other welfare programmes or projects directed towards your livelihood?
6. Were you involved in any type of such projects before? If yes, how did the results turn out for you? Were they any different from the current one?
7. How did the concept of this project pop up? Who was the initiator of the idea?
8. Were there any other projects targeted at these groups/you before? If yes, what kind of projects were those? How did the result of those projects turn out? Were there any significant improvement in the livelihood and food security from those projects?
9. How many families/households were initially targeted? How many are involved till date?
10. Why did a foreign agency choose to help you/ the people from this region?
11. Was it the local authority/you who sook help from the foreign agency or was it the agency itself that came up with the proposal of helping you/ these people in need? (indirectly question about their motivation factors for funding this project and long-term gains from it)
12. How was the project first presented to you/them? Were you/they convinced with the idea of the project?
13. How is it being implemented today? Are there any differences between what was promised and what is happening?
14. Who is involved in the planning, implementation and operation of the project? Do you/the target group have any say in the planning, implementation and operation? If yes, to what extent? If no, then why?
15. Do you/they have any complaints or grievances related to certain things in this project? Do you/they relay these grievances to the higher authority of the projects? How are they handled by the management team?
16. What were their expectations at the start of the project and to what extent have they been fulfilled?
17. Do you see any changes happening in your/their life after being involved in the project? What kind of changes have you experienced in your/their socio-economic status and food security?
18. What have you/they learned after participating in the project?
19. Are there any plans of expansion of the project? If yes, to what extent? Is it going to be around aquaculture only?
20. Are you confident about the long-term welfare from the project?
21. Do you believe this project can help you to have stability and sustainability in your lives?
22. What if the agency stops funding the project tomorrow? What would you do in that case?
23. Would NNSWA be able to continue the project in the same scale for the welfare of the target groups in such situation?
24. Would you/they be able to work on this by yourselves/themselves for the livelihood? How would you/they be able to meet the long term and short-term needs in that case?

