

Evaluation of Sustainable Livelihood Assets in Pre- and Post- Disaster Context: A Case Study of Dal Lake, Srinagar

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Abstract

The issue of achieving sustainable livelihoods (SL) is a constant problem that has gained significant interest for all countries. Livelihood of people comprises five core types of asset base namely human, social, natural, physical and financial asset. Even though contexts of vulnerability and coping from shocks has been highlighted to be critical to SL, which particularly in context of disasters is seen to be ignored. This study aims to make a comparison between the pre- and post- floods (2014) situation based on various SL components and understanding the coping mechanisms adopted by these communities to diversify their livelihood after the floods. A Capacities and Vulnerability Analysis (CVA) was also carried out in order to support the effort of people to achieve socio-economic development post the floods in Dal lake. The essence of enquiry revealed through specific research questions like how changes in different livelihood assets are measured in various pockets, how relevant indicators and variables are related to different types of assets for livelihood assets, what is the reflection of livelihood assets pentagon, how should livelihood assets be improved in the future in terms of the information for comparing the pre and post disaster situations? The present study prompts us to a conclusion that the assets changes significantly from one spatial scale to other across the lake with the change associated with different results and features. But all these attributes instinctively showed that there has been a major lacuna in the government management systems which failed to support the Dal dwelling communities post the floods of 2014.

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Sustainable Livelihood;
Disaster;
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Introduction

The global climate change has already had observable effects on the environment. Such large transitions pose profound challenges for sustainable management of the various demands on land for human settlements which directly affects the livelihood of thousands of people all around the world. It is now prevalent for those communities already vulnerable to the impacts of present-day climate hazards to take an urgent call (IISD, 2020). Disasters are often the outcome of a hazard. The poor are particularly vulnerable to disasters given their already low income and depleted asset base, and therefore can ill afford to suffer increasing unemployment, crop and livestock losses, and lower wages or higher prices, especially on food items.

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Linking vulnerability with socialecological systems and sustainable livelihoods

Vulnerability can therefore be pre and post disaster risks. Different groups and geographical areas are exposed to lesser or greater degree depending on the degree of physical exposure and their social and economic conditions. A livelihood comprises the people, their capabilities and their means of living including food, income and assets (Cavallo & Noy, 2009). Livelihoods are considered to be sustainable only if they can cope with and recover from stress and shocks, as well as maintain and strengthen assets, activities and capabilities without destroying the natural resource base.

Over the years many researchers have confirmed that the vulnerability to hazards and risk related to it not only affect one's ability to cope with a disaster, but also affect one's livelihood for mitigation (pre-disaster event) and recovery (post-disaster event) (Blaikie et al., 2014). Relationships refined from centuries of social and ecological systems demands increased research which, can guide better future policies for sustainable development.

About DFID Sustainable Livelihood Framework

The most commonly used and accepted framework for these studies is the sustainable livelihoods framework (SLF), which was established by the United Kingdom's Department for International Development (DFID) (DFID, 1999) (see Figure 1).

In the framework, there are five main components, including vulnerability context, livelihood assets, transforming structure and processes, livelihood strategies and outcomes. Specifically, the vulnerability context refers to the external environment which is vulnerable. In general, it can include shocks in the form of natural calamities, recession, trends and seasonality, which are beyond the control of people. Livelihood assets under the sustainable livelihood framework includes five forms of assets, which are human (H), physical (P), social (S), financial (F) and natural (N) assets. The livelihood framework attempts to organize the various factors (assets, policies, institutions, processes, and outcomes) in a vulnerability context (shocks, disasters, trends) which constrain or provide opportunities and shows how these components relate to each other.

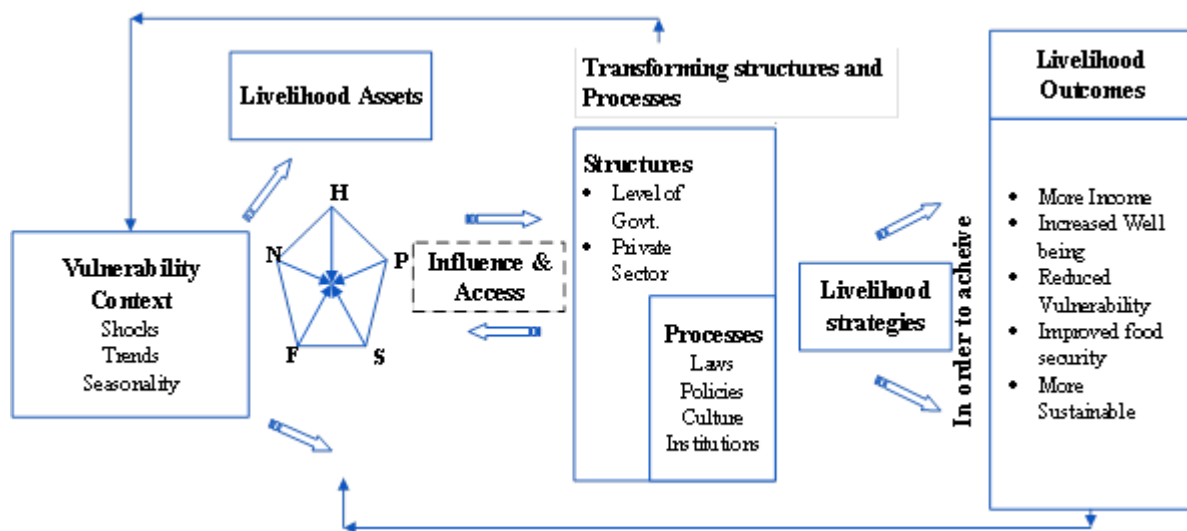


Figure 1. DFID sustainable livelihoods framework (DFID, 1999)

H: Human Assets, N: Natural assets, F: Financial assets, S: Social assets, P: Physical assets

Loss of assets by the effect of disasters

The loss of physical Assets is often worsen in developing countries due to the use of flimsy building materials, poor legal enforcement of rules and regulations, and weaker resilience and prevention systems (Cavallo & Noy, 2009).

Human Assets can be counted in an even greater toll in terms of the loss of life, death, injury, disease and emigration. Disasters lead to increased malnutrition amongst children, poor mental and physical development, and therefore impact education with long-term consequences on livelihoods (Akresh et al., 2007).

Financial Assets including savings, insurance, and access to credit are all severely affected by disasters. Also, the savings in the form of informal savings groups are washed away, which further result in people fleeing from their villages. Lost or destroyed documents and records affect the ability of the household to access allowances and formal banking services (Savage & Harvey, 2007). This results in conflicts and insecurities among native people.

Long term consequences of disasters can be clearly seen on natural assets. Floods, tsunamis, and cyclones often make large tracts of crop land unusable for several seasons (DFID, 1999). The conservation of natural capital is considered the key factor underlying ecology, societal sustainability and inclusive growth. Other factors such as decrease in freshwater supply, crop production, and increase in health problems as well as the fragility of mud homes are common post disaster effects on natural (Everett et al., 2010).

An ambiguous effect of disasters is seen on social asset. At times, traumatic experiences during the disaster can alter norms in a positive direction with respect to collective action in either post-conflict (Blattman, 2009). Disasters provide stricken communities with the opportunity to strengthen their social bonds by affecting social norms, attitudes, and behaviour.

Disasters have a strong and mostly negative impact on livelihood assets, leading to outcomes of increased vulnerability, reduced food security, and more fragile institutions. Therefore, depicting the characteristics of SL to the vulnerability to various disasters is an important step in reducing vulnerability and accelerating resilience.

Disaster context in Srinagar and it's effect on livelihoods

The valley of Kashmir is highly vulnerable to the impact of disasters due to a range of physical, social, economic, institutional and environmental factors. It has been frequently subjected to massive floods along its history. The recent floods of September, 2014 have exposed the valley's lack of disaster risk reduction mechanism (Dar & Qadri, 2015). Kashmir valley has a large network of wetlands and water-ways, one of the most important among them is the Dal lake which act as sponges to Srinagar city during the floods and shred the Jhelum water (Abubakr & Kundangar, 2008). The rapid urbanization in the city along with the excessive siltation and encroachments has degraded the impact on the efficacy of wetlands to retain flood water endangering the lives and property of Srinagar city and other suburban areas (Bhatt et al., 2017). The fury of the 2014 floods in Srinagar showed a direct impact on the lives of the Dal dwellers creating a bizarre damage to the livelihood of these communities.

Thus, the aim of our analysis is to understand strategies adapted by Dal dwellers to diversify their livelihood after the floods of 2014. A comparison of pre and post flood situation based on various SL components is also made in the study. The paper also focused on different coping mechanism developed by individuals and communities residing in Dal Lake against any natural calamities occurring in that region. The Sustainable Livelihood (SL) and their main components under various vulnerability contexts are compared. Carrying out the SL evaluation of Dal dwelling communities has a practical significance for reducing vulnerability and avoiding livelihood risks for such communities. An essential part of the research is to determine the perceptions of the success (or failure) of systems by different stakeholders, and then to relate these to the sustainability of the systems. In specific the study deals with issues related to the adaptability to change in indigenous people of Dal lake by understanding the coping mechanism from natural disasters and Capacities and Vulnerabilities Analysis (CVA). The CVA analysis shall help the givers of the aid learn how to give it so that it supports the efforts of people to achieve social and economic development in order to make relief interventions more developmental.

Research Method

Overview of the study area

Dal Lake is one of the most beautiful lakes of India and the second largest lake in the State of Jammu and Kashmir. It is a shallow urban water body situated at an altitude of 1583 m (above sea level) within the geographic coordinates of North latitude 34° 05' 0" -34° 09' 04" and East longitude 74° 49' 55" -74° 52' 55" at a distance of about 12 km to the North east of the Srinagar city. It has a total area of 11.5 km², with the

maximum depth of 1.5m (Fazal & Amin, 2012). However, the lake still serves as the main attraction of the city and develops a large amount of tourist attraction as well as providing drinking water to the city.



Figure 2. Study Area: Dal Lake

Data collection

The responses are collected using the recall method i.e. recalling the timeline information of the Dal lake and changes in the livelihood overtime. Respondent included, elders of the community and youth members. The approach involved various mix methods such as the primary survey whereas the thorough review of the secondary literature has been carried out. The primary survey included the Focus Group Discussions (FGDs) and individual consultations with the community members. The interviews were conducted in Kashmiri and Urdu either in respondent's home or in public place. Critical review of the secondary literature published on Dal lake and its inhabitants was done from various secondary sources in order to get an in-depth understanding of the post disaster recovery mechanism of the Dal dwelling communities.

For better understanding of distribution capabilities and vulnerabilities in the Dal lake, the primary survey was conducted specifically in five pockets (locally called as the *mohalla*) of the Dal lake, which were uniformly spread across the study site. These locations included pockets namely, *Choti Moti Mohalla*, *Khorad Mohalla*, *Khand Mohalla*, *Shabri Mohalla* and *Sheikh Mohalla*. However, as the research is mostly qualitative, we considered community as a source point of our research rather than taking data point to reach as the broader understanding of the issues. The interview questionnaire for the Dal dwelling communities was designed in a semi-structured where a series of open questions are asked, followed by more specific questions depending upon the responses to the open questions. The questions mainly focused on the status of the various assets pre and post the floods of 2014.

Table 1: Sustainable livelihoods (SL) framework-based indicators for assessing pre and post flood (2014) situation in Dal lake

Major Components	Sub Components
Human Asset	Agriculture, Tourism, Marketing Skills, Fishing net making
Physical Asset	Housing conditions, Houseboats, shops, stalls
Natural Asset	Water quality, Manure from the Dal Lake, Flora and fauna in the lake, fodder
Financial Asset	Income level (particular activity tourism, houseboats, Shikaras, floating markets, fish selling), income from supplementary sources, capital for investment, disposable assets
Social Asset	Interdependency of Dal dwelling communities on each other, status and prestige in society, leadership role, security of land tenure

For each asset a different range of word scenarios or indicators were determined by the relevant stakeholders to represent the best and worst scenarios in their view. These responses to these scenarios were then used to assist in the interpretation of local criteria of success to adaptation, the identification of local indicators and to

assess the success of the systems from the perspective of different stakeholders. score from 1 to 5 was assigned for each asset depending upon the current status of the assets – the worst having the lowest score, and the best having the highest. Scores of the most representative cell were counted. The scores for each capital have also be depicted on “an asset polygon” for a more rapid visual appreciation.

Using these “assets polygons” a comparison can be made between indicators, a comparison of the same system over time if this information is available, or a relative comparison of different systems. This would be based on the assessment of livelihood status according to local experience, therefore strict quantitative comparisons are impossible as experiences of the best and worst scenarios will naturally vary between pre-flood conditions and post flood conditions. These polygons were seen to be influenced by policies, institutions, processes and acts as a driver for livelihood strategies and outcomes.

Results and Discussion

It is clear from the polygons that livelihood assets changed significantly from one pocket to another across the Dal lake. However, the changes in different types of assets are associated with different results and features.

In the case of the communities residing inside the Dal lake, the livelihood has been affected in a large way post the flood of 2014. No change was seen in the natural assets although the loss of physical and human assets is evident. According to the respondents the degradation in the social relationships occurred due to coercive relocation and mismanaged in rehabilitation by the government. With respect to social capital, it was observed that the social relationships of local Dal dwelling community residents such as the mutual trust, cooperation, voluntary contribution, conflict, social ostraciation, animosity free riding, individualism among the group members played an important role in coping from the shock of the floods. As the new construction and renovation of old and flood hit houses is not allowed by the J&K Lakes and Waterways Development Authority (LAWDA) it has become difficult for inhabitants to manage quality housing facilities Most of the income still comes from the lake itself for the families. Having nothing in hand for livelihood guarantee outside of the Dal lake has increased the vulnerability of these inhabitants.

Livelihood asset index values for different neighbourhoods in Dal lake

Although the loss of Physical and human assets is evident. Further the degrading of social relationships due to coercive relocation and mismanaged rehabilitation by the government is telling. As the new construction and renovation of old and flood hit houses is unallowed by the government agency LAWDA. And having nothing in hand for livelihood guarantee outside of the Dal lake increases the vulnerability of the inhabitants.

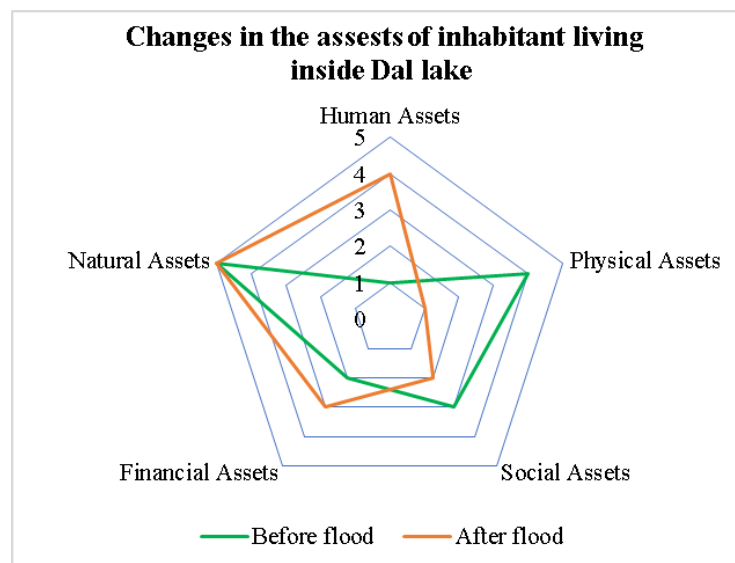


Figure 3: Changes in the assets of inhabitants living inside Dal lake

Though the natural assets did not experienced any measurable change due to the indigenous skills for establishing a sustainable social-ecological relationship with the lake. Most of the income still comes from the lake itself for these families. Inhabitants living inside the Dal lake own the most of the space. The source of income for these families is floating gardens, tourism, income from shops and lotus roots.

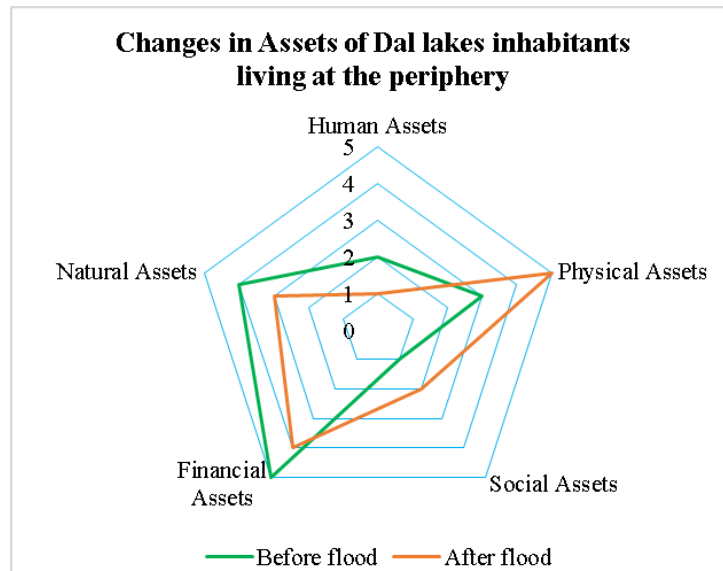


Figure 4: Changes in the assets of inhabitants living at the periphery of Dal lake

Inhabitants living on the periphery of Dal lake are connected to the land mass of the Srinagar city by roads and smaller paths. Post the flood situation, a rise in the physical assets has been seen in the pockets located at the periphery of the Dal lake. New and wide cemented walking paths were constructed in these peripheral areas for better connectivity and people do own small vehicles such as motor bikes, load carrier and autos. Also, these communities who lived on the fringes of the lake recovered very quickly from the incident compared to communities residing in other areas of Dal lake. According to the inhabitants in these neighbourhoods, they have easy access to both land and water and it was comparatively very easy for them to construct new house by replacing the damaged ones. As living more closer to the market the inhabitant does not have greater solidarity among them around the work they are doing.

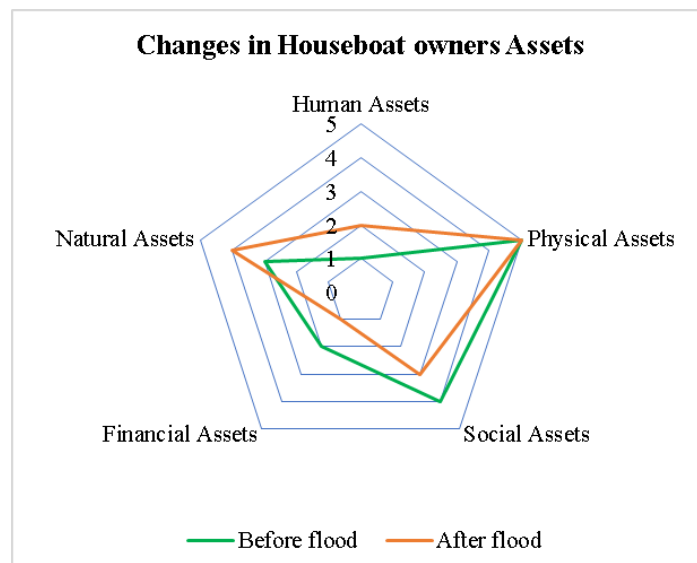


Figure 5: Changes in assets of houseboat owners

As the basic income of the houseboats owners depends on the socialecological systems of Dal lake, hence their vulnerability to any kind of disaster affecting the Dal lake becomes high and tourism is the only source of income for the houseboats. It was observed during the study that the financial asset of the houseboats owners has been drastically affected in the pre and post flood situation. The individuals who owned houseboats also recovered from the incident quickly as there was very minimal damage to their houseboats.

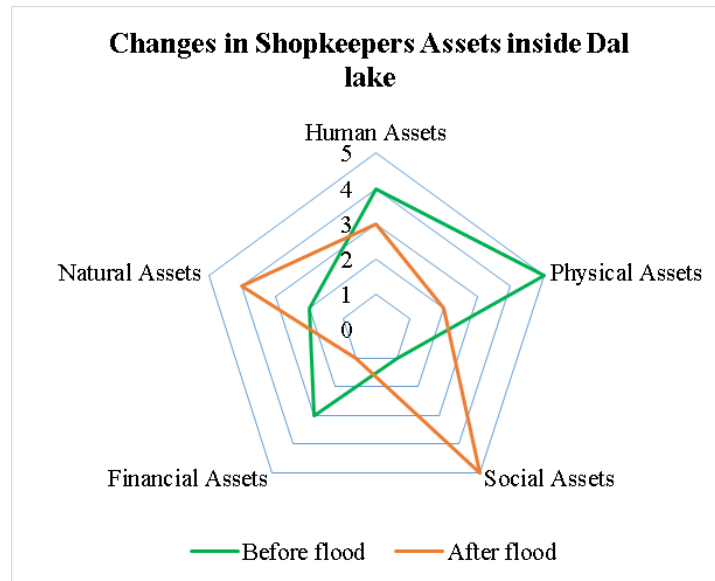


Figure 6: Changes in shop-keepers assets inside Dal lake

Due to having an immovable property the shopkeepers of the Dal lake, they had suffered financially in terms of the loss in their physical assets. Social asset is the network of relationships between the agents within an economy. The greater is the intensity of the stock of social capital, the more developed is the network (Barkes & Folke, 1998). Thus, to compensate the loss of financial and physical assets, the reliability on the social assets showed an increasing trend. Thus, having strong community solidarity around similar kind of work reduces the increases the chances of bouncing back after the hazard. As per the respondents most of the shopkeepers lost everything in the flood and they were also declined from the insurance as they did not have any proof of their loss.

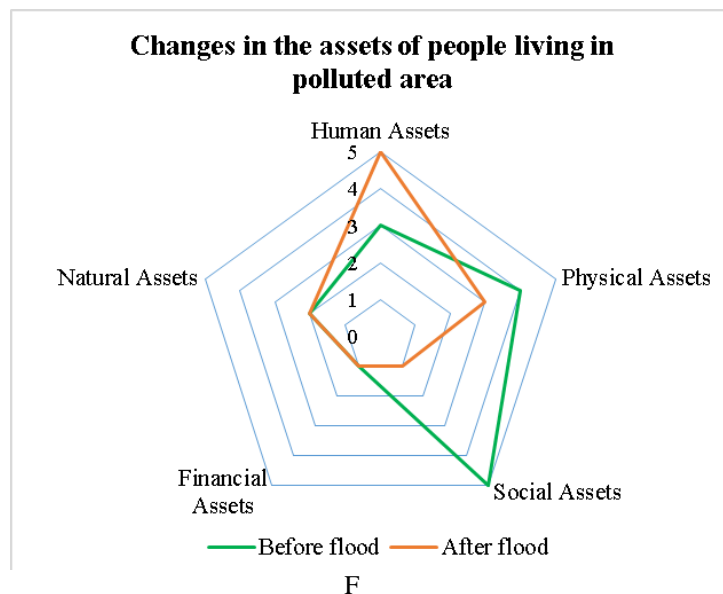


Figure 7: Changes in the assets of people living in polluted areas of Dal lake

Some pockets in the Dal lake such as the near the Dal gate specifically lie in the areas prone to high level of pollution. These communities which are living in the polluted water and do not have proper access to clean water, sanitation, and are prone to many waters borne diseases (Ali, 2015). Any governmental or non-governmental aid does not seem to have reached them. The communities residing in these areas are most vulnerable and had to bear most during the flood. Their houses have been damaged due to flood and they are also sensitive to any disaster that might happen in the future. Further, their plea for relocation has not been considered yet by the authorities. As the area is also the exit point for the Dal lakes water. Making it more congested and polluted than any other area of the lake. The inhabitants living in this area are demanding for better rehabilitation. These residents do not hold any property inside the lake with a legal status, no stable source of income. Thus, they have to be dependent on the Human assets instead.

They point to stark visible inequalities of having to face the most during the flood, showing as they did not had much to lose, as they had to rely mostly on their human assets after the flood. For Natural assets neither before the flood they had much nor after the floods.

On the basis of the responses collected a simple CVA framework matrix was developed for Dal lake in order to view people's vulnerabilities and capacities post the flood situation of 2014. This analysis includes majorly three broad interrelated categories which are the physical, social and motivational areas. The CVA shall help make distinction between 'vulnerabilities' and 'capabilities' which are long term factors that affect the communities residing in different pockets of Dal lake susceptible to disasters and their ability to respond to these events (Cannon et al., 2003).

The most visible area of vulnerability in the Dal lake post the flood situation was found to be the physical and material poverty including various attributes such as the infrastructure, labour, health, environment, housing, finance etc. The poor are more vulnerable because of no savings, few income and production options. The capacity of the communities residing in Dal lake to organise themselves and overcoming their internal conflicts is very appreciable. Poor societies that are well organized and cohesive can withstand and recover from the disasters much faster. The aspect of coordination between formal political structures and the informal systems needs to be strengthened. Motivational and attitudinal vulnerability and capacity which includes how people in the society view their ability to affect their environment does play an important role in the coping with the post disaster situations(Le Masson, 2015). In case of Dal lake, it was observed that the Dal dwelling communities have well developed indigenous knowledge which enabled them to co-operate successfully and help each other in the time of disaster. Various other factors such as disaggregation by gender, economic status, different scales or levels of application were also considered during the construction of the CVA matrix.

Table 2: CVA matrix for vulnerabilities and capabilities in Dal lake

Aspect	Vulnerabilities	Capabilities
Physical/Material What productive resource, skills and hazards exist?	Climate change, Increased frequency of floods, Cemented houses are more vulnerable to flooding leading to expensive renovation, Cannot renovate homes as per govt. order, Improper rehabilitation (leading to loss of livelihood), Land issues, Conflict with the government, Education, Poverty, Few income sources for communities residing outside Dal lake, Less saving, Low literacy rate (particularly among women), Drastic reduction of vegetable produce	Indigenous knowledge of plants species grown in Dal lake, Traditional income sources from centuries (e.g. row shikaras, manufacture them, swim), Floating vegetable gardens, Diversified work inside the dal lake, Tourism

Social/Organisational What are the relationship and organisation among people?	Breaking up of social relationships due to mismanaged relocation, Solidarity decreasing based on similar work, Mental health issues could be a prominent issue in coming years, Lack of voluntary organisation, Lack of own political association	Still strong social relationships (to some extent), Strongly identify with Dal Lake and their own identity
Motivation/Attitudinal How does community view its ability to create change?	Younger generation is no more interested in traditional work, Hopelessness due to unwanted relocation to different areas, Have to run behind the bureaucracy for paper work	Dal lake can be saved by them, as they know more about the Dal lakes health, Future is Dal lake, Lived inside the Dal lake from generations
Disaggregation by gender	Women have more workload than their share (Domestic and looking after floating gardens), Low literacy rate among women, decision making power, Welfare policy paralysis to target women from such locations	
Disaggregation by other differences (e.g. economic status),	Stagnant income, no change in agri-produce, Youth less interested in traditional source of income, Tourism sector overcrowded, Less educated lowers the job prospect, Danger to cultural heritage	Diverse source for income e.g. selling weeds as animal fodder, niche agri-produce, fishery, tourism, cultural heritage of living inside the Dal, working in other hospitality business, sharing economy

Conclusion

The present study used different indicators and variable based analysis regarding different type of assets to significantly explore the differences in various scales which provide us the major lacuna in the socio-economic management systems of the government post the floods of 2014 in Dal Lake, Srinagar. Here, specifically the DFID Sustainable Livelihood Framework (SLF) has highlighted the importance of vulnerability contexts and thus provides additional tools to assess the impacts of vulnerability. The vulnerability contexts in Dal lake, Srinagar are quite complex. The frequent floods in the river - Jhelum has greatly restricted the normal productivity of the socio-ecological systems in the area. The analysis from the study provides guidance on how Sustainable Livelihood (SL) can be achieved in practice. Further, the capacities and vulnerabilities analysis proved as a versatile and effective method capable of covering vulnerabilities, capacities and livelihood issues extensively. Despite their ecologically resilient practices to sustain the social and ecological balance, the inhabitants of the Dal lake are still on the losing side. During the floods the departments like the flood control, disaster management, State Disaster Response Fund (SDRF) have displayed an inability and absence of professionalism (Wani et al., 2013).

Moreover, our study also highlights the importance of the local institutions which contribute to adaptive capacity from disasters in social ecological systems in Dal lake. Various factors indicated that city's hazard coping capacity is limited for under financed and under trained staff. Regarding the management of localized natural resources in the context of developing economies in recent years, it is argued that local level community level institutions have been more successful than others in managing natural resources because of existence of higher level of resilience in the society (Dutta & Guchhait-Barddhaman, 2018). Thus, it is necessary to involve the indigenous people (Barkes & Folke, 1998; Ostrom, 1990; Tengö & Heland, 2012) living in and around the Dal lake in the designing of the disaster mitigating as well as coping strategies. Local decentralized natural resource management (Boyd & Folke, 2012; Ostrom, 1990) programmes are often rooted in livelihoods and intended to strengthen the livelihood base to provide improved level of well-being and enable people realizing their expectations with respect to the quality of life to make development more

comprehensive and more sustainable. The potential strengths of this approach are evident in the way that vulnerability is highlighted as a key component of disaster preparedness.

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