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Original Article

Changes in the Livelihood Capitals and Strategies of Hydropower Displaced Community of Arun-III in Nepal

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Abstract

The growing clean energy demand in the South Asian region has seen an increase in the hydropower construction in Nepal. This has undoubtedly raised the issues of involuntary displacement. This study explores the displaced population of the Arun III hydroelectric project in Nepal. Findings reveal people have adjusted to different livelihood strategies in the short term. However, the disparity in household livelihood choices has reduced natural asset-based activities, and long-term sustainability is a concern. To close this gap, the government should focus on developing people's skills, improving their human capital, and focus on improved benefit-sharing mechanism for holistic development of the region.

Keywords: Hydropower, Displacement, Livelihood Assets, Community Sustainability

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1. INTRODUCTION

Dams are monolithic barrier that restricts water flow for power generation, irrigation, and water supply etc. (Afzal, et al., 2022). Mega hydropower projects exert different effects of surrounding and catchment areas (Afzal, et al., 2023). Concerns raised by non-governmental organizations (NGOs) about the environmental effects and rampant privatization of the Arun valley's culture and natural beauty, as well as criticism of the project's size and increase in already-high electricity tariffs, prompted the World Bank to cancel the 400-megawatt hydroelectric project developed by the Nepalese government in 1992 (Udall & Director, 1995). However, in response to rising energy demand in Nepal and neighboring India, the Arun-III hydroelectric plant in Sankhuwasabha District, Province 1, East Nepal, is being built on the Arun River. The Nepalese government intends to increase access to electricity to 1426 MW (87 percent) by 2022, up from 67.3 percent currently. They could build numerous hydropower facilities based on the number of licenses granted by the Nepalese government to conduct feasibility studies on potential projects. The impact on the displaced typically extends beyond economic considerations and into political, social, and cultural dimensions, resulting in a range of outcomes such as loss of identity, feelings of marginalization, and health and wellness consequences (Aboda, et al., 2019).

According to Scudder (2011), from developed nations to emerging economies, no country can show that they have even been able to restore the incomes of most project-affected people. An investigation

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into the impact of forcible relocation on agricultural families in two villages in the catchment area of the Three Gorges Dam in China, for example, discovered that PAPs became more sensitive to external shocks after resettlement than they were before resettlement. They were becoming more vulnerable because of agricultural revenue losses that were not offset by increased off-farm income from paid labor or self-employment (Wilmsen, et al., 2011). Similarly, infant mortality rises dramatically to 7.57 percent for infants born further downstream in floodplain areas, according to empirical research in Africa, because lower water levels caused by dam construction degrade the wetland environment, which is critical to household livelihoods (GebreEgziabher, 2014). These household livelihood capitals include natural, physical, human, social, and financial resources essential to people's survival in the face of stresses and shocks without jeopardizing natural resources (Ansoms & McKay, 2010; Ding, et al., 2018).

Like other parts of the world, in Nepal also the living conditions of the displaced population have deteriorated following their displacement from their original locations (Koirala, 2016). Even though new guidelines for land acquisition were introduced in 2015 in collaboration with the Asian Development Bank, cash compensation at maximum market value (equivalent to replacement value) is still one of the compensation mechanisms used in Nepal for people affected by development projects (Koirala, et al., 2017). The past research on Kulekhani Hydropower Project in Nepal has shown that the monetary compensation program was designed to place as little financial strain on the government as possible, and that it appeared to favour the interests of the majority population while ignoring the concerns of the local people (Shrestha, et al., 2016). Furthermore, according to a recent study conducted in four villages affected by the Budi Gandaki, even after allocating resettlement and restoration programs for affected households, the project has a weak positive effect on social sustainability (Khanal, et al., 2021).

In terms of livelihood studies in Nepal, previous research shows, agriculture, livestock, and forest-related activities are the mainstays of rural livelihood strategies in Nepal. Agriculture is vital to rural life because it provides income, fuel, building materials, and animal feed. The capabilities, assets, and activities necessary for survival and the development of such capabilities, assets/resources, and activities are referred to as livelihood (Subedi & Pandey, 2002; Subedi, 2017; Paudyal, 2017). Rural households build a portfolio of livelihood activities by combining a variety of income-generating and social activities to meet and, if possible, improve their livelihood outcomes (Paudyal, 2017). Even though the country's population is booming, and the natural environment is deteriorating, many Nepalese rural dwellers rely on land for subsistence agriculture. Agriculture, livestock, forestry, and other traditional economic activities based on locally available natural resources provide livelihoods for many rural Nepalese (Banskota & Pradhan, 2007).

Furthermore, from 1970 to 2013, the DFID commissioned a study in the Koshi Hills region of eastern Nepal found that, the Koshi Hills people are better off now than they were in the 1970s in various ways, including higher living standards, a better quality of life, and lower poverty. Government and donor interventions have aided this transformation, but not nearly as much as development practitioners would like or expect. Similarly, research on relationship between livelihood capitals and livelihood strategies in the Dalit community of Parbat, Nepal show that Dalits are deprived of opportunities. The high poverty level in Dalit communities shows that Dalits' capabilities or livelihoods have not been adequately increased in quantity or quality. They are ill equipped to decide about their livelihoods despite having adequate knowledge, skills, income, and physical capital.

However, to the best of our knowledge, no research has been found that has used the Sustainable Livelihood Approach framework to investigate and compare the livelihoods of hydropower displaced people in Nepal. Thus, by comparing the displaces livelihood derived after the adopted resettlement practice, we can gain a comprehensive understanding of their livelihood conditions before and after resettlement. This article therefore aims to address these issues by investigating Arun-III Hydropower project. The overall objective of this article is to evaluate the sustainability of the affected household's livelihood by these projects, understand displaced people livelihood goals and to make recommendations towards ameliorating them.

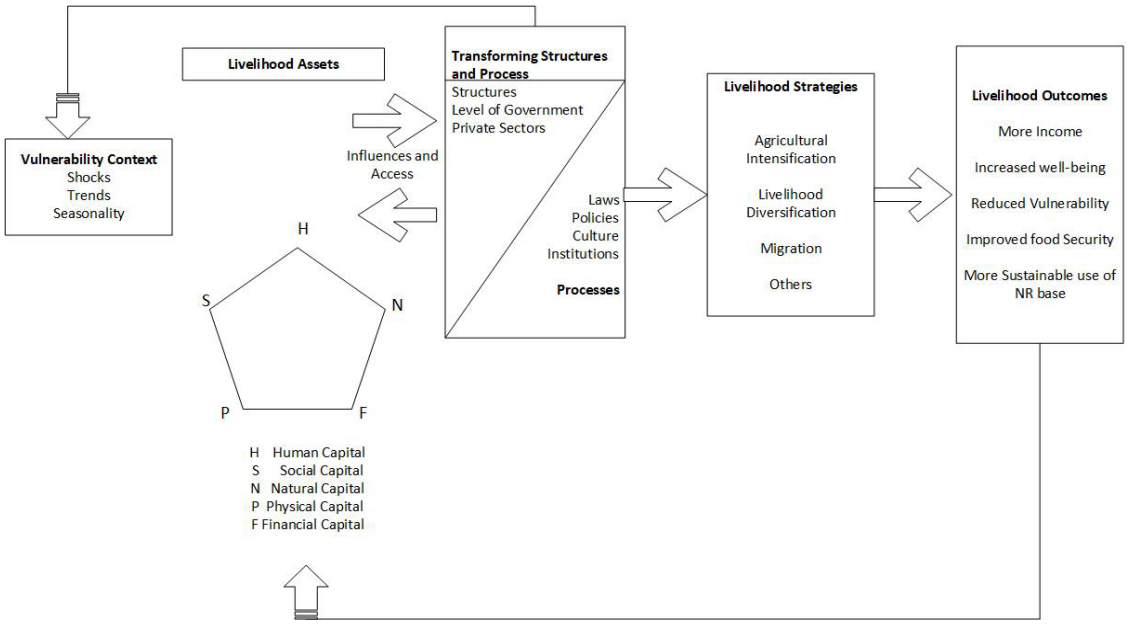

Fig. 1. DFID's Sustainable Livelihoods Framework

Case Study Area

The Arun-III hydroelectric project on the Arun River will include the construction of a concrete gravity dam 70 meters high and 466 meters long. The hydropower plant is expected to cost more than $1.6 billion and will generate 4,018.87 million units of electricity per year. When the governments of India and Nepal agreed in February 2020, the project received financial closure. The transmission line, which will cost more than $156 million, will be built as part of the project. It is being built under a build-own-operate-and-transfer (BOOT) model, a collaboration between India and the Government of Himachal Pradesh. In March 2008, SJVN and the Government of Nepal (GoN) signed a memorandum of understanding (MoU) for the project's execution. SJVN will operate the power plant for a 30-year concession period. Following that, the property will be transferred to the GoN. During the term of the concession, Nepal will receive 21.9 percent of free electricity. In August 2015, the Ministry of Science, Technology, and Environment (GoN) authorized the project's environmental assessment study. The hydropower project started in May 2018 and is expected to be completed in 2023. During construction, the project is expected to create 3,000 jobs in India and Nepal. Similarly, the project will provide 269 homes with thirty free units of electricity per month. In addition, the project intends to improve the area by building new roads, bridges, and services such as schools, hospitals, and community centers.

Agriculture, service (salaried jobs), small business/industry, and wage work were the main sources of income prior to the start of the project. 36.87 percent were employed in agriculture, 4.6 percent in paid work (in and out of the country), 4.7 percent in business and cottage industries, and 0.7 percent in wage employment. Nearly 40.09 percent of those polled were students, and 12.6 percent were family caregivers. Only 4.7% of households in the project area owned business, such as a petty shop, a retail store, a restaurant, or a hotel. Only 37.09 percent of households were able to grow enough food to meet their annual needs. Most of the reasons for households not growing their own food were topography, small holdings of land, fertility, and traditional farming methods. Food deficiency was an issue in the area because previously only about 32.09 percent reported food deficiency of 6-9 months, while to cope with the food deficiency 52.99 percent of houses took out loans and 20.15 percent worked as wage labour. Similarly, a small percentage of households rely on business and salary jobs. The average household income in the previous year was NRS. 262, 2873, with agriculture accounting for 61.08 percent and off-farm income accounting for 28.31 percent. Fuelwood was the primary source of energy for all families in the project area, and solar power was used for lighting. Cardamom, paddy, maze, and mullet were cash crops. Animals in the household included buffaloes, cattle, goats, sheep, and pigs.

In terms of resettlement, all the houses in the area chose cash compensation. However, because the government rates do not fully reflect the essence of the replacement cost principle for the project's affected individuals, a 100% additional unit charge was added (Shen, 2012). We discovered during our fieldwork that all the hundred households we examined had received Land to Cash compensation, because of their desire to purchase homes or engage in business activities that met their specific preferences and needs and their desire to move to cities.

2. MATERIAL AND METHODS

Data Collection and Analysis

This study made use of both primary and secondary data. Using modified questionnaires as reference to and semi-structured interviews, the survey was conducted with households affected by hydropower in Sankhuwasabha District, East Nepal (Shen, 2012). People who had moved to Makalu Village's Wards 3 and 5 were chosen for the fieldwork. We completed only one hundred of the desired 150 household surveys. We conducted the survey from February to April 2021. For this study, we hired two residents who had previous experience collecting data in the area. The authors also reviewed documentation such as the Resettlement Action Plan and other annual published reports to complete this research. Following the distribution of the translated questionnaires and explanation of consent in Nepalese, the household interview was conducted in their home. The questionnaires contained information on changes to socioeconomic details, such as annual household income and major expenses before and after land expropriation, policy appeals, livelihood goals, livelihood Strategies, and their outcomes.

Compensation Policies for Land Expropriation

We discovered people were asked whether they preferred Land-to-Land or Land-to-Cash compensation during the compensation process. They compensated people for their desire to buy homes that met their specific preferences and needs and their desire to move to cities. Special provisions have been made for households whose balance land (land remaining after acquisition) is less than the Minimum Economic Land Holding within Sankhuwasabha districts. If such households purchase land in six affected VDCs, they receive cash incentives equal to 50% of the total compensation paid to the total private land acquired. Furthermore, suppose they decide to spend some of the compensation money on land. In that case, they will be eligible for a 50% bonus on the amount spent on land (from the total amount calculated as Land compensation amount). Fruit-bearing trees, cash crops, timber trees, firewood trees, and standing crops were also compensated. Moving allowance, food security allowance for six months, income-based transitional allowance for six months, and provisions for senior citizens' allowance for sixty and up were made.

According to our survey, the land exploration period was from 2014 to 2017. Approximately seventy-six households reported having their land expropriated in 2016, four in 2014, and twenty in 2017. The compensation amount varies with the size of the land expropriated between households. From our study, we discovered that the compensation amount ranges from Rs. 1500000 to Rs. 15000000. We show the compensation received by the sample households in Table 1.

Table 1
Compensation Amount

Amount	Number of Households	Percentage (%)
Rs.1500000 to Rs.3000000	3	3
Rs.3000001 to Rs.5000000	10	10
Rs.5000001 to Rs.7000000	27	27
Rs.7000001 to Rs.9000000	36	36
Rs.9000001 to Rs.11000000	19	19
Rs.11000001 to Rs.13000000	3	3
Rs.13000001 to Rs.15000000	2	2
Total	100	100

Depending on the compensation amount, different households received payments at various stages regarding the payment timeline. During our survey, we discovered that 29 respondents said they received compensation in a lump sum, while 71 households received the compensation in instalments. The Nepalese government has widely adopted the instalment compensation process (See Table 2).

Table 2
Compensation Status

Statements	Number of Households	Percentage
made by onetime payment	29	29
made by instalments	71	71
Total	100	100

Since monetary compensation was used to assist affected households in rebuilding their livelihoods that had been lost because of the hydropower project, all affected eligible households were required to take part in the Financial Awareness Program (FAP) before receiving their compensation. The training's goal was to raise awareness among the affected households so that they could make better financial decisions in the future, including cash risks and how to mitigate them, savings, investment, and spending management. Similarly, all compensation was paid through bank accounts to ensure security during cash collection and a long-term engagement of displaced people in the formal economy to gain financial access. Furthermore, these bank accounts had to be joint bank accounts between two family members, implying that any money withdrawal required approval from both account holders. This was also done to encourage family members to consult when deciding on compensation, and because many of these accounts included husband and wife, it was intended to promote women's participation in household financial decision-making. To be more precise, the goal was to reduce the possibility of monetary compensation being misused, to contribute to women's empowerment by boosting women's access to household assets, particularly land and house ownership, and their engagement in household level financial decisions.

Measurement and Comparison of Livelihood Assets

Based on a detailed and in-depth investigation of displaced households in the study region, consultation with numerous experts and scholars in related fields, and a quantitative study on livelihood assets conducted by experts and scholars in development-induced displacement, the author developed an evaluation index system and made an assessment (Afzal, et al., 2022). Prof. Saaty, an operations research scholar, proposed the Analytic Hierarchy Process (AHP) in the 1970s as a systematic analysis method. Complex multi-objective decision problems are treated as a system by AHP, which divides the problem or planning issue into constituents or levels and arranges them in ascending hierarchical order. At each level of the hierarchy, a pair-wise comparison matrix is used to compare the components. This methodical approach produces a list of priorities or relative importance and a method for weighing the various actions or options. The relative priority weights can be used to guide resource allocation between lower-level entities (Saaty, 2008). We obtain the influencing weight value of measuring indicators of hydropower displaced households' livelihood assets using AHP (See Table 3). The following steps are involved in measuring livelihood assets: first, standardize the sample data to address indicator type and dimension inconsistency. To obtain the standardized value Ii. Second, by calculating the weighted average of the affecting weights Wi and the standardized value Ii, we obtain the integrated value P of each type of livelihood asset, i.e., the livelihood asset value. The following is the formula:

$$P = \sum_{i=1}^{n} W_i I_i$$

Equation. 1. Integrated Value

Table 3
Indicators and Affecting Weights

Livelihood Assets	Measuring Indicators	Affecting Weights
Physical Capital	Area of House	0.667
	Housing Structure	0.333
Financial Capital	Income	0.540
	Monetary Compensation	0.287
	With Loan or Financial Support Obtained from Formal Financial Institutions	0.173
Natural Capital	Area of Land	1
Social Capital	Number of Family Members with Special Identities or Experiences** (person)	0.667
	Close contact with urban relatives or friends	0.333
Human Capital	Numbers of Labours	0.413
	Average education years of labor	0.327
	Number of family members with employment and business experience or specialty	0.260

Notes: *Special identities or experiences mean the background of being village leaders, army men, teachers, and politicians.

All Livelihood Assets Value Comparison

The Arun III hydropower compensation policy caused changes in the structure and value of livelihood assets among the affected population. Expropriation of land changed the structure of livelihood assets, forcing the value of livelihood assets to change through various forms of compensation. We calculate and obtain the livelihood assets of the affected population before and after land loss using the formula from Equation 1. We then use valuation to determine whether these endowment factors of livelihood assets are comparative advantages or disadvantages.

Table 4
All Livelihood Assets Value

Category of Livelihood Assets	Human Capital	Natural Capital	Financial Capital	Physical Capital	Social Capital	Total Assets
Before Land Expropriation	0.36	0.22	0.15	0.24	0.20	1.23
After Land Expropriation	0.39	0.29	0.31	0.37	0.19	1.49
Change	0.03	-0.07	0.17	0.12	-0.01	0.25

As shown in Table 4, before the land loss, human capital was highest (0.36), followed by physical capital (0.24), natural capital (0.22), social capital (0.19), and financial capital (0.14) due to a lack of income-generating sources other than agriculture. Human capital has an advantage over other capital types because the surveyed region has a young working-age population, which gives the labor force a quantity advantage. Thus, human capital is valued higher than other capitals.

However, after losing their land, the affected people's livelihoods changed significantly. Due to the compensation fees obtained for land expropriation, natural capital value (-0.07) decreased and ranked last; financial capital value (0.31) increased and ranked third; and human capital value (0.39) slightly increased and ranked first. As stated in the project's resettlement action plan, the majority of the population was between the ages of 15 and 58, which GON considers being a healthy population; however, because our survey was conducted after five years of land exploration, these people are now over the age of 18 and engaged in financial activities; physical capital value (0.37) increased as some relocated households used compensation money to upgrade their housing structure. The social capital value decreased slightly as some people moved to other regions within the country. Figure 4 depicts the changes in the value of livelihood assets before and after land loss.

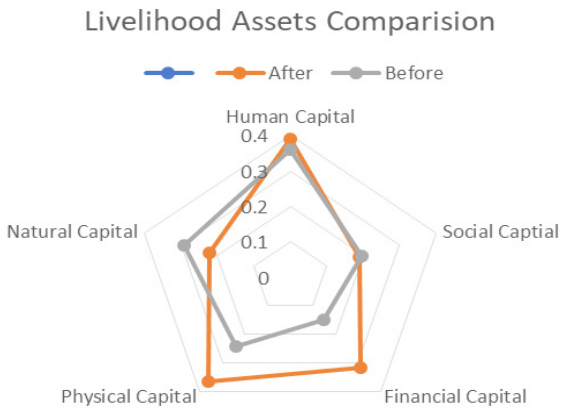

Fig. 2. All Livelihood Assets Comparison

In summary, the total value of affected households' livelihood assets increased from 1.23 prior to the land loss to 1.49 post-land loss. This suggests that the basis of livelihood assets was increased to some extent during our survey. Some of the affected households deciding not to purchase large tracts of agricultural land but using the compensation to improve their housing structures and pay their loans caused a decrease in natural capital. At the same time, working on the project has helped them diversify their income and yielded positive results until now. This is backed up the recent studies in other places, which have shown that people in rural areas have been able to diversify their household income in recent times in Nepal (Gautam & Andersen, 2016).

Livelihood Asset Value Comparison based on Livelihood Activities

We calculate the value of various types of displaced households' livelihood assets using equation 1. Since human capital value comes first in terms of comparative advantage, while financial capital value comes last in terms of comparative disadvantage, the livelihood asset structure of different affected households is similar, as shown in Table 5. M-based households (2.60), N-based households (1.71), and H-based households have the highest total value of livelihood assets when compared (1.37). Even though many households were engaged in N-based activities prior to the loss of land, the M-based household has a comparative advantage in natural capital. Farmland abandonment is a problem in Nepal, affecting the local population and the entire society in terms of the production of goods (e.g., foods, feed, fiber) as well as services provided by the multifunctionality of the agricultural landscape (e.g., sociocultural practices, values, and norms). This also supports the findings of that livelihood strategies have no effect on livelihood outcomes in Nepal. Similarly, in Nepal, the land is now considered an asset for future life security rather than a source of agricultural income. Hence, the house with a large landholding or highest natural capital might not be engaged in the N-based activities.

Table 5
Different Household's Livelihood Asset Value Comparison

Household Types		Total Assets	Human Capital	Natural Capital	Financial Capital	Physical Capital	Social Capital
N-based Households	Before	1.71	0.50	0.30	0.23	0.39	0.29
	After	1.64	0.39	0.15	0.40	0.56	0.14
	Change	-0.07	-0.11	-0.15	0.17	0.17	-0.15
H-based Households	Before	1.37	0.44	0.34	0.16	0.23	0.20
	After	1.73	0.51	0.24	0.30	0.48	0.20
	Change	0.36	0.07	-0.10	0.14	0.25	0
M-based Households	Before	2.62	0.51	0.59	0.40	0.62	0.50
	After	2.74	0.67	0.29	0.60	0.68	0.50
	Change	0.12	0.16	-0.30	.20	0.06	0

Following the loss of land due to land exploration, almost all households experienced a decrease in natural capital; N-based (-0.15), H-based (-0.10), and M-based (-0.30). Similarly, social capital has decreased in N-based households while remaining unchanged in other types of households. All household financial and physical capital increased as monetary compensation was used for land exploration.

Livelihood Behaviour and Livelihood Outcomes

Vulnerabilities determine changes in the structure and value of livelihood capital after displacement. This will then necessitate changes to the livelihood goals, reflecting the livelihood outcomes (Shen, 2012). We divide these livelihood Strategies into three categories based on the household's income level based on our data for a better understanding. In this context, classified livelihood activities refer to a household selecting livelihood Strategy patterns based on the livelihood assets endowment with the most significant advantage. Agricultural income primarily refers to the household's primary source of income from agricultural activities (N-based). Similarly, wage income refers to most income derived from employment or wage-based activities (H-based). While M-based activities rely on multiple capitals, except for natural capital, business income refers to activities primarily related to business that exclude agricultural income and generate the most income.

Table 6 shows that before the resettlement, most households were engaged in farming activities. Their primary source of income was agriculture; however, many people were employed at the project after the resettlement. These earnings from wages outnumbered those from agriculture. Before being displaced, people said they were heavily reliant on traditional farming, and the income from farming did not improve their living conditions. Similarly, wage earnings have assisted them in dealing with food insecurity issues in the event of a poor crop production year. However, we discovered that almost all the houses except the M-based households reported some extra earnings from farming activities, although they were not actively engaged and made only a tiny portion of their living.

Table 6
Livelihood Strategies Comparison

Items	N-based Households (Farming)	H-based Households (Employment)	M-based Households (Business Undertakings)
Before Land Expropriation	78%	18%	4%
After Land Expropriation	23%	69%	8%

We use both objective (income) and subjective (respondents' evaluations of their livelihoods) indicators to measure livelihood outcomes. The average household income of the surveyed households before the land loss was Rs.1,29,261.00, as shown in table 7, with N-based households relying on agricultural income earning the most. This reflects the remote location of the surveyed households, where people lacked other sources of income prior to the project. After a significant decline in agricultural income, overall income has increased by over 35.76 percent. Local businesses in the area have also benefited from the hydropower project, with a significant increase in revenue. This means that if households cannot adjust their livelihood Strategy quickly or choose inappropriate strategy; their total income will decrease, potentially jeopardizing their long-term livelihoods.

*Exchange Rate: 1USD= Rs.125.1 (June 20/2022)

Table 7
Household's Income Comparison

	All Households	N-based Households	H-based Households	M-based Households
Before Land Expropriation (10000)	Rs.1790.81	Rs.1292.61	Rs.383.5	Rs.114.7
After Land Expropriation (10000)	Rs.2788.00	Rs.624.00	Rs.1767.00	Rs.397.00
Change Rate (%)	35.76	-107.14%	233.50%	71.10%

To improve our understanding of livelihood conditions, we asked respondents to assess the livelihood scenario objectively. According to the bar graph below, most people were concerned about their children's education prior to land exploration. Because they had a limited income, providing education was their priority. There was little difference in opinion about the importance of basic life and an improved standard of living. While people were concerned about their income situation because traditional livelihood strategies only provided them with a limited income, they were also less concerned about income insecurity because they were familiar with the livelihood strategies.

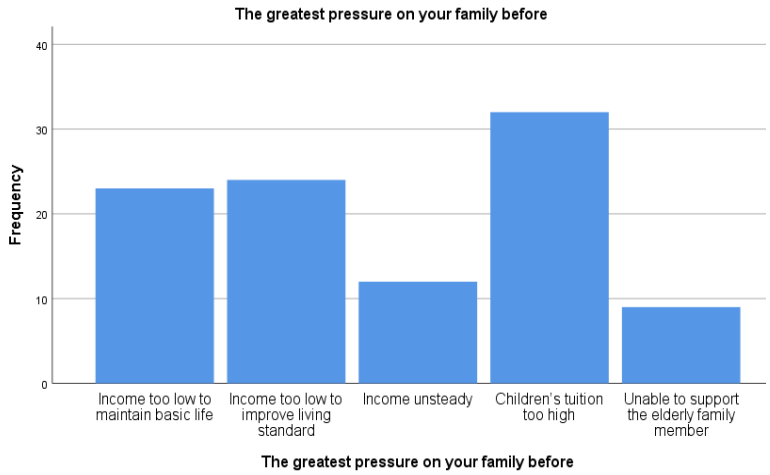

Fig. 3. Living Pressure before Land Lost

However, even after land exploration, the vulnerability to maintaining a basic lifestyle remains. To maintain a better standard of living, the cost of living has risen in tandem with earnings. Changes in livelihood Strategy have increased uncertainty about consistent income, while the cost of medical expenses for older people is higher than tuition fees for children.

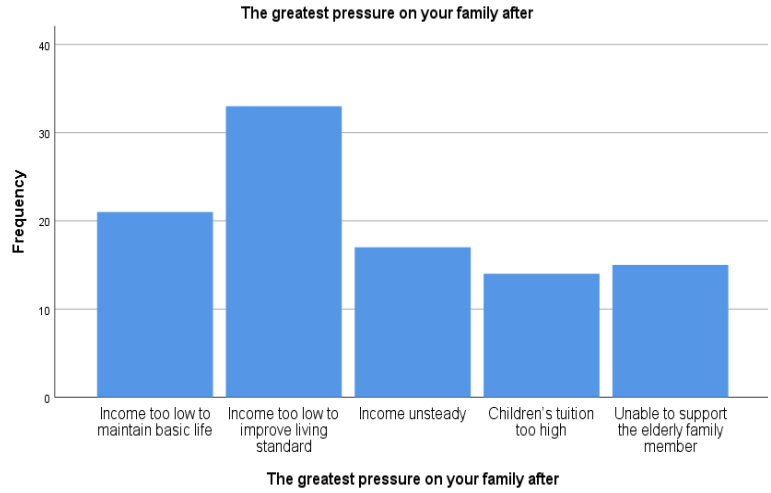

Fig. 4. Living Pressure After Land Lost

Similarly, table 8 explains how the cost of living has risen significantly since land exploration. In terms of basic living expenses, this is consistent with the overall Nepalese national situation, which has seen a significant increase in inflation and a trade deficit due to a lack of internal production. Nepal relies heavily on imports for nearly all the items required to maintain a basic lifestyle. We see another significant increase in the cost of education and medical expenses for children. The desire to provide a better education for children has resulted in parents enrolling their children in private schools far from home in urban areas, requiring additional living expenses. Although the total amount of debt has increased, the number of people owing the debt has decreased from 40 to 25 households.

Table 8
Family Expenses Comparisons

Items	BeforeLand Lost	AfterLand Lost	Change
Expenses for basic life	Rs. 6,100,000	Rs. 8,945,000	31.80%
Expenses for Improved Living Standard	Rs. 9,018,000	Rs.10,677,000	15.53%
Children's Tuition Expenses	Rs. 1,152,000	Rs. 3,366,000	65.77%
Medical Expenses	Rs. 1,428,550	Rs. 2,946,500	51.51%
Debts Repayments	Rs. 4,515,000	Rs. 5,730,000	21.20%

Discussion and Conclusion

Since Nepalese policymakers see hydropower as the primary source of economic growth and improvement in people's living conditions, the demand for land for such projects is rocketing. These projects are frequently carried out in rural areas where the Nepalese government has expropriated significant rural land, resulting in more farmers losing their land and becoming economically displaced. In the case of Arun III, land loss shocks changed the structure and value of displaced households' livelihood assets, and livelihood pathways are becoming more uncertain. Similarly, cash compensation and external support are starting to look insufficient to allow displaced households to adjust their livelihood path, and their Sustainable Livelihood is experiencing challenges. This causes household differentiation and, to some extent, stymies Nepal's smooth urbanization progress. As a result, ensuring the long-term viability of displaced households' livelihoods has become a practical and pressing issue in Nepalese development-induced displacement cases.

Livelihood Goals

In this paper, there are five options for future life expectations: a steady and guaranteed income, improved life quality, more income, successful children, and higher social status. Respondents' confidence in achieving livelihood goals and relative reasons can be reflected in their answers to reasons to be optimistic or pessimistic.

According to table 4, 28 percent of parents expect their children to be more successful in the future. Improved living standards are followed by income, and 9 percent are unsure about their options and have remained silent. This shows that displaced people have a higher expectation of being able to raise their living standards and see their children succeed once they are resettled. In Nepal, where the social security system is still not to desired standard, people see improving and supporting their children to improve their livelihood security as the primary goal.

Table 9
Livelihood Goals

	Children's Successful	Improved Quality of Living	Stable and guaranteed income	More Income	Higher Social Status	Not Sure
The expectation for Future Life	28%	27%	14%	12%	10%	9%
	Children more successful	More favorable policies	Government support in difficulties	More hard work	More development opportunities	
Reasons for Being Optimistic for Future Life	30%	26%	17%	16%	11%	
	Insufficient government support and improper policies	Not sure	Low literacy	Heavy family burdens	Lack of technical skills	
Reasons for Being Pessimistic for Future Life	57%	14%	13%	10%	6%	

As we know, resettlers' intention to choose livelihood strategies is influenced by their livelihood goals and attitudes. We asked them to rank the reasons for being optimistic and pessimistic about the future to assess the affected population's level of confidence in achieving these objectives and their attitudes toward future livelihood Strategies.

In these aspects, respondents see their children's success as a reason to be optimistic, and they have certain positive feelings toward government policies, which are consistent with their livelihood goals. As previously stated in the case study, hydropower power projects were first planned in 1996. However, they were cancelled due to environmental concerns, which, according to locals, was a significant setback in terms of development. According to the project documents, none of the houses had access to electricity and relied on solar energy for power. Similarly, hydropower projects in Nepal have resulted in some positive changes in access and connectivity (Gunatilake, et al., 2020). People, however, remain skeptical of the government's assistance. As a result, the majority (57 percent) of those polled are pessimistic about insufficient government support and policies. People mentioned during our interview that the pessimism stems from a lack of post-resettlement programs and support. Because many people are currently employed in the hydropower project, they have been able to diversify their livelihoods and earn more money (Afzal, et al., 2023). However, once the project is completed, those extra earnings are likely to cease, potentially impeding the progress toward a more prosperous future. As a result, most

respondents are concerned about their future livelihood security.

Land Expropriation Compensation Ways and Policy Evaluation

In development projects, involuntary relocation has context-specific consequences. The Arun III hydropower project saw a positive shift following the resettlement rehabilitation effort. As previously stated, special provisions were made to mitigate the negative impact of displacement and improve people's living standards. These include hydropower employment assistance, moving allowances, food allowances, and so on; however, monetary compensation was the primary support policy in terms of the livelihood restoration program. The project changed the lives of those affected because compensation allowed them to purchase higher-quality homes and property. Our findings were as the study conducted to understand cash compensation used by the Government of the Nepal Investment Board, which reported that displaced households were more likely to invest in fixed assets such as land and houses. However, the trend of some displaced households closing joint accounts and opening single bank accounts, owned mainly by male household heads, is alarming. Though the number is small now, it could jeopardize the entire effort to empower women by allowing women to access household assets through joint bank accounts if it grows in the future.

Hence, although people were excited about the change, the investigation revealed insufficient employment support and post-resettlement programs. These issues can be seen in respondents' responses regarding their living pressure, which are almost identical to before land exploration. This is consistent with previous research in Nepal and other developing countries, which shows that these are widespread issues (Oware Twerefoo, 2021). We discovered that policy dissatisfaction is linked to inadequate compensation, future unemployment concerns, and social security programs during our research. This means that, for hydropower displaced communities, monetary compensation alone cannot replace the functions of employment and social security (Schulz & Skinner, 2022). This is also why respondents consider "guaranteed and stable income" (livelihood security) to be a more important livelihood goal than "more income." Regarding house relocation and resettlement, most residents were pleased with the policies because they allowed the displaced community to improve their living conditions, pay off their debts, and provide better education for their children. In the meantime, they have high expectations for resettlement policies, making policy implementation efficiency a critical factor in policy satisfaction.

Livelihood Changes

Livelihood Assets and Livelihood Goals

In terms of livelihood assets, the displaced households surveyed had a good human and social capital base prior to land loss, which assured them that they could cope with the loss shocks. The structure of their livelihood assets changed because of land exploration. Cash compensation increased financial capital because of land expropriation; housing quality and resettlement influenced physical capital, and changes influenced human and social capital in the external livelihood environment. More than half of respondents prioritized livelihood safety in the event of land loss shocks and expressed reasons to be optimistic or pessimistic about the future. According to both the optimistic and pessimistic respondents, the policy is the most crucial factor influencing respondents' livelihood attitudes. This demonstrates that displaced hydropower households are heavily reliant on the government, implying that policy is a significant factor influencing the livelihood pathway. Because of limited financial resources, the government finds it challenging to increase the compensation policy rapidly. The key to improving policy efficiency is to use policy as a guide to encourage hydropower displaced households to choose positive livelihood strategies to achieve long-term livelihood sustainability (Serrat & Serrat, 2017).

Livelihood Strategies

Prior to land loss, households were primarily engaged in N-based activities (farming), followed by H-based activities (employment), and the remaining households were primarily engaged in M-based activities (doing business). For many of the surveyed households in the project area, subsistence farming was their primary source of income. Traditional agricultural methods, a lack of technical knowledge, poor soil fertility, a lack of irrigation, and a lack of agriculture inputs, crop loss due to diseases, pests, wild animals, and natural calamity caused low agricultural production in the project area. As a result, the project area already had a food shortage. They imported food grains into the area in small vehicles, and those roads were only open seasonally to Num and Diding VDCs. The government distributed it through

the Nepal Food Corporation on a quota system to meet the food demand of the project's local people. Cardamom was regarded as an important cash crop in the area, contributing significantly to the local economy and meeting the needs of the local population. However, it was discovered that an unknown disease reduces yield annually and that its orchid is endangered. As a result, farmers faced a significant challenge, gradually declining to farm.

Agricultural activities fell precipitously after the land was lost. The proportions of the other two types grew. It shows that land loss shocks forced hydropower displaced communities to change their livelihood strategies and that this adjustment provides the opportunity to diversify household income sources. However, as the hydropower project nears completion, the lack of significant change in human capital has increased livelihood risks. These provide policy improvement recommendations.

Livelihood Outcomes

In terms of livelihood outcomes, displaced households surveyed saw a 35 percent increase in income. This suggests that losing land has a little immediate impact on most households. However, there are income gaps between households. The significant loss in N-based activities income and the massive increase in H-based income show the importance of selecting livelihood Strategy in determining household income. As a result, the government should provide more guidance in N-based activities and help develop livelihood assets.

In conclusion, changes in the livelihood assets of hydropower displaced households cause them to adjust their livelihood strategies, resulting in different livelihood outcomes in Arun-III. As a result of these actions, the average household income increased from Rs.1,79,081 to Rs.2,78,800 per year. This shows that the long-term viability of the hydropower displaced people's livelihood pathway has improved. Due to differences in capability and intention to change livelihood strategies, the N-based livelihood pathway is unsustainable.

3. POLICY RECOMMENDATION

To diversify their income while improving the compensation standard for land expropriation, the government should intensify benefit-sharing mechanism. To be more specific, the government should: 1) Improve human capital by improving employment training. 2) Establish an affordable health insurance system centered on the elderly and subsidize the agricultural sector to ensure smooth transitions. 3) Increase the amount of social security and make it mandatory for hydropower companies to provide the highest rate of Employees Provident Fund for lower unskilled workers. 4) Improve communication and coordination between the government and the hydropower displaced community by addressing both the positive and negative effects of these projects to improve housing resettlement policy efficiency.

Limitation of the Study

We conducted this research in two villages where the hydropower project displaced population is located. Due to the cash compensation mechanism, some affected households left the areas and moved to various parts of the country, which might have presented a different perspective on our findings. Similarly, when the data collection was started, COVID-19 was at an early stage, and the impact was minimal; however, due to the risk of infection, we could not meet our target sample size of 150 households. The compensation process had ended a lot earlier, so the respondent said that COVID-19 had no impact on their opinions.

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Competing Interests

The authors have declared no competing interests.

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