Pakistan: Vanished Livelihoods. Reverberations of Civil War in Swat

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Abstract. This case study relies on primary data from a household survey conducted in conflict-affected Swat. The methodology consists of a two-step procedure. First, the k-means clustering tool validates the household classification in Swat. Second, we identify asset-base (human, physical, social, natural, and financial) constraints in pursuing alternative high-return and sustainable livelihood possibilities. The specific limitations in human and financial capital are observed. We highlight priority improvements in wide-ranging infrastructural necessities. These have strong potential to make household livelihood choices sustainable again. Such sustainability is likely to diminish their chances of sympathizing with and joining militants again. If not, they may fall under their strong influence again.

Keywords: Post-war livelihoods, Taliban and Swat, Civil war, post-war reconstruction.

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Conflict Studies Quarterly
Issue 51, April 2025, pp. 18–40

DOI: 10.24193/csq.51.2
Published First Online: April 03, 2025

1. Introduction

Violent civil conflicts are among the most severe man-made disasters, shocks, and catastrophes, and they have immense consequences. Escalated conflicts, particularly civil wars, devastate physical infrastructure and natural resources, limit occupational choices, disrupt education and healthcare services, and displace populations. Civil wars create food insecurity, which, if it worsens, often results in famine (as seen in Somalia, Ethiopia, Sudan, and, more recently, Yemen). Civil

wars contain factors that disrupt lives and lead to man-made famines. In addition, war causes injuries, physical disabilities, and casualties among civilians.

Despite the devastating nature of civil wars, there is limited evidence in the literature on how civil war explicitly damages and disrupts household livelihoods in war-affected regions. While some destruction in conflict zones may be similar, much of it is region- and household-specific. Answers to such questions hold significance beyond academic concerns. Many post-conflict recovery efforts—aimed at achieving maximum impact—depend on meaningful investigations and findings about 'who has been affected and to what extent'. Therefore, such investigations are more insightful when they analyze a specific civil conflict and its aftermath, rather than drawing broad conclusions. Despite approximately 20 years of foreign military presence, massive financial aid, and development programs, efforts failed to prevent the Taliban's resurgence and their militant takeover of the entirety of Afghanistan.

However, studying conflicts directly may be difficult: a war zone is not welcoming to outsiders. Data collection, and sometimes even visits to conflict areas, are restricted by government forces and pose risks due to the potential presence of rebels. Thus, it is understandable that many post-conflict studies focusing on households rely on published data from national or international sources.

Nevertheless, few studies are based on literature reviews. For example, Wiggins et al. (2021) primarily analyze the effects of conflict on livelihoods in 11 countries and find variations in the nature and severity of consequences at the national level. Alternatively, Kaila and Azad (2019) use telephone interviews and a panel dataset from a local public organization in Kenya. They examine post-conflict household welfare in three regions of Kenya.

These examples strengthen our argument that primary data collection in affected regions remains risky and rare. Moreover, reliable panel surveys make it difficult to extract information in conflict regions (as explained in detail later in this article). Because people migrate during wars, they may not resettle in their pre-conflict habitats.

Furthermore, considerable literature relies on secondary data sources. Among recent studies that rely on published household data are Badiuzzaman et al. (2020), D'Souza and Jolliffe (2012) for Afghanistan, and Justino et al. (2012) for six conflict-affected contexts, particularly regarding their impact on women. Following a similar data pattern based on a national survey, Minoiu and Shemyakina (2012) quantify post-conflict child health complexities in Côte d'Ivoire. Rockmore (2017) compares the welfare costs of risks associated with violence in neighboring areas with those in active conflict areas of Northern Uganda. It is relevant to mention that these authors acknowledge that collecting primary data from conflict-ridden regions is risky and challenging. Nevertheless, an argument can be made that reliance on published data sources (which are often limited) may constrain the selection of parameters and, to some extent, the objectives of the study.

Despite the complications involved, recent conflict literature—which is still limited—shows little interest in directly examining affected households and the local (micro) impacts of

violence using primary data sources. To cite a few, Shah and Shahbaz (2015)—although at a limited level—analyze the rationale behind post-conflict livelihoods in Swat, which is also the study area for this article. Similarly, a study by Fransen and Mazzucato (2014) explores remittances as a worthwhile safety net in the post-conflict rebuilding and resettlement phase in urban Burundi. Likewise, Blattman and Miguel (2009), Bozzoli et al. (2009) and Justino (2009) base their studies on primary data from conflict-affected regions.

This article seeks to determine how economic shocks caused by the civil war between the Taliban and military forces in the Swat region might affect the sustainable livelihoods of households. The point of departure from existing literature is that we focus on detailed household asset base endowments and adopt an approach based on the sustainable livelihood framework (SLF). This method is used both for household data collection and for analyzing the livelihood patterns of post-conflict households in Swat. Violent conflicts have multiple impacts on rural and urban households, livelihood options, assets, and outcomes for households and various institutions—conflict in Swat was no exception. Therefore, merely focusing on the impact of conflict on employment and income opportunities was insufficient and unconvincing.

The primary data at hand first allow us to categorize households into distinct livelihood portfolios using k-means clustering. These portfolios comprise five major income- and labor-specific strategies. Clustering households with identical livelihood strategies (LS) advances our analysis. It may also support post-conflict public investment strategies; a clear distinction of LS could be useful for efficient interventions where they are needed most. We further model these livelihood choices as a function of post-war core asset endowments (physical, financial, human, social, and natural) and investigate how damaged or limited war-torn assets constrain the pursuit of high-return portfolios in Swat.

1.1 Background: The Civil War in Swat

The Swat district was a renowned tourist-friendly region in Pakistan. *Tehrik-e-Nifaze Shariat-e-Muhammadi* (TNSM) meaning 'the movement for enforcement of the law of Prophet Muhammad' started multiple radical religious propaganda activities in the region in early 2000. Their escalation included a campaign to wipe out dissent, alongside other militant activities, which included the recruitment of local people and militant training. Political opponents, security personnel, and independent journalists were killed, often executed by beheading. Moreover, the Islamic movement promised to end the dominance of large landlords and offered Sharia law as an answer to public grievances, particularly as a rapid solution to land disputes. They launched armed attacks on business locations and began blowing up infrastructure, such as power supplies, bridges, government offices, and girls' schools—declaring them un-Islamic (Bhatti, 2015; Torwali, 2009). By force, they took full control of the district. Finally, the state responded, and a full-scale civil war erupted between the Taliban and military forces in mid-2009. The war ended when the Taliban retreated and fled Swat.

Household economic activities and assets were greatly affected. Orchards, the key to Swat's agriculture, were damaged, and houses suspected of serving as safe havens for opponents were demolished. In addition to orchard farming, Swat's economy relies heavily on tourism, which came to a complete standstill, and tourism-related businesses suffered greatly. Businesses such as hotels, restaurants, and thousands of various shops were either destroyed or permanently closed.

During field visits and discussions for this study, it was reported that those who remained in business not only suffered substantial income losses but also faced job cuts and wage reductions—resulting in widespread underemployment and unemployment.

During the war, shelling, aerial bombings, militants, and military movements further damaged crops, fruits, and irrigation sources such as canals, tube wells, dug wells, and flood embankments. Moreover, the civil war in Swat resulted in the large-scale internal displacement of the population. The World Bank (2009) estimated that more than 140,000 families were displaced from the Swat District. The war left devastating, visible impacts on the infrastructure, regional economy, and households. Houses, land, and road networks were severely damaged, and bridges that are major physical and communication links among many towns were either partially damaged or destroyed. In addition, the presence of approximately 30,000 military troops altered normal life even after the retreat of the Taliban from Swat (Duparq, 2011).

Beyond the introduction above, this article proceeds as follows: the next section scans some micro post-conflict household studies and briefly presents the analytical framework. Subsequently, we explain the survey areas, data collection, limitations, and the clustering of households. Next, we present the empirical results, followed by the conclusions.

2. Related Research

More than a decade ago, Justino (2006) noted the lack of focus on individuals and households in conflict-related literature and even in conflict resolution strategies. She observed that such analytical shortcomings prevailed in the absence of systematic data sets and detailed information about households. Contributing to inquiries on micro household impacts, Elahi (2015) focused on Swat and used, among other methods, a limited household survey to determine gender inequality and lapses in the post-conflict reconstruction efforts. Justino and Verwimp (2006) probe postwar household income effects for Rwanda. They note that previously land-rich and affluent households suffered income and welfare losses, including severe damage to houses and land, which decreased incomes per adult in the households.

Alternatively, postwar welfare outcomes from agricultural production in rural northern Mozambique are addressed by Bozzoli and Bruck (2009). The authors conclude that the allocation of resources to endogenously known activity choices results in better welfare outcomes than experimentation with some cash crops, which depend upon market

response. A post-war damaged economy is uncertain, and future returns and prices are likely to fluctuate. In a related study, post-war cropping patterns and investment decisions—made under varying degrees of fear about renewed violence in rural areas of Chittagong—are observed by Badiuzzaman et al. (2011). Such decisions include increased land use and cash crop cultivation, and complementary efforts to increase human capital. These authors seem to be in agreement with Bozzoli and Bruck's (2009) observation that the market prices of cash crops can be uncertain, and that returns from schooling years depend on future demand in local labor markets. However, Badiuzzaman et al. (2011) did not elaborate that the perception of violence prompting specific livelihood practices impacts the smallest fraction (9%) of their sample households—who express the highest sensitivity about the recurrence of violence. This study further overlooks the relative income status of this fraction: heightened fear of violence may be linked to more assets and a better income level.

Post-conflict human capital impacts are observed by Justino, Leone, and Solari (2010) for Timor-Leste, while Akresh and De Walque (2008) quantify the primary educational losses for Rwanda. These studies infer a substantial negative effect of conflict on primary school completion and on significant long-term loss of human capital among young males. Such losses involve future consequences for labor markets and productivity. Alternatively, Dourian, Litchfield, and Sabates-Wheeler (2010) analyze rural Kosovo and probe the immediate losses of social and physical assets. They note that reliance on social networks becomes difficult as neighbors and friends are experiencing similar stresses and shocks. Furthermore, the sale of physical assets provides limited returns when markets are flooded with goods, with other households doing the same.

Displacement is a typical outcome during violent conflicts—it brings vulnerability and further asset-based restraints and may completely alter the known livelihood patterns. Focusing on displaced post-conflict Colombian households, Ibanez and Moya (2009) argue that these households leave behind physical capital; natural capital becomes vulnerable (particularly crops and livestock). Such households lack formal references—assets or collateral—so credit is constrained at new destinations. Moreover, the displaced population finds it enormously difficult to enter new labor markets. Similarly, self-employment and labor market behavior in post-conflict rural Colombia are studied by Bozzoli, Bruck, and Wald (2013). They note that displacement from original habitats reduces self-employment—particularly in agriculture. A related significant aspect that emerges from displacement is that people seek refuge or asylum in other countries. Focusing on this aspect, Zimmerman and Zetter (2011) highlight the lives of Somali refugees in two host countries, the United Kingdom and the Netherlands. They argue that refugees face social pressures originating from connections in their host country and exile—alongside experiencing social problems including drug use and divorce, which lead them to economic exclusion and poverty.

A village-based study by the World Bank (2007) involves a qualitative livelihood assessment for post-war Lebanon with an asset-based approach. It assesses war impacts and highlights

damage to physical and human capital, while identifying the scarcity of financial capital in reviving livelihoods. Some inspiration for the present article relies on identifying such asset base losses and constraints in Swat. However, here, the household data and adopted methodology are expected to provide new directions in studying post-war household livelihoods.

The literature discussed above evaluates the negative consequences of conflict on income and other proxy indicators of household welfare. Nevertheless, these studies have limitations, either in the data sources used or in the scope. The region-specific quantitative literature based on affected household information and centered on the SLF framework is difficult to locate. Identifying this space and contributing to micro conflict-based research, this article addresses the role of five core capitals (human, physical, natural, financial, and social) in determining livelihood choices in post-war Swat. In what follows, we aim to investigate post-conflict livelihoods and legacies and use primary household information from the rural and urban localities of the Swat district.

2.1. The Livelihood strategy concept

A livelihood strategy is a portfolio of activities and choices that people make to achieve their livelihood objectives, including productive activities, investment strategies, management of assets, and reproductive choices (Jansen et al., 2006). Moreover, secure livelihoods depend on substitution capabilities among assets and livelihoods. Low substitution potential makes livelihoods more vulnerable, particularly in times of crisis and when coping with shocks (Ellis, 2000).

The definition of livelihood was systematically expanded by the Department for International Development (1999, 2005) to form a framework. This framework identifies five core assets or capitals on which livelihoods are built. These include human capital, such as age, education, and family structure; natural capital (e.g., land, climate, and water); physical capital (e.g., equipment, tools, public facilities, and access to public infrastructure); financial capital (e.g., credit, savings, and transfers); and social capital (e.g., social relations, affiliations, and associations). Livelihood strategies determine the use of land and labor allocations, investment in education, migration decisions, and participation in strengthening social resources. Sustainable livelihoods are those that can avoid or resist stresses (predictable pressures) and shocks (unpredictable phenomena, e.g., natural disasters and civil violence) and have the ability to bounce back to their previous state (Chambers & Conway, 1991).

A number of studies focus on the Sustainable Livelihood Framework (SLF), and analyse household decisions with certain asset endowments in different settings. Notable examples as discussed later include, Alwang, et al. 2005; Jansen, et al. 2006; Ellis & Bahigwa, 2003; Ellis et al., 2003; Iiyama et al., 2008; and Tuyen & Lim, 2011.

3. Research sites and data

The household survey was completed by late 2011—one year after the extremely violent period—with 296 completed questionnaires. It is quite difficult to use a panel data technique (data from two points in time) in post-conflict studies, particularly if conflicts are associated with the displacement of households. On their return, they might not be living in the same houses or even the same villages or towns, depending on asset losses and available livelihood opportunities. In addition, if pre-conflict data are collected, it is practically difficult to predict the end of a particular conflict.

Five out of seven *tehsils* (subdistricts as administrative units) in the district were selected as research sites. These tehsils include, Babozai, Barikot, Charbagh, Khwazakhela and Matta. Each *tehsil* was covered by locally hired enumerators (who were well-versed in the local *Pashto* language). The far northern Bahrain (which includes the famous tourist destination, Kalam) and the Kabal *tehsils* were excluded. The former is 60 kilometres from Mingora (major town of the district). Its distance and dilapidated roads, military check posts and unavailability of public transport after sunset made it difficult for commuters to make one-day return trips. The latter, at the time of this survey, was inaccessible and unsafe due to ongoing targeted military operations and occasional combat. The selection of five *tehsils* and their respective study areas and provided reasonable coverage for the survey within the Swat district, and diverse income and employment patterns in a range of different geographic areas were identified.

The household data cover the asset portfolio, income, and consumption—including food and non-food items—and expenditures on health and education. The survey reveals that agricultural production is the dominant livelihood choice of 33.1 percent of households; the mean income of those households is the lowest among other livelihood activities. Nevertheless, it provides much supplementary wage work, such as planting saplings, pruning, harvesting, picking, weeding, packing, and drying fruits. Self-employment in business constitutes the second major livelihood choice, forming the primary income source for approximately 27% of the sampled households. Swat, an all-year-round tourist destination, creates multiple business opportunities for the local population.

3.1. Sampling frame

A multistage sampling design was used. In this sampling design, after an initial selection of five *tehsils*, two to six localities or villages were randomly selected depending upon the *tehsil* population. Very remote and scattered rural dwellings were excluded because access was difficult and required extensive travel. Finally, households were randomly selected for interviews. This created a sample, as Deaton (1997) mentions, in which sample households are geographically grouped (*tehsil*-wise in Swat), rather than being randomly distributed over space. A random pilot study of 50 households in Swat was conducted to investigate the feasibility of the questionnaire in Mingora and other areas, including Islampura,

Qambar, Ghalegai, Khwazakhela, and Matta. As Glewwe (2005) suggests, the pilot study was conducted in both urban and rural areas.

The percentage of households interviewed in five tehsils was approximately proportional to the population of each tehsil. For example, the most populous tehsil is Babozai, and more than 31% of the sample households were interviewed there. Notably, any updated population data for the tehsils, particularly after the large displacements, were unavailable. The proportional representation in the sample was adjusted after field discussions and in conformity with the available sample frame.

There was a successful outcome (complete and usable data) for 275 households consisting of 2,288 household persons in the conflict-affected population.

The survey collected wide ranging information about the possession of capital (human, social, natural, physical and financial). Moreover, market prices of various food crops, including horticultural products for agriculture-based households and other income-generating products, and output variations in the post-conflict era were collected. Data on land holdings were gathered. Participants were asked for any recent diversion in expenditure patterns (food, education, health, housing, etc.) in the post-conflict period.

3.2. Livelihood strategy identification

This study uses shares of income from one or more sources of total household income to make livelihood classifications in Swat. Several studies on the classification of livelihood strategies use the share of income from various sources as a group characteristic, as a baseline criterion. For example, Barrett et al. (2000) examine rural African households, and Iiyama et al. (2008) adopt this approach for rural Kenya. Similarly, Alwang et al. (2005) use this method in their study of livelihoods for three central African countries. Similarly, Dercon and Krishnan (1996) probe household characteristics and barriers to entry into higher return activities in Tanzania and Ethiopia. Lopez (2008) analyzes livelihoods in Ecuador, while Tuyen and Lim (2011) observe livelihoods in peri-urban areas of Vietnam. There is some disagreement over income-based grouping; for example, Brown et al. (2006) propose directly considering households' asset endowments when analyzing livelihood strategies. They favor that the income earned and the type of activity undertaken by a household function as a function of the assets it controls. However, their argument ignores the work of Dercon and Krishnan (1996), which highlights that an important determinant of income is the comparative advantage of households in particular activities, which results in higher outcomes. As a real-world example—in farm-based activities—two farms of the same size, even with the same crops, may give different yields, depending on farm management practices. The decisive factors could be the type of seeds used, better timing practices for farm inputs such as water, and appropriate choices for pesticides and fertilizers. In addition, household and village characteristics influence the income output of households with more or less similar asset portfolios.

3.3. Livelihood strategies in Swat

Field data reveal that a significant number of household members in Swat are involved in more than one income-earning activity. Approximately 68% earn income from involvement in one major activity, and around 30% diversify their labor and resources in at least two activities. For example, among households with remittance as an additional source of income, other available adult working members were found to be engaged in agricultural production, either for domestic use or as a commercial farming activity—particularly in high-return orchard farming. Similarly, some households reporting salaries from public sector jobs also reported engagement in farming activities.

Based on the income sources in the survey data, households are categorized into five major income and labor-specific strategies. According to the numerical share approach, households with 60% or more of their total income from one source are classified into that dominant livelihood group (Lopez, 2008). The remaining 40% of income in that classification may be earned from diversified livelihood patterns. This criterion identifies the major income-earning strategies for households in Swat as follows: self-employed in agriculture, self-employed in business/trading, and formal wage employment that includes jobs in the public sector. Private jobs, including jobs in other cities or countries, and households that rely on daily wages, form the informal sector. A more explicit employment classification for each livelihood group is summarized in Table I.

Table I: Household employment classification in Swat

Majo employment category	Subcategory	Description
Agricultural production	Cash and staple crops	Fruit and vegetable farming and production of wheat, rice and maize
Self-employment in business	Ownership of retail shops and services including production activities	Retail stores for consumption goods, trading and service including tourism-based businesses like hotels and restaurants, taxi drivers, handicrafts etc.
Formal jobs	Jobs in the government sector	Stable wage work, people in teaching, working in government offices, hospitals etc.
Private sector jobs	Jobs usually less paid locally than public jobs, also includes remittance from within and outside the country	Jobs in private factories and organisations, in other small business activities, NGOs
Daily wage work	Work without formal contracts	Labour work in construction, tourism, services and agriculture, on daily wage basis

Source: Authors' field survey data

The household data were further analysed to inform the livelihood classification of Table I. The mean, minimum and maximum income earned during the pre-survey year were calculated and are presented in Table II, which provides standard statistical details of livelihood classification, alongside annual income.

Table II: Livelihood strategies and annual income from strategy choice in Swat (Pak Rupees)

Livelihood Strategy (LS)	Obs.	% of Sample	Mean	Minimum	Maximum	S.D
Daily wages (informal work) **LS 1**	25	9.1	174,576	48,000	355,200	81,899
Self - employment in business **LS 2**	73	26.6	269,159	60,000	840,000	171,949
Agricultural production **LS 3**	91	33.1	95,018	11,200	572,700	91,587
Public sector jobs (formal) **LS 4**	42	15.2	342,418	84,000	768,000	168,735
Private sector jobs + remittance **LS 5**	44	16	409,590	84,000	1,632,000	354,458
Total	275	100	260,462	11,200	1,930,000	245,151

Exchange rates at the time of survey can be taken as 88 PKR = 1 US $

Source: The authors survey data

According to the details in Table II, agricultural production is the dominant livelihood choice for 33% of households—simultaneously, the mean income levels for those households are the lowest. Moreover, it was observed during the survey that agriculture was the most labor-intensive livelihood portfolio (both for subsistence and cash crops). It provides much subsidiary wage work such as planting saplings, pruning, harvesting, picking, weeding, packing, and drying fruits. Orchard farming in Swat historically had a high per-unit income per *jareeb* (approximately 10 *jareeb* per acre) compared to other agricultural crops. The war and subsequent large-scale displacement of households negatively impacted maintenance practices, and affected trees' fruit-bearing capacity and soil fertility. This resulted in low farm production in the post-war year.

Self-employment in business constituted the second major livelihood choice, forming the primary income source for approximately 27% of the sampled households. Swat, an all-year-round tourist destination, creates numerous business opportunities for the local population. However, in the post-war period, small entrepreneurs struggled to revive business activities and regain their pre-war dynamism. Most small businesses relied on tourist inflow, which was much lower than in pre-war years.

LS 4 (public sector jobs) and LS 5 (private sector jobs) are relatively high-return income activities. Foreign remittance-based jobs are included in LS 5. These jobs had no direct impact from the war and were uninterrupted; thus, they seem to provide higher income compared to other livelihood groups. Although public sector jobs were mostly discontinued during the war period, their formal structure prevented salary losses. Public servants were later paid salaries by their respective employers. Another livelihood strategy (informal work) based on daily wages showed visible post-war effects on income: the mean returns in this activity are greater than those from agricultural income, but the maximum returns are the lowest.

3.4. Cluster analysis

Cluster analysis is a statistical data reduction method that summarizes large observations into a smaller number of distinct groups or clusters. The formal definition of groups or clusters is mostly performed intuitively (Everitt et al., 2011). The central idea in group-based identification is that common features enable the agglomeration of individual observations into small groups based on similarity along predetermined dimensions (Brown et al., 2006). The items (or variables) or people in each cluster are similar to each other and contrast with those in other clusters.

We applied this statistical tool to further validate the household classifications in Swat. As studies explaining cluster partitioning note, this method requires establishing the number of clusters a priori (Bernhardt et al., 1996). Observations are randomly assigned to each of the k-clusters at the initial analysis stage and then reassigned with an iterative method so that the within-cluster variance is minimized and the between-cluster variance is maximized. This method does not require deciding on a distance measure; it uses Euclidean distances, an extension of Pythagoras' theorem (Sarstedt & Mooi, 2011). They further regard k-means as superior to hierarchical methods because it is less affected by outliers and irrelevant clustering variables.

The available household data from Swat adequately fulfilled the fundamental requirement of k-means: predefining the number of clusters. The classification (as discussed earlier) is based on more than 60% of household income being earned from the dominant livelihood strategy. The clustering algorithm produced five robust clusters (i.e., k = 5): the output minimizes the variability within clusters and maximizes the variability between clusters.

4. Empirical strategy

The effects of asset endowment on livelihood choices are observed next—by using a multinomial logit model (MLM). In this model the livelihood strategies (LS 1 ... LS 5) are used as limited dependent variables and as a function of household characteristics. MLM is appropriate for determining where the outcomes can be hypothesised to be dissimilar (Hausman & McFadden, 1984; McFadden 1974). As the previous livelihood classification and cluster analysis distinctively identified five mutually exclusive livelihood strategies in Swat, this makes MLM applicable. A general formulation of the multinomial model given by Dourian et al. (2010) is:

$$P_j = = \frac{\exp(\beta x_j)}{\sum_j \exp(\beta x_j)} = \text{ for j = 0, 1... j} \quad (1)$$

where is the probability of selecting portfolio j, from a set of J + 1 portfolios (here j + 1 = 5), and x_j is a vector of variables influencing the choice of portfolio. The parameters β are estimated for the reference portfolio, i.e., agriculture in this particular analysis.

On the basis of the above, the equation used for the forthcoming livelihood analysis becomes:

$$\textbf{\textit{Livelihood outcomes}} = \beta_1 Livelihood\ choices + \beta_2 Natural\ capital + \beta_3 Human\ capital + \beta_4 Social\ capital + \beta_5 Physical\ capital + \beta_6 Financial\ capital + \varepsilon \quad (2)$$

4.1. Model Specifications

The parameters selected for human capital include household size, which determines labor availability. Furthermore, the total number of men and women in the working age category (16 to 60 years) also captures the labor endowment in the model. Other human capital variables include the mean age of household members aged 16 to 60 years who were employed in the one-year pre-survey period. The average educational attainment of the same household group is also included in the model. Studies by Alwang et al. (2005) and Jansen et al. (2006) regard the education of the household head as a contributing variable in identifying livelihood strategies. However, in the cultural and social context of this study area, they may not be the main earner in the household. The mean years of education for household members are recorded in some studies (Jansen et al., 2006), but this could improperly reflect the formal educational status of households in the Swat district. This is because, as survey data reveal, about eight percent of children of both genders are either currently enrolled in or have been enrolled in madrassas. Madrassas teach religious education and provide accommodations and food to those enrolled. The formal educational syllabus is not part of madrassa education. Household members enrolled in madrassas reported this as education, but educational attainment for some members in religious seminaries and for others in formal educational institutions was difficult to compare in the study area.

Moreover, the proportion of females aged 16 to 60, considered similar to the male labor endowment in labor markets, is included. Gender is often found to constrain the patterns of income diversification pursued by the household, either directly due to the total or partial prohibition of women working outside the home, or indirectly by giving girls less access to schooling than boys (Ellis, 1998). This observation was validated during our survey in Swat and established its relevance for the study area, as less than 1% of female members reported working outside the home in formal employment.

Physical capital was destroyed or severely damaged on a large scale in Swat. Public utilities and infrastructure such as communication networks, bridges, electricity supplies, health facilities, and educational institutions became the targets of militants. Physical capital becomes much more significant in determining post-conflict livelihood choices (Dourian et al., 2010). Alwang et al. (2005) use predictors of physical capital, which include distance to key facilities and access to paved roads in livelihood analysis. Their approach is modified in this study, based on more detailed in-hand information from the field survey—a variable representing scores for household access to various basic public utilities was used. These

scores are based on a list of 15 basic household facilities and public utilities in Swat. The list contained the basic assets required for sustainable living in Swat. The scores for households range from 0 to 15. For example, if a household had access to or was using 10 out of 15 assets, it received a score of 10. Another physical capital variable represented the monetary value of the household's productive assets, including machines, tools, and other useful household items. Households were found to have few assets, and the calculated mean values were quite low. The total asset values in Pakistani rupees were divided by 1000 to make the unit coefficient values in the MNL model results more meaningful: a one-unit change represents a change of Rs.1000 in asset values. Otherwise, the unit change in the original currency values would be very small and could be difficult to interpret.

The variables for financial capital are included. A lack of financing can create barriers to entry into high-return activities and hinder the enhancement of human capital. Moreover, financial constraints prevent the adoption of proactive management practices in farm-based livelihood selection, such as the timely and suitable use of different farm inputs and investment in farm care practices. In response to a survey question, households considered a lack of finances to be a major constraint on remunerative outcomes. Following Brown et al. (2006), determinants of financial capital, such as self-reported access to credit and receipt of remittance payments, are included.

Social capital is represented differently in studies of livelihood choices. For example, Alwang et al. (2005) regard participation in agricultural organizations in Africa, while Jansen et al. (2006) focus on membership in various formal groups and organizations. This study's environment lacked a strong presence of formal groups and associations, while horizontal dimensions of social capital are widespread in Swat. Mostly, family, relatives, and friends are the main sources of, and hope for, financial help and other assistance during difficult household circumstances. Therefore, expressions of confidence and trust in many people who can be helpful during difficult household circumstances, and confidence in more than three people outside the immediate family—who can provide financial assistance during a crisis—are included as variables.

Natural capital, like physical capital, is significantly affected during violent conflict. In a predominantly agrarian setting, such effects become more damaging for households that rely on agriculture. The displacement of more than one million people from Swat left farms and orchards unattended, while explosives and shells damaged land, crops, and fertility. Livestock perished. Moreover, the availability of canal water—the major source of irrigation—was disrupted. Although farm size is used in many studies as a proxy for natural capital (e.g. Barrett et al., 2000; Brown et al., 2006; Dercon & Krishnan, 1996), production patterns like subsistence or orchard farming matter more in Swat. In a largely mountainous region, most farms are smaller than those in the plains of the country. Even the smallest unit—one acre of land—can provide a reasonable income. The specific fruits and off-season patterns of vegetable farming make per *jareeb* farm earnings higher than those in other areas. In this context, land ownership rather than land size is used in the

model. Variables that represent natural capital include ownership of land and access to canal water for irrigation purposes.

4.2. Results and discussion

The numerically largest household group among the classifications above participates in agricultural production and receives earnings from subsistence crop cultivation or orchard farming. Household cluster (3) was selected as the base category to analyze whether livelihood diversification into other earning and occupation categories—apart from agricultural self-employment—can be regarded as systematically different from other livelihood choices. The outcome of the analysis, parameter estimates, and the relative risk ratios (RRR) for the multinomial logit model are presented in Table III.

RRR can be interpreted as how many times (or (RRR-1) percent) a one-unit change in the corresponding variable will increase or decrease the likelihood of choosing an outcome relative to the base outcome (agriculture in this article). For example, if the age of employed household members increases by one unit (year), the relative risk of diversification into comparatively low-income daily wage work relative to earning all income from agricultural farming is expected to decrease by a factor of 0.93 or 7% (parameter estimate), given that the other variables in the model are held constant.

The results in Table III show that pursuing daily wages in Swat is negatively related to the age of the working household members. Daily wage work is mostly available in construction or tourism-related businesses and is often physically more demanding—sometimes requiring longer hours than formal employment. This makes it difficult for older people to become involved in this form of income generation. Moreover, in the construction and rebuilding activities that followed the war, most of the contracts were awarded to the military, and their regularly employed workforce provided construction labor.

The tourism industry was estimated to employ 40.000 regular and irregular workers before the conflict—most of whom remained out of work even after peace was restored (World Bank, 2009). Another parameter, land ownership, increases the likelihood of preferring agricultural production relative to the alternative strategy of daily wage work.

Self-employment in businesses (LS2) consists of small-scale enterprises to medium-sized business establishments. It includes a variety of family-based businesses such as shops, retail outlets, and businesses providing essential services. As expected, the surveyed businesses in Swat significantly rely on household size and labor endowment to decrease labor and business running costs—avoiding, as much as possible, the hiring of formal or informal wage workers from the labor force. The RRR value for household size is 1.285. This implies a positive association between an increase in household size and the likelihood of continuing self-employment in business compared to agricultural production. One additional family member increases the probability of pursuing self-employment in business rather than adopting the alternative strategy of agricultural production.

Table III: Multinomial logit regression of livelihood strategies in Swat. Parameter estimates and Relative Risk Ratio (RRR)

Variable	Coefficient	Std. Error	RRR
Daily wages versus Agricultural production			
Human Capital			
Household size	0.028	0.225	1.029
Total HH members (age 15 to 60)	0.254	0.261	1.289
Average age of employed members	-0.071	0.036	**0.930***
Average education of employed members	-0.086	0.079	0.916
Percentage of Female 15 +	-0.017	0.033	0.982
Physical Capital			
Access to Public Facilities	-0.094	0.145	0.910
Household Asset Value	-0.000	0.000	0.999
Financial Capital			
Remittance	-15.104	959.9	2.76e-07
Got credit/loan for any purpose	-0.539	0.853	0.583
Social Capital			
Association with family and community	1.174	0.792	3.235
Financers in need	-0.460	0.761	0.630
Natural Capital			
Land ownership	-6.316	1.158	**0.001****
Canal water availability	0.055	0.714	1.057
Self-employment in business versus Agriculture production			
Human Capital			
Household size	0.251	0.131	**1.285***
Total HH members (age 15 to 60)	-0.037	0.171	0.962
Average age of employed members	-0.039	0.023	**0.961†**
Average education of employed members	0.066	0.051	1.068
Percentage of Female 15 +	-0.005	0.023	0.994
Physical Capital			
Access to Public Facilities	0.018	0.086	1.018
Household Asset Value	0.000	0.000	**1.000***
Financial Capital			
Remittance	0.078	0.544	1.082
Got credit/loan for any purpose	-0.679	0.504	0.497
Social Capital			
Association with family and community	0.525	0.505	1.690
Financers in need	0.525	0.542	0.996
Natural Capital			
Land ownership	-4.765	0.747	**0.008***
Canal water availability	-0.346	0.460	0.707

Variable	Coefficient	Std. Error	RRR
Human Capital			
Household size	-0.009	0.144	0.990
Total HH members (age 15 to 60)	0.105	0.185	1.111
Average age of employed members	-0.025	0.026	0.974
Average education of employed members	0.289	0.067	**1.335***
Percentage of Female 15 +	-0.132	0.024	0.986
Physical Capital			
Access to Public Facilities	0.037	0.092	1.038
Household Asset Value	0.000023	0.00001**	1.000
Financial Capital			
Remittance	0.959	**0.508**	**2.610†**
Got credit/loan for any purpose	-1.252	0.518	**0.285***
Social Capital			
Association with family and community	0.959	0.547*	2.611
Financers in need	0.102	0.586	1.108
Natural Capital			
Land ownership	-2.712	0.830	**0.066***
Canal water availability	-0.523	0.497	0.592
Private jobs + Remittance versus Agriculture production			
Human Capital			
Household size	0.0196	0.127	1.019
Total HH members (age 15 to 60)	0.335	0.164	**1.398†**
Average age of employed members	-0.055	0.21	**0.945****
Average education of employed members	0.015	0.053	1.015
Percentage of Female 15 +	-0.032	0.023	0.968
Physical Capital			
Access to Public Facilities	0.045	0.088	1.046
Household Asset Value	0.00002	0.000011	**1.000***
Financial Capital			
Remittance	0.064	0.544	1.066
Got credit/loan for any purpose	-1.470	0.502	0.229**
Social Capital			
Association with family and community	0.027	0.516	1.028
Financers in need	0.796	0.592	2.217
Natural Capital			
Land ownership	-3.642	0.777	**0.026****
Canal water availability	0.631	0.489	1.880
Prob > chi 2	0.000		
Pseudo R^2	0.3335		
Observations	275		

Statistically significant at 10% (†), at 5% (*) and at 1% (**)

Source: The authors' survey data

Since land ownership in Pakistan is considered a common diversification option and safe investment, as land prices rarely fall. Moreover, agricultural activity can be pursued on a part-time basis. The empirical results confirm this option and show a significant negative association between land ownership and small business holding as a livelihood strategy. Land ownership decreases the likelihood of pursuing self-employment in business compared to the alternative strategy of agricultural production.

Public sector employment (LS 4) is considered a preferred livelihood choice in Pakistan, particularly among lower- and middle-income groups. Economic fluctuations do not affect salaries, and public sector employment is also associated with pensions and other work-related benefits. Households in Swat show similar opinions. In response to a survey question about what was considered the best livelihood option, 39% of households selected public sector employment. Education is crucial for better employment, and the estimation results confirm this well-established empirical finding. An increase in the average education of employed household members significantly increases the likelihood of pursuing public sector employment relative to agriculture-based strategies. Household asset value is positively associated with this relatively rewarding livelihood choice. The remittance parameter is positively associated with public sector jobs. This explains why receiving remittances significantly increases the probability of pursuing public sector jobs relative to agriculture-based livelihoods.

Remittances remain a preferred and stable source of income in post-conflict Swat. During the field survey, it was noted that households whose members work in other countries—mostly employed in the Middle East, a common destination for workers from the Northern Province—consider it a good diversification option. Another result reveals that access to credit and sourcing options increases the likelihood of adopting the agricultural production strategy. Although public sector jobs provide employment security, they are not very rewarding in terms of salary in Pakistan. Moreover, the cost of living is consistently rising, while salaries in the public sector do not increase accordingly to match inflation rates. Particularly in the post-war environment, the cost of living increased further, which was associated with rehabilitation and reconstruction expenditures. The ability to diversify into the pre-conflict rewarding option of agriculture appears to depend on households' relatively greater financial liquidity, through access to credit and remittances. This finding is consistent with previous studies on the importance of financial capital for livelihood diversification (Barrett et al., 2001; Brown et al., 2006; Dercon & Krishnan, 1996). Agricultural production, as a complementary choice alongside public jobs, is very practical in the regional context. Moreover, it creates the possibility for surplus household members to engage in farming work. Finally, for this livelihood cluster, the parameter for social capital is positively associated with the likelihood of pursuing this strategy. More social relations and horizontal interactions increase the likelihood of pursuing public sector employment.

Employment in the private sector includes jobs in Swat, as well as in other cities and countries. This choice is significantly associated with human capital indicators. More

household members in the working-age group increase the probability of pursuing this livelihood option. Larger households presumably benefit from returns to scale in various household tasks. A number of studies emphasize that household size should not have an impact on labor supply if all markets are perfect (Rahut & Scharf, 2012). The finding that household size has a significant impact on diversification behavior suggests that labor markets in Swat are imperfect. Moreover, this livelihood choice is negatively associated with the average age of a household's working members. An increase in age decreases the probability of adult members working in private jobs or away from Swat. Alternatively, younger household members appear to prefer this livelihood option. Moreover, physical asset value is significant; those with more physical assets are likely to pursue livelihoods in this comparatively rewarding non-farm sector. Regarding access to and availability of credit, it significantly decreases the likelihood of pursuing private jobs compared to agricultural farm work, similar to the results with public sector employment. There is no inconsistency in the results regarding land ownership and livelihood portfolios; all show a statistically negative association. Land ownership drives the likelihood of choosing agricultural production as a household livelihood option, suggesting that households without land are constrained from adopting this strategy.

Summing up the empirical findings, the gender effect, represented by the number of adult females of working age in a household, is not associated with any livelihood choice. This validates the survey findings, which indicate that a significant majority of working-age women are involved in household work and do not participate in external economic activities. Likewise, social capital is positively associated with public sector jobs, and as expected, the likelihood of adopting public sector employment increases with the strength of social relations with relatives, friends, and the community. Moreover, the effects of physical capital's value are noteworthy in driving all livelihood choices except for daily wage work. This is logical since daily wage work is the least remunerative of the selected livelihood portfolios, and this creates constraints on physical asset accumulation. Additionally, it involves manual labor, and physical asset value may not influence this choice. Furthermore, public sector jobs and private sector employment offer greater rewards compared to other choices, and with more financial capital, the likelihood of diversification increases. As noted above, this is plausible, given that agriculture is considered a rewarding diversification option in Swat. Finally, in terms of the empirical interpretations mentioned in the introduction, this study is a pioneering attempt to explore the effects of assets on livelihood strategy choices in Swat. Therefore, comparisons of these results with those from other available livelihood studies on Swat are difficult. The results, wherever possible, are compared with field survey findings and explained based on information and insights gained during field discussions in Swat.

5. Conclusions

Households in Swat experienced violent occupation and a full-scale military operation against the Taliban, resulting in displacement for a long period. As these displaced households struggled to resettle, they faced a natural shock in the form of severe floods. Vulnerability rarely occurs on such a scale. This article focuses on these households and attempts to improve the understanding of their livelihood constraints and patterns. This study used cluster analysis to identify livelihood strategies from household survey data in Swat. The resulting partitioned data show that some livelihood strategies offer demonstrably higher income returns but are unattainable for households facing constraints in postwar asset endowment.

Conflicts, as Ibanez and Moya (2009) argue, leave a legacy of structural poverty. Justino (2009) notes that in such times, households may find it difficult to continue even their known survival strategies. This is the case for agriculture in Swat, the base comparison group. In the pre-conflict period, it was the center of an orchard industry, with related facilities for grading, storage, and processing to enable the transport of products to other parts of the country. Militancy and civil war affected farms and orchards the most, and the resulting displacement left them unattended and unprotected. Both militants and the military damaged crops and trees to pursue their objectives. If new trees are planted, most take approximately 10 years to mature and reach reasonable production levels, provided proactive agricultural practices are followed. This requires substantial capital investment, which post-war households do not have. The survey data revealed that this was also the lowest income-earning sector among the five classified household groups. This was different in the pre-war period. Households in Swat usually owned small farms but were previously able to earn reasonable amounts. For example, with one hectare (2.47 acres) of mature apple orchards, a household was able to earn an approximate yearly income of PKR 0.5 million (approximately US $5700) in the pre-war period. The amount in PKR is much higher today due to the depreciation of the rupee. This amount could support a reasonable living in Swat.

The findings also reveal that small businesses earn slightly more than informal workers in the daily wage group. This again reflects a changed economic situation. In the pre-conflict period, Mingora—the largest city in the district—was the major market in the country for imported Chinese goods. Thousands of people were associated with this business, and many visited these markets on business trips. Such market activity was one of the major economic casualties of the Taliban. Related sectors, such as transport, hotels, and restaurants, almost collapsed. The inflow of tourists visiting for pleasant weather and sightseeing ended, and business visitors also stopped traveling to Swat.

A practical limitation in micro post-conflict studies is that they rely on cross-sectional field data. Among the studies reviewed, Justino and Verwimp (2008) used panel data for their study on Rwanda. However, even secondary data on pre-conflict information about the same households they surveyed in the post-conflict environment are needed. Conflicts are uncertain in terms of their intensity and timing—when they will begin or intensify—

locational aspects (which areas are most affected), and the displacement and rehabilitation of affected households—who may change their location if they return or may not return at all. These characteristics make it unfeasible to rely on any other form of primary data-based analysis. The exact quantitative nature of pre- and post-conflict asset and income losses is, therefore, quite difficult to estimate. Nevertheless, this article asked people qualitative questions about pre- and post-conflict losses and livelihood coping strategies. For earnings (e.g., agriculture), pre-conflict prices also rely on secondary information sources.

This article highlights various asset-based constraints as the main factors influencing livelihood diversification. Certain activities have high entry constraints in the form of skills (education) and financial capital. Improved physical capital significantly drives livelihood strategies LS 2 to LS 5, but not LS 1, which is based on daily wages. The two high-return livelihood choices, private jobs (LS 5) and public sector employment (LS 4), are more likely to diversify into farm-based income earning if they have access to credit and if remittances increase their financial liquidity. However, few formal credit-disbursement mechanisms exist in rural Swat. Some NGOs grant limited amounts, and some microcredit banks operate in the area, but the interest rates and collateral requirements put these out of reach for most people. Low physical asset values make diversification less likely; an increase in physical assets enables households to pursue known endogenous livelihood strategies. A consistent finding of this article is that ownership of land (increase in natural capital) increases the ability of households to diversify into farm-based livelihoods, which were a rewarding option in pre-conflict periods.

In terms of policy actions, this article suggests that the largest and once-rewarding livelihood option, agriculture, requires priority assistance for its revival. Nevertheless, the natural and time-tested advantage of the area as a tourist destination, associated with small businesses, must be the foremost focus of reconstruction and rehabilitation initiatives. Such concentration includes broad-based infrastructural development that supports households in overcoming asset deficiencies. Improving the household livelihoods of Swat is highly important. Otherwise, persistent vulnerability creates economic and social discontent, which may become fertile ground for future organized discontent, sympathies for militants, and violence. As news of forced attacks is very common these days.

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