FOOD SECURITY AND DIETARY PATTERNS IN THE TAJIK PAMIRS

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With 4 figures, 3 tables and 2 photos
Received 23 May 2024 · Accepted 25 October 2024

Summary: For mountain regions in the so-called 'developing world', an increase in the number of people considered vulnerable to food insecurity has been noted since the turn of the millennium. Challenging environmental settings, as well as difficult societal conditions have been identified as sources of aggravation to mountain food systems. This paper applies a case study approach, conducted in a remote settlement in the Western Pamirs of Tajikistan, to underpin these general insights with detailed accounts of the complexity of the subject under study, and examines the question of how food security plays out in a specific local setting. The goal is to illustrate how socio-ecological conditions influence the food situation in a specific location, how different parameters generate unequal access to food and effect the nutrition patterns of local households, and what dynamics these patterns exhibit over time. Empirical material was analyzed using Cannon's food systems approach. The findings exemplify how ensuring food security is made more difficult by the concurrence of challenging conditions, that there is a relationship between the socio-economic status and the dietary patterns of individual households, and how consumption patterns are subject to fluctuations over time. Based upon this, I argue that customized strategies are vital in order to tackle food security challenges in specific settings effectively, and that differentiated, empirically grounded analyses are essential to developing such approaches.

Keywords:Central Asia, Gorno-Badakhshan, high mountains, livelihoods, participatory research, longitudinal study, food systems, food diary

1 Introduction

The starting point of this paper is the fact that the number of people living with hunger is on the rise worldwide, and ensuring physical and economic access to sufficient, safe, and nutritious food for a healthy and active life for all people remains an ongoing global challenge (IGS 2023: 10–11, UNDP 2024: 39–40). The number of people living in rural mountain regions in the so-called 'developing world'[1)] that are considered vulnerable to food insecurity has increased from 250 million in 2000 to 350 million in 2017 (Huddleston et al. 2003, FAO 2015, Romeo et al. 2020). Challenging environmental conditions, natural hazards, and the impacts of global climate change have been identified as factors that aggravate mountain food systems, especially in remote rural areas, along with armed conflict; resource degradation; and limited access to markets, social services, and facilities, as well as a lack of off-farm income opportunities (Romeo et al. 2020: 30, Jones et al. 2013: 483–484, Sidle et al. 2023). Recent crisis-laden events such as the Covid-19 pandemic and Russia's full-scale war against Ukraine have aggravated the handling of this problem both, as both economies are major producers and exporters of staple foods (Behnassi & El Haiba 2022, Ben Hassen & El Bilali 2022, FAO 2022, Lin et al. 2023).

As Jones et al. (2013) discuss in detail, such aggregated metrics do not allow us to make satisfying statements about local manifestations of food insecurity at the community level, as well as the lived experiences of the affected people. Case studies have the potential to flesh out global statistics with context-specific, detailed accounts of the complexity of the subject under study, which can then be made available to policymakers, development practitioners, civil society activists, and local communities to develop customized measures and targeted interventions. With its empirical approach, geography can make important contributions in this regard, as previous studies have proven (e.g., Bohle 1991, Korf 2004, Dame 2024).

Against this backdrop, this paper utilizes a local case study conducted in the Central Asian high mountain region of the Pamirs. The central question is how food availability, the access to food, and

[1)] This term is used by the Food and Agriculture Organization of the United Nations (FAO) to classify all countries except Japan, Israel, and Cyprus in Asia; Canada and the US in the Americas; Australia and New Zealand in Oceania; and all European countries (Romeo et al. 2020: 9).

https://doi.org/10.3112/erdkunde.2024.04.01 ISSN 2702-5985 (Online)

dietary patterns play out in a remote rural mountain settlement located in the Wakhan Area of the Gorno-Badakhshan Autonomous Province (GBAO, or Gorno-Badakhshan) of Tajikistan, the poorest country of the Commonwealth of Independent States, under the conditions of a challenging socio-ecological environment.[2] The goal of the research is to illustrate how socio-ecological conditions influence the food availability in a specific location, how different factors and parameters mentioned above contribute to unequal access to food within the chosen community and effect the nutrition patterns of individual households, and to look at which dynamics these patterns exhibit over time.

A mix of quantitative and qualitative research methods were used to generate original data for the case study. Secondary data, such as statistics, historical, and recent qualitative information on the societal setting, was added to embed the case study in the respective context. The combination of material collected in interviews, snapshots obtained from survey data, and longitudinal evidence from a diachronic documentation of food consumption enhanced the informative value of each type of information gathered during the empirical research.

The following section briefly introduces both the rural study region of the Pamirs and the settlement where the case study was conducted. It also includes an outline of the food systems concept that serves both as analytical framework and guideline for arranging and presenting the findings, as well as a description of the methodological implementation of the research. Taking the food systems concept as the organizing structure of the study, the third section presents research results about the general food supply situation within the case study community, comparisons of the sampled households in terms of their socio-economic status and access to food, and vignettes of the unequal dietary patterns of individual households representing different socio-economic layers of the community. The fourth section contextualizes the findings, and discusses their scope. The paper then ends with a brief conclusion.

[2] In the high mountain regions of Central Asia, development corresponds to the dynamics described at the beginning of this paper. The number of mountain dwellers vulnerable to food insecurity grew from about 2.5 million in 2000 to over 4.5 million in 2017 (Romeo et al. 2020: 44–46).

2 Studying food security in the remote high mountain region of the Pamirs

The Pamirs are characterized by two main landscape formations and two main forms of land use. While the cold high mountain desert of the plateau-like Eastern Pamirs is predominantly used as a natural pasture for mobile animal husbandry purposes, the partially semi-arid Western Pamirs are characterized by deep valleys where agriculture for local food and fodder production has been practiced since historical times on alluvial fans and debris cones. The food supply system relies on two main pillars: cultivation and import. Cultivation is the first pillar, and the main branch of the regional agricultural production. It depends on irrigation due to annual precipitation being lower than the agroecological threshold (Vavilov 1964, Mukhiddinov 1975, Kreutzmann 2015, Dörre 2020). The agricultural output is limited by the terrain, altitude, and climatic conditions of the mountainous environment; scarce arable land suitable for cultivation in terms of soil properties and water availability; and limited access to fertilizers, mechanical equipment, and improved technologies such as greenhouses. Local production only partially covers the regional food demand, and the provision of externally produced foods is essential. Import is, therefore, the second pillar of the regional food supply system (MSDSP 2004, Dörre 2023, Sidle et al. 2023).

2.1 A remote locality where food supply is an ongoing challenge

Food supply-related problems in the Pamirs are a recurring topic in the historical accounts of witnesses throughout time. Local voices and external observers such as European travelers, Russian functionaries and servicemen, and Soviet officials observed at the end of the 19th century and during the first quarter of the 20th century that the local population repeatedly experienced food shortages due to high taxation and land confiscation by the ruling elite, limited local production, and bad harvests due to detrimental environmental conditions and disasters (Eggert 1897: 696–696v, Yagello 1917: 543v; 215, Burkhan-Du-Din-Khan-i-Kushkeki 1926: 171–172, Vavilov 1964: 25). Decades later, local witnesses, external researchers, and international development practitioners reported on food provision-related hardships caused by economic crises, interrupted exchange relations, and violent conflict

in the course of World War II, the dissolution of the Soviet Union in December 1991, and the subsequent civil war in Tajikistan lasting from 1992 until 1997 (Bliss & Mamadsaidov 1998: 18, 22–23, 38–39, 50–54, 96–99, MSDSP 2004: 8, 31, Mirzo 2010: 118, Van Oudenhoven & Haider 2015: 208). The closed border to internationally isolated Afghanistan, a vulnerable road network, trade directed mainly to the capital, and limited opportunities to create revenues from products imported from China present additional obstacles for a deeper integration of the region into both the national and international markets (Safarmamadova et al. 2020). These conditions culminate in it being cost-intensive to access the GBAO, which contributes to higher-than-average prices for imported food, fuel, fertilizer, and agricultural equipment, amongst other goods. This is exemplified by the retail price for imported standard quality wheat flour (the main staple in the region), in the bazaar of Khorog City, the regional administrative center (Fig. 1).

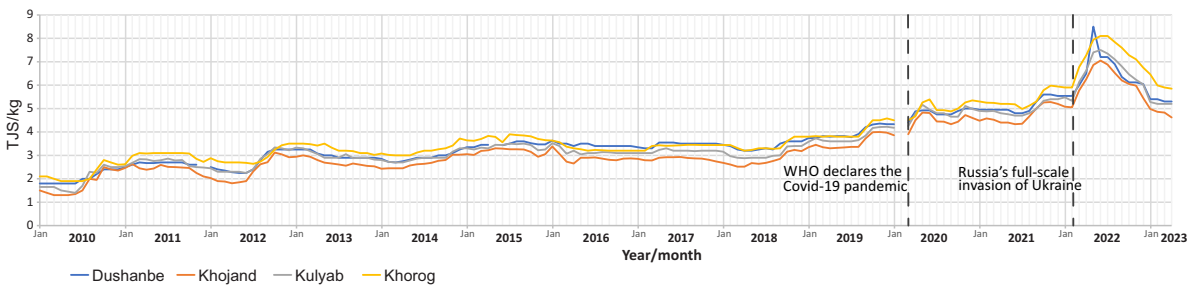

Fig. 1: Wheat flour retail price dynamics compared by location in in Tajik Somoni (TjS)/kg, 01/2010-04/2023. Draft: A. Dörre 2024 based on SA PRT 2023. Note: In March 2018, the exchange rate of TjS 1.00 was approximately US$ 0.12. Price spikes for imported standard wheat flour seen right after the beginning of the Covid-19 pandemic in spring 2020 and the beginning of Russia's full-scale war against Ukraine in February 2022 highlight both Gorno-Badakhshan's food system's dependence on external supply and its exposure to externally determined market prices, and can thus be seen as outside stressors fueling Gorno-Badakhshan's food system's vulnerability (WFP 2020, SA PRT 2023).

The research for the case study presented in this paper was conducted between spring 2018 and spring 2020 in the remote, rural settlement of Zong (37°1'54.4"N, 72°37'47.1"E). Zong is the administrative center of Zong Municipality in the eastern part of the Ishkashim District of the GBAO, located on a rocky hillside at an altitude of 3000–3400m at the headwaters of the Panj River, which represents the border to Afghanistan (Fig. 2). As seen in other places in Gorno-Badakhshan, the population of Zong has grown significantly from 110 people living in eleven households at the beginning of the 20th century to approximately 2200 inhabitants living in 240 households in 2018. This makes Zong a large settlement when compared to other settlements in the district (Serebrennikov 1895, Galevinskii 1902: 4v–5, UNKHU 1932: 125–130, SA PRT 2016, GI ZA 2018). Apart from this, Zong shares a number of features that are characteristic of many settlements in the Western Pamirs, in general, and the Tajik Wakhan Area, in particular. While the population is continuously growing, land suitable for cultivation is limited and its productivity is comparatively low without capital-intensive inputs. At the same time, the community has many years of practical experience in dealing with the challenging conditions, as well as proven strategies for tackling the challenge of food provision. Against this backdrop, Zong is a good example to illustrate the characteristics of local food systems of remote rural settlements in the Pamirs.

2.2 Food systems framework

Following fundamental arguments in critical agrarian studies, the basic premises of this research are twofold. First, under capitalist conditions[3] agrarian societies are not homogeneous but become socio-economically stratified. Second, the affairs of local communities are nested within wider political-economic relations and dynamics at the regional, national, international, and even global level. Critical agrarian studies as a field of research, therefore, conjoin micro-level and macro-level analyses by connecting local research on socio-economic inequalities to wider social relations and dynamics, taking into consideration diverse perspectives (Akram-Lodhi et al. 2021: 2–3). Four questions can help to guide such an

[3] Socio-economic stratification should not be seen as a unique feature of capitalist societies. For example, socio-economic inequality can also be observed in non-capitalist caste systems.

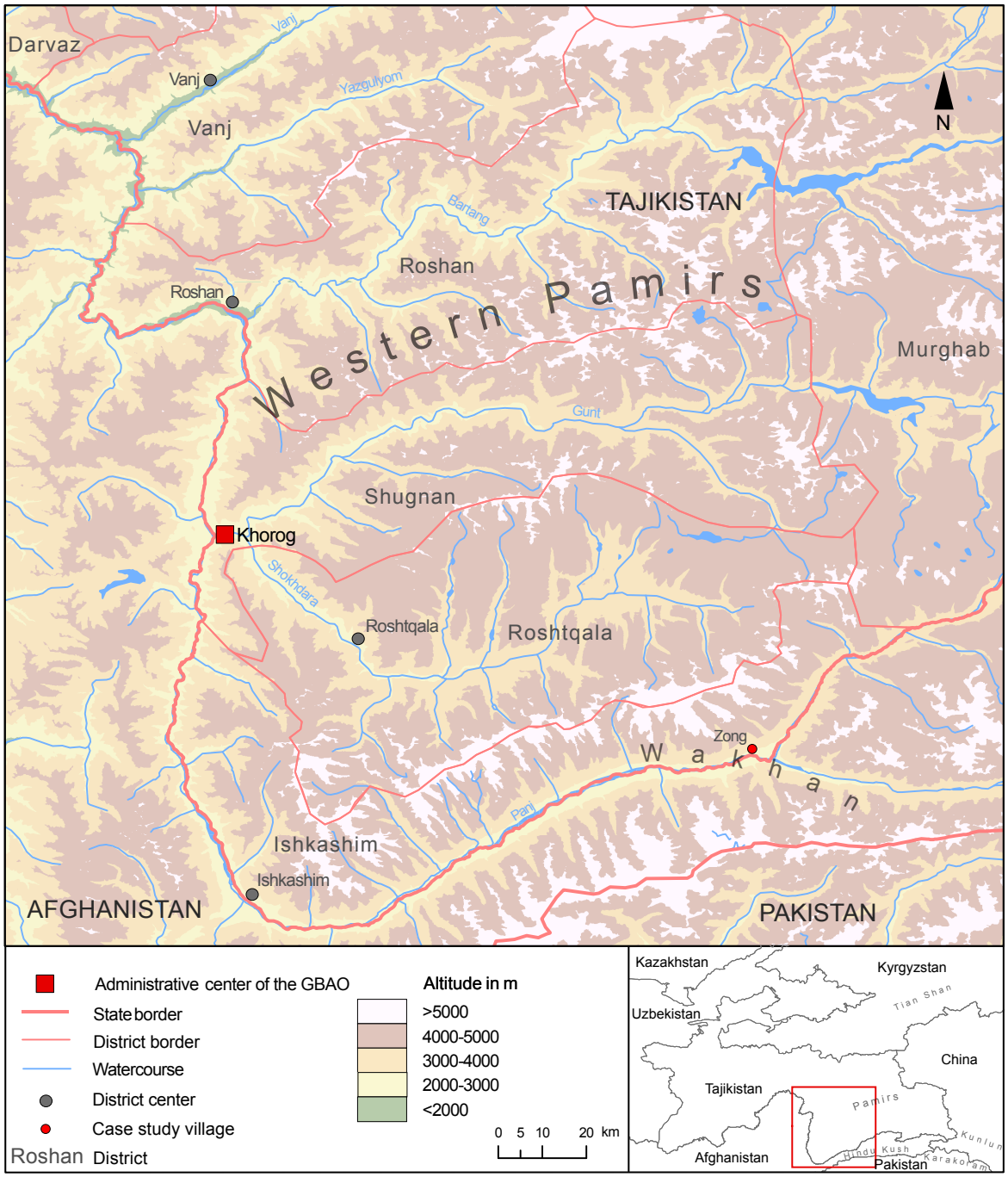

Fig. 2: The Western Pamirs in the GBAO and the location of the study site of Zong Village. Design: A. Dörre 2020 based on Jarvis et al. 2008, OSM 2017

investigation of the economic disparities and social relations of, and within, a studied community: "Who owns what? Who does what? Who gets what? What do they do with it?" (Bernstein 2010: 22).

In the context of this case study, the first question refers to the means of production, such as agricultural land, animals, and machinery, and how these assets are distributed within the community. While the second question refers to the income strategies and the social, oftentimes gendered, division of labor, the third question addresses the frequently unevenly distributed revenues from these activities. Finally,

the fourth question is about what forms and patterns of food consumption are enabled by the use of these unevenly distributed assets and revenues (ibid.: 22–23). These questions correspond well with Cannon's (2002) food systems approach, which has been applied in geographical studies before (e.g., Etzold 2008, Caleta et al. 2020) and is one of numerous ways researchers have developed to operationalize food availability, access to food, and utilization of food, as the three interrelated core domains of food security (e.g., Watts 1983: 521, Ericksen 2008: 238, Ingram 2011: 420, Dame & Nüsser 2011: 180, Jones et al. 2013: 483–484).

Cannon's concept was used in this research both as an analytical prism to look at the chosen empirical case and an organizing structure for systematically arranging and presenting the findings. According to Cannon (2002), a food system is the "specific combination of social […] and 'natural' […] components that leads to the potential satisfaction of nutrition for a given individual or household through their combination of livelihood activities based on assets and incomes" (ibid.: 354). The concept subdivides food systems into four domains: production, exchange, distribution, and consumption. Production encompasses assets households and individuals own and control that permit agricultural or other activities aimed at food production to take place. This includes, amongst others, access to agricultural land and water, tools and technical equipment, livestock, and inputs like fertilizer and labor force. Exchange refers to the transactions between local and remote food producers, intermediaries, and consumers, including the acts of buying, selling, and trading, as well as non-monetary activities such as giving, donating, lending, and bartering. Distribution describes the spatial relocation of food between producers, intermediaries, and consumers, and encompasses questions of physical transport and storage. Finally, consumption refers to food intake at both the individual and household levels against the background of the respective nutritional needs and preferences, and encompasses potentially problematic issues like social status, age, and gender that feed hierarchies within households, as well as food deficit-related coping mechanisms (ibid.: 354–356).

The four domains shouldn't be seen as distinct categories but rather represent an abstract framework that enables the systematic collection of information, as well as orderly inspection, analysis, and presentation of data and findings, and, therefore, the depiction of the complexities of specific food systems in a comprehensible and organized way (ibid.: 356).

At the same time, the approach explicitly considers spatially and temporally distant aspects and factors, as well as wider contexts, interrelations, processes, and power asymmetries that influence the local case studied. Such constellations can be imagined as a kind of fabric being stretched across a grid of scales and levels, whereby scales are understood "as the spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon, and 'levels' as the units of analysis that are located at different positions on a scale" (Cash et al. 2006: 2), such as the levels of the region and the global for a spatial scale, or days, weeks, and seasons for a temporal scale (ibid.: 3, 4).

2.3 Mixed method approach

The complex and multiscale character of the topic required the application of a mix of empirical research methods. The workflow consisted of four steps. In a first step, a focus group interview with local leaders[4] and other representatives of both the municipality and the settlement of Zong was conducted to address the food security situation at the village level. The group interview included the head of the local state administration (*raisi jamoat*); heads of three village organizations (VO) that were established in Gorno-Badakhshan in the 1990s by the non-governmental Mountain Societies Development Support Programme (MSDSP) of the Aga Khan Development Network (AKDN) to empower local communities in times of crisis after the Tajik civil war; the heads of the women's associations (*raiskhoi zanon*) of both the municipality and the village of Zong; one of the village elders[5] of Zong (*raisi kishloq*); the heads of both the local farmers' association (*raisi khojagi-i dekhqoni*) and the social club; the deputy headmaster of the main school; the general physician of the village; and the deputy of the religious leader (*khalifa*). The aim of this meeting was to understand the strengths and opportunities in the community, as well as the challenges and threats the community experiences from the perspective of local stakeholders, and to explore how these circumstances relate to

[4] These village leaders were elected by the community members to represent the community to the outside world and to fulfill administrative tasks.

[5] Village elders have no formal status as the village leaders do, but are widely respected persons of trust, which communicate daily and directly with the community members and communicate their concerns to the local administration.

the food system of Zong. The group also addressed strategies and measures developed by the community to tackle food security-related problems, and what external support is provided by the state and non-governmental organizations.

In a second step, key informant interviews with local knowledgeable persons, including the *raisi kishloq*, the *raisi khojagi-i dekhqoni*, water masters (*mirobon*), the heads of the three main neighborhoods of Zong, medical staff, teachers, the *khalifa*, and a shepherd served to raise, discuss, and evaluate information on producing, exchanging, distributing, and consuming food in the village community in more detail. These respondents were visited in person at home or at their place of work, which offered the advantage of being able to visit and explore various neighborhoods of the village, common infrastructures related to local food production such as water storages and canals, and agricultural lands in different locations. Despite the wide range of assessments discussed during the focus group interview, those entrusted with senior management functions, most of whom were male, spoke more frequently and emphasized aspects that were important to them. With the help of the key informant interviews, it was possible to compensate for the probably unbalanced picture obtained during the focus group interview by collecting assessments from participants who were reticent during the focus group meeting.

A household survey provided quantitative data as a third step, which helped to draw a differentiated picture of the food security situation within the community, as well as of individual households. A household is defined in this study as a group of people who form a functional unit. Work is organized and shared, and monetary and non-monetary income is accumulated within these units. Reproductive activities and the allocation of food and other resources also take place there (De La Rocha & Grinspun 2001: 59). Although most household members live in co-residence, this is not mandatory. Persons living away can also be counted as part of the household if, for example, they contribute to the household income generation through remittances.

The sample size of the survey was 48 households, which corresponded to 20% of the population of 240 households that existed in 2018. This sample size appeared adequate to provide a meaningful and robust picture of the differentiated characteristics of food security in the community. The sample was chosen purposefully to represent different socio-economic layers of the community as they were classified by the respondents during the group interview. According to those statements and the assessments of the *khalifa* and the heads of different neighborhoods, who know the village community well, the community was subdivided into three broad socio-economic layers (GI ZA 2018, KIK 2018).[6] Households described as 'poor' struggle to make a living due to a regular income that barely covers their immediate needs (category 1). Households of this category are oftentimes structurally indebted, and are entitled to receive quarterly state support. Households labeled as 'middle income' households have an income at their disposal that covers their immediate needs in the medium run (category 2), and occasional debts can be repaid. Households that enjoy a regular income that is considerably higher than their immediate needs and are able to save money are described as 'above middle income,' to avoid the attribute 'wealthy' (category 3). These households can participate in self-organized savings groups, take out and service larger loans, and occasionally also grant credit.

The survey took place in the presence of one of the village elders. Due to his powerful position in the community, it cannot be ruled out that the respondents were subject to a certain social-desirability bias during these meetings. However, the participation of the village elder was essential for two main reasons. First, he established a trustful contact with the representatives of the households and presented the purpose of the study. Second, the subsequent conversations were conducted in Russian, Tajiki, and Wakhi with the village elder providing translation where necessary.

The first section of the questionnaire collected information on livelihood strategies, with a particular focus on agricultural assets and practices and, thus, the food system dimension of production. A second set of questions was dedicated to social relations and the acquisition and consumption of food and, thus, the food system dimensions of exchange, distribution, and consumption. A final brief set of questions addressed circumstances and risks that have had an impact on the food security of the interviewed household, as well as hopes for a better future.

In a final fourth step, individual households from the survey sample were asked to keep food diaries for an initial period of four months (April 1, 2018 – July 31, 2018) of the lean season, i.e. the period of a year

[6] This subdivision is informed by categorizations used by government agencies when allocating social security benefits. Similar categorizations are made by development organizations such as the MSDSP in order to take measures for specific target groups.

when the risk of food shortage grows due to the exhaustion of winter stocks, when monetary funds have been absorbed by seasonal agricultural investments, and before the new harvest is brought in. The goal of this method was to document data for longitudinal vignettes of both dietary diversity patterns and diachronic food consumption shifts in individual households belonging to different socio-economic layers of the community.

One household from categories 1 and 3, respectively, as well as two households from category 2 agreed to make systematic records on a daily basis about food consumption, food-related expenses, agricultural activities, and other aspects worth mentioning such as particular social events or specific environmental conditions. The documentations were successful, although there were a few gaps in the food diaries that can be attributed to a prioritization of other tasks and omissions. Upon further request during a visit in July 2018, the households agreed to continue keeping the diaries until the end of October 2018, i.e. after the harvest period. Finally, a third visit to Zong in October 2018 enabled an on-site review of the entries from the second documentation period, which were also satisfactory. The households expressed their willingness to continue keeping the food diaries until the end of March 2019 in order to record food-related aspects over the course of an entire year. The households received daily dated notebooks with prepared sections for their entries, as well as an honorarium, which was paid out on a staggered basis.[7] For the analysis, the hand-written entries were anonymized, transferred to electronic tables, and post-coded into defined distinct dish categories, which are presented in the following chapter.

3 Presentation and analysis of the food system in Zong

This section presents and analyses the food system of Zong Village in detail. The insights are arranged according the four domains of Cannon's food system concept: production, exchange, distribution, and consumption. Specific attention is payed to spatial, temporal, institutional, and social relations-related issues.

3.1 Production

As in the other high mountain regions of Central Asia, agriculture is the main economic pillar of Zong Village, and farming is of paramount importance due to the lack of pastures close to the settlement. The scarce arable land is primarily used for the cultivation of crops that directly serve human nutrition. In the Western Pamirs in general, and in single-harvest areas such as the Wakhan, in particular, these included mainly cereals and pulses at the beginning of the 20th century. Forage crops were of secondary importance (Galevinskii 1902: 4v-5V, Baranov et al. 1964: 76, 197). In the second half of the 20th century, the extended cultivation of fodder crops was politically enforced as an economic measure of socialist modernization. Today, due to the economically difficult situation in the GBAO, in general, and in remote settlements such as Zong, in particular, food crops are once again the main focus of subsistence-oriented agriculture (GKTSSRPS 1988: 13, Kreutzmann 2002: 40-42, Akramov 2013: 129-130, AO PJT VMKB 2013: 85, 88-89, GI ZA 2018, KIFA 2018, KIVO 2018). In addition to cereals and pulses, potatoes have gained in importance (Robinson & Guenther 2007, GI ZA 2018). The results of the household survey underline these trends.

Forty-three of the 48 households (90% of the sample) surveyed grew potatoes and 42 households (87.5% of the sample) grew wheat. The proportion of households growing pulses or mixed crops consisting of barley and legumes was lower at 7 and 17 households, respectively, or 14.6% and 35.4% of the sample. Only three households surveyed (6.25% of the sample) were in a position to market crop surpluses. Fodder grass is cultivated by relatively few households, on marginal land, and it is primarily used to feed the sheep and goats kept on seasonal pastures during late spring, summer, and early fall, as well as the cattle kept close to the farmstead all year round to supply milk, which is practiced by 38 of the households surveyed (80% of the sample) (GI ZA 2018, KISH 2018).

Of central importance is the fact that, due to low precipitation and high evaporation rates, the cultivation areas need to be irrigated using meltwater fed by glaciers and snowfields. This requires the labor-intensive operation of technical infrastructures, such as an extended canal network fed by a creek running to the East of Zong and a reservoir located above the village center, as well as an irrigation scheme that relies on the broad acceptance by the population. The institution of collective work (*khashar* or

[7] In view of the structural income conditions of the participating households, the economic effect of the staggered honorarium paid for keeping the diaries can be regarded as marginal, and distortions of the overall picture are not expected.

kyriar) for the construction, repair, and rehabilitation of communal assets, which has been tried and tested throughout Central Asian mountain regions since historical times, is therefore also used in Zong and its neighboring settlements. Community actions on irrigation canals are of central importance for local food security, as they provide basic physical conditions for agricultural practices, and local food production in a cost-sharing effort, and it promotes social cohesion in the community (Dörre 2020, KIM2 2018). As seen elsewhere in Gorno-Badakhshan, the irrigation schemes in Zong are designed and monitored by elected water masters that are collectively paid in kind for their services. In the studied case, each household receiving irrigation water contributes a defined amount of wheat annually to a communal fund to remunerate the water masters (GI ZA 2018, KIFA 2018, KIM1 2018, KIM2 2018, KIVE2 2018).

Apart from relatively low-yielding kitchen gardens near the farmsteads, Zong has around 114ha of arable land, which varies in quality depending on its location. Toward the end of the Soviet era, these lands were farmed by a state farm named *Put' Kommunizma* (Path of Communism). From the second half of the 1990s, the usage rights were privatized and the land was divided up between the households in the settlement. As different qualities of farmland were considered in the allocation process, many households received plots in different locations, which led to the unintended effect that considerable transaction costs were incurred in the cultivation of the dispersed areas (KIFA 2018, KIVE1 2018). The results of the household survey show that only a few households had consolidated the location of their farmland by 2018, for example, by exchanging land plots. The scarcity of land is exacerbated by the loss of 50ha of land located on the Panj River as a result of a dike breach in 2010 and an increase in illegal housing being built on farmland due to the demographic growth of the community and formed new households. Due to funding difficulties, the dike damage was not adequately repaired, and the flooded land had not been fully drained as of 2018 (GI ZA 2018, KIFA 2018, KIM1 2018, KIVO 2018, Photos 1, 2).

In addition to land scarcity, a reduction in soil fertility has been observed, as previously common farming techniques such as letting land go fallow and adherence to certain crop rotations are now rarely used due to the need to use all land resources for the cultivation of staple foods (KIVE1 2018). A low level of mechanization; few available draught animals; difficult access to fertilizers, pesticides, fresh and high-yielding seeds, and lack of physical labor are additional factors that reduce agricultural productivity. Only three of the households surveyed had their own agricultural machinery such as trucks and tractors (6.25% of the sample), which can be borrowed by community members, and just one household (2.1% of the sample) had a draught animal for heavy field work. The main reason for the lack of physical assets is the people's low endowment of financial capital, which is also leading to increased labor migration to Tajikistan's urban centers and to Russia. With over 200 migrants, almost 10% of Zong's population was absent, at least temporarily, in 2017, and the majority of households have expatriate members, which was the case in 36 households (75% of the sample) (GI ZA 2018, KIFA 2018).[8] The predominantly male labor migration often means a higher workload for the women that have stayed behind, as they take over responsibility for both domestic reproductive work and agricultural tasks. This phenomenon is well known under the term 'feminization of agriculture,' and has also been observed and studied in other regions of Tajikistan (Mukhamedova & Wegerich 2018, Hofman 2021).

These factors have led to relatively low subsistence rates, although the range within both the community and the sample surveyed is considerable. The wheat harvests of individual households showing low subsistence rates often only cover a consumption period of two months, as seed must also be saved for use in the following year. The highest subsistence level for wheat, achieved by one household in the sample, covered eight months. In the case of potatoes, yields are closer to demand, so that four or more months of demand can often be met, and a few households can even cover their year-round needs from their own harvest. Value-added processing of fruits, particularly apricots and apples, and the subsequent marketing of such products as well as meat, dairy produce, and other animal products is prevented by the lack of processing facilities and reliable cold chains, as well as an insufficient market integration of the municipality (GI ZA 2018, KISK 2018, KIVE1 2018). As local production cannot cover local demand, food shortages can be seen at the village level (Millman & Kates 1990: 11).

[8] According to a village elder, between 2018 and 2020, ten households from his neighborhood have left Zong for Russia permanently due to persistent economic difficulties (KIVE 2020).

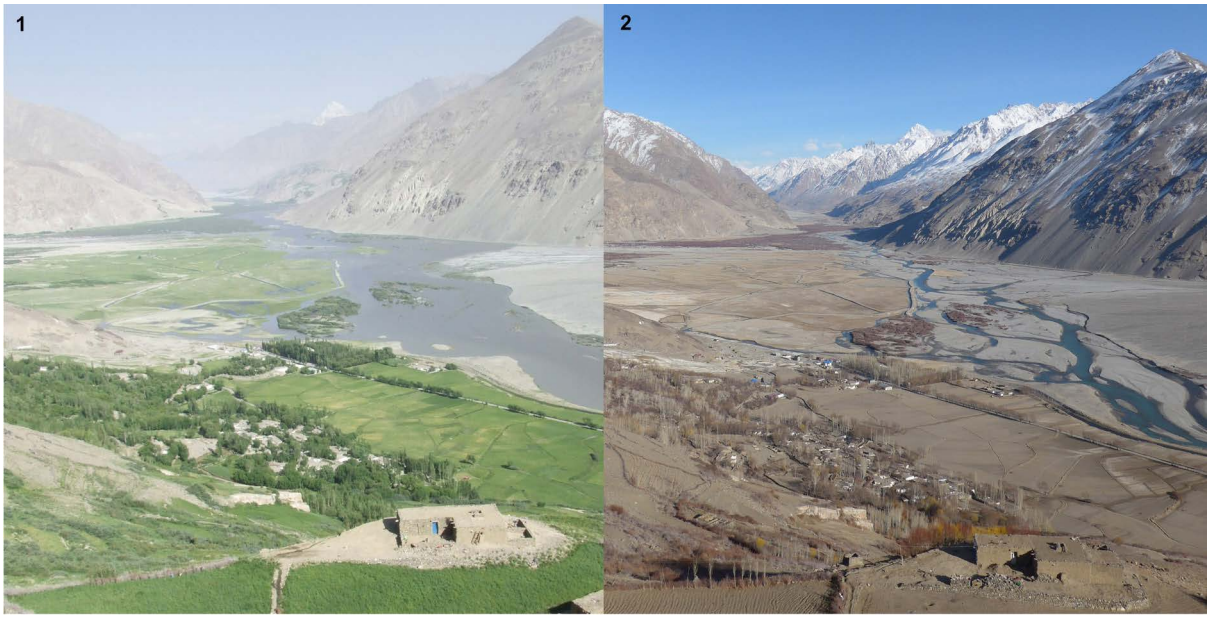

Photo 1 and 2: Center of Zong and its arable lands in summer (1) and in winter (2). A. Dörre July 2014 and March 2018. The Panj River, visible in the photographs, is formed by the Pamir River and the Wakhan River, which join just upstream of Zong. Somewhat downstream of the confluence Photo 1 shows parts of the areas that were flooded in 2010 as a result of a dike breach (slightly higher and to the left of the center of the photograph). Photo 2 shows that the dike has been partially restored.

3.2 Exchange and distribution

Low subsistence rates and the limited portfolio of local products mean that food has to be imported. However, these imports are disproportionately expensive and often of poor quality due to the considerable transport costs related to high fuel prices, the great distance products must travel from regional and national market centers, the oftentimes poor state of the transport infrastructure, and the resulting long travel times. At the same time, there are only a few wage jobs available in Zong, mainly in state institutions such as in schools, the administration, and the outpatient clinic (GI ZA 2018). In light of the fact that there were only around 60 paid jobs available in Zong in 2018, one village elder commented ironically: "We always have Sunday. What we don't have are (paid) working days" (KIVE1 2018, translation by the author).

This picture of the situation is supported by figures from the household survey, according to which only 13 households (27% of the sample) receive income from permanent employment subject to social insurance contributions. At least 17 households (35.4 % of the sample) reported income from external seasonal work, mostly during the spring and summer months, and 20 households (41.7 % of the sample) reported receiving support from relatives.

Comparisons of the monthly salaries of teachers at local schools, at TjS 400–500 (about US$ 50–62) are typically for paid positions in the region and monthly pensions of approximately TjS 250 (about US$ 31), on the one hand, and kilogram prices for wheat flour (TjS 3–4 or about US$ 0.45), buckwheat (TjS 11–12 or about US$ 1.45), sugar (TjS 8–9 or about US$ 1), or pasta (TjS 6 or about US$ 0.7) in local stores, on the other hand, illustrate the challenge that many households face in accessing imported food due to their low purchasing power (KISC 2018, KISK 2018). This becomes even clearer in light of the per capita expenditures for food. Based on the information provided in the household survey, these numbers range from around TjS 30 (about US$ 4) to around TjS 330 (about US$ 41) per month.

Another obstacle is the structural lack of cash on the ground, which puts the few local suppliers of surplus products in a weaker position when doing business with external trading partners. Local sellers of livestock, meat, and dairy products are more likely to enter into suboptimal transactions than external buyers due to the need to obtain cash. The head of the local administration sums up these unfavorable terms of trade laconically: "We get low prices for the things we sell. What we buy is expensive" (GI ZA 2018, translation by the author). Consequently, the concept of food poverty often applies at the house-

hold level, which is defined as lacking the means to acquire a sufficient amount of varied food (Millman & Kates 1990: 11).

In the face of these difficult conditions, people are adopting both individual and collective coping strategies, and take advantage of support measures offered by the community, as well as external non-governmental, state, and corporate institutions. According to the interviewees and the results of the household survey, non-formalized, reciprocity-based forms of neighborly support are widespread (KIM1 2018, KISK 2018). All households in the sample stated that they had access to various forms of neighborly help. This includes collective emergency aid, non-monetary loans, and individual lending of agricultural equipment, along with physical support with agricultural work and taking turns tending each other's livestock in the neighborhood. Collective emergency relief funds at the neighborhood level are a historical practice in the region. This is called *ambar* locally, and is formed by donating an agreed amount of grains to a collective granary. In 2018, one of the *ambar* groups in Zong comprised 41 households, each of which undertook to store ten kilograms of wheat in the group granary every year. In emergencies, this provides almost half a ton of grain for needy members of this group (KIM1 2018, KISK 2018). Twelve households surveyed (25% of the sample) have already received assistance as part of the *ambar* concept.

For important festivities such as the *Navruz* or *Shogun* festival at the spring equinox, needy households receive episodic material collective support from the municipal administration to bridge the challenging lean season of late winter and spring, when food availability is particularly limited due to dwindling supplies. Interest-free loans are also granted episodically from the VO budget. Formal interest-bearing loans offered by banks, on the other hand, are only suitable for households that are at least able to pay interest. Informal loans can be obtained from shopkeepers and other tradespeople who are categorized as relatively wealthy and have direct access to cash (KISK 2018). Despite debt risks, seven households considered poor stated that they had taken out loans of up to TjS 5000 (about US$ 617) to finance medical treatment, life cycle events such as weddings and funerals, or everyday expenses including food procurement. Forty households (83% of the sample) stated that they were in debt or at risk of falling into debt. It is not surprising, therefore, that steady paid work outside agriculture was the aspect most frequently associated with a better life, with 17 mentions (35.4 % of the sample), alongside a good education for the next generation, with ten mentions (20.8 % of the sample).

Finally, the MSDSP supports over 100 needy households in Zong with potato and wheat seeds, along with fertilizers free of charge or at very low payback rates. The medium- to long-term goal is to develop both local agricultural production of staple foods and a local stock of adapted seeds (GI ZA 2018, KIRMNRM 2018, KIVE2 2018). This measure is not only intended to increase the subsistence level, but also to replace the otherwise necessary purchases of imported food, to relieve the budgets of participating households.

In addition to support from external non-governmental organizations, households classified as 'very poor' receive governmental social assistance amounting to TjS 100 per quarter (about US$ 12), though this can be described as marginal in view of the high cost of goods. In the case of the household survey, this applied to 26 households (54.2 % of the sample). Table 1 summarizes selected parameters of the households surveyed.

3.3 Consumption

It is clear from the above that the majority of households surveyed have limited monetary assets that can be used to purchase imported food. Ensuring a sufficiently varied diet is, therefore, a major challenge. Many interviewees believe that the low-varied and vitamin-poor, carbohydrate-rich meals dominate the diet of many households for this very reason (GI ZA 2018, KIC 2018, KILH 2018, KISC 2018). As in Tajikistan in general, and Gorno-Badakhshan, in particular, children from poor and large households, pregnant women, and women of childbearing age, as well as weakened, elderly, and sick people suffer from the consequences of malnutrition such as anemia in Zong (GI ZA 2018, KIC 2018, KISC 2018, Klassen et al. 2019, SA PRT et al. 2018: 188–189, 193–194). Other consequences mentioned include goiter and increased susceptibility to secondary diseases, as well as a lack of concentration that prevents children from succeeding in school in the short- and medium-term, and from having opportunities for professional advancement in the long-term. According to local interviewees, spoiled imported food and low-quality products, as well as the poor quality of local drinking water also pose a risk of gastrointestinal illnesses (GI ZA 2018, KIC 2018, KILH 2018, KISC 2018).

Tab. 1: Selected parameters of the interviewed households in overview (n=48)

Parameter		Value (percent of the sample)
Demographic data		
Household characteristics	Mean # household members	7.3
	Min	2
	Max	16
	Median	6
	Households with absent members	36 (75%)
Off-farm livelihoods		
Households with incomes from permanent jobs		13 (27%)
Households with incomes from seasonal jobs		17 (35.4%)
Households receiving remittances from household members		19 (39.6%)
Households receiving support from relatives		20 (41.7%)
Households receiving neighborly help via the ambar scheme		12 (25%)
Households receiving other forms of neighborly help		48 (100%)
Agricultural assets and practices		
Land per household member in m²	Min	0
	Max	1667
	Median	444
Dairy cows	Min	0
	Max	3
	Median	1
Sheep	Min	0
	Max	22
	Median	4
Goats	Min	0
	Max	17
	Median	4
Apple trees	Min	0
	Max	20
	Median	0
Apricot trees	Min	0
	Max	40
	Median	2
Households cultivating wheat		42 (87.5 %)
Wheat: self-sufficiency in months	Min	0
	Max	8
	Median	2
Households cultivating potatoes		43 (90 %)
Potatoes: self-sufficiency in months	Min	0
	Max	12
	Median	4
Households cultivating pulses		7 (14.6 %)
Households marketing agricultural produce		3 (6.25 %)
Households owning draft animals (oxen)		1 (2.1 %)
Households owning agricultural machinery		3 (6.25 %)
Food-related monetary aspects		
Monthly expenditures per household member	Min	TjS 33.3 (ca. US$ 4.1)
	Max	TjS 333.3 (ca. US$ 41)
	Median	TjS 117.7 (ca. US$ 14.5)
Households that are in debt or see the risk of debt		40 (83 %)

Source: Household survey conducted in March 2018

The household survey confirms this picture. In 15 cases (31.3% of the sample), children or other household members were reported to suffer from anemia and vitamin and micronutrient deficiencies. These health issues were attributed to their diet. Members of these households are at risk of food deprivation, which describes the qualitative and quantitative inadequacy of individually consumed food and can lead to symptoms of malnutrition (Millman & Kates 1990: 11).

A program set up by external non-governmental organizations such as the AKDN and the United Nations World Food Programme that provides free hot meals in day-care centers and the lower grades of school, therefore, contributes significantly to upgrading the daily dietary patterns, especially of children, from deprived households. The daily rations of the program, which contain carbohydrates, vegetable fats, and vegetable proteins, have a nutritional value of around 450 kcal and are highly valued in the community for three main reasons. Directly, the program combats children's hunger pangs and creates an atmosphere conducive to learning. Indirectly, parents experience a slight economic relief through the external absorption of the costs of a main meal. In the long term, both the children's health and learning success are promoted, making it more realistic for them to pursue higher and vocational education in the future (KIES 2018, KISC 2018).

Vignettes of three households, including their dietary patterns over the course of the year, are presented below, each of which can be assigned to one of the three socio-economic layers of the village community introduced before. The illustrations are based on the food diary entries made independently by the households, and include information from the household survey.

3.3.1 Food consumption of a poor household

The poor household (code GH_1-5) is led by a single mother and consists of three adults and three children. The household has 330m² of arable land per member at its disposal, two apricot trees, a dairy cow and calf, four sheep, and two goats. Ten acres of land are located in the area flooded when the dike was breached and cannot be farmed. The household grows wheat and potatoes exclusively for their own use, as well as some vegetables in the kitchen garden. The wheat and potato harvests usually cover the household's needs for two and four months, respectively. All other products are purchased with the help of the regular monthly salary that the mother earns as a cleaner at the school (TjS 300 or about US$ 37). The household does not receive any remittances. This financial situation means that the household is officially categorized as need by the government, and thus entitled to receive the social assistance, however, this does not structurally change the precarious overall situation they experience. The wedding of a daughter required considerable expenditures, for which an interest-bearing loan of TjS 2000 (about US$ 247) had to be taken out. At the time of the interview, the interviewee described her household as being in debt.

With regard to the documented purchases, it is noticeable that mainly durable and carbohydrate-rich foods were bought, such as tea, salt, sugar, flour, and pasta. Fresh fruits, vegetables, and meat are expensive and rarely purchased, as only around TjS 200 (about US$ 24.7) per month can be used for food purchases in the medium-term, which corresponds to around TjS 33 (about US$ 4.1) per household member. When looking at the diachronic dietary pattern of household GH_1-5, several things stand out (Tab. 2, 3; Fig. 3), as detailed below.

Bread with salted milk tea (dish category 1) dominates the diet throughout the year and is consumed for breakfast on all documented days, at most documented lunch events, and in some cases also in the evening. On 27 days of the year, all three main meals consisted of this dish. Carbohydrate-based meals (dish category 2) are the second most frequently consumed dish category with 150 mentions, all prepared almost exclusively in the evening throughout the year. The same applies to mixed dishes (dish category 3), the third most frequently consumed category with 105 mentions. Dishes consisting mainly of animal protein (dish category 4) or based on milk (dish category 5) were mentioned 27 and 25 times, respectively, and were generally served for dinner. Category 4 dishes were mostly egg-based. Fresh food (dish category 6) was mentioned seven times, with a higher frequency in the spring and summer months. The household consumed dishes based on vegetable proteins only twice (dish category 7).

In summary, the diary entries indicate that almost 78% of all 1095 main meals in the course of one year were cereal-based or otherwise carbohydrate-based, that the greatest variety is found in the evening meals, and that fresh, uncooked, and protein-rich food is rarely served. In April 2018 and December 2018 to the end of March 2019, which are in the lean period, the diversity of the food consumed was lowest, without a single mention of dish categories 6 and 7 (Table 2, 3; Fig. 3).

Tab. 2: Overview of the dish categories from the food diaries, and the number of times mentioned

Code	Dish category	Definition (uncertainties)	Typical dish (local designation)	GH_1-5	GH_2-5	GH_3-5
1	**Bread with salted milk tea**	Bread soaked in black tea with milk and a greasy matter (type of greasy matter not explicitly mentioned)	See definition (*non va shir choi*)	702	711	727
2	**Carbo-hydrate-based dish**	Journal entry mentions carbohydrate-rich ingredient only (way of preparation, and other ingredients not explicitly mentioned)	Macaroni (*Makaron*) Rice (*Birinch*) Buckwheat (*Grechka*) Fried potatoes (*Kartoshka biryon*) Flour soup (*Atolo*) Thick flour porridge (*Kochi*)	150	125	88
3	**Mixed dish**	Journal entry mentions at least two ingredients, e.g. "macaroni with egg," or a dish which consists of several ingredients, according to common recipes (specified information on dish composition not provided)	Broth with meat and vegetables (*Shurpo*) Rice dishes with meat, and vegetables (*Plow and shula*) Dumplings (*Manty*) Somosa (*Sambusa*) Stew (*Shushp and sous*)	105	213	170
4	**Animal protein-based dish**	Journal entry mentions animal protein or a dish mainly consists of ingredients which contain animal protein, based upon local recipes (specified information on dish composition not provided)	Fried egg (*Tukhmi biryon*) Chicken meat (*Gushti murg*) Kebab (*Kabob*) Fish (*Mokhi*)	27	2	47
5	**Milk-based dish**	Journal entry mentions dish that requires a substantial amount of milky matter and no other animal protein (ratio of solid matter, and milk unknown)	Rice pudding (*Shir birinch*) Milk-flour soup (*Shir atolo*) Squash cooked in milk (*Shir kadu*)	25	13	35
6	**Fresh food**	Journal entry mentions dish consisting mostly of fresh vegetables, herbs, and/or fruits and no animal protein or substantial amounts of milky product (specified information on dish composition not provided)	Salad with fresh vegetables, and curd (*Shakarob*) Fresh vegetables with bread soaked in milky matter (*Kurutob*) Freshly stewed leafy plants such as spinach enriched with greasy matter (*Khuroki alafi-gazg*)	7	5	9
7	**Plant protein-based dish**	Journal entry explicitly mentions certain kind of pulses containing protein (specified information on dish composition not provided)	Chick peas (*Nakhud*) Peas (*Shokh*) Lentils (*Chechevica*) Beens (*boch*)	2	22	10
0	**No data**	No journal entry (No conclusion possible about food intake)	Not applicable	77	4	10

Source: Food diaries

3.3.2 Food consumption of a middle-income household

Household GH_2-5 is comprised of eight adults and three children, and has more physical capital than household GH_1-5. In addition to a kitchen garden with twelve fruit trees, the household has 410m² of arable land per member, two dairy cattle and calves, a bull, eight sheep, and three goats. The wheat and potato harvests usually cover their needs for two and eight months, respectively. In addition, legumes are cultivated, though these are mainly used as animal feed. The regular monthly income comes from three household members working at the school as

Tab. 3: Number of an individual dish category was mentioned per month by household

Dish category	04/18	05/18	06/18	07/18	08/18	09/18	10/18	11/18	12/18	01/19	02/19	03/19
Household GH_1-5												
1	58	57	44	65	59	54	61	63	64	64	58	55
2	10	9	8	14	11	11	18	16	17	13	11	12
3	9	9	5	7	11	11	9	7	8	11	11	7
4	1	3	-	1	2	5	3	-	3	2	2	5
5	5	3	2	-	2	2	2	2	1	3	2	1
6	-	2	-	2	1	1	-	1	-	-	-	-
7	-	2	-	-	-	-	-	-	-	-	-	-
Household GH_2-5												
1	58	62	56	61	62	58	61	60	62	62	56	53
2	12	14	7	4	18	14	11	2	12	16	8	7
3	12	14	22	27	12	16	19	27	16	11	14	23
4	-	1	-	-	-	-	-	1	-	-	-	-
5	3	2	1	-	-	1	-	-	-	-	3	3
6	1	-	3	-	-	-	-	-	-	1	-	-
7	4	-	1	1	1	1	-	-	3	3	3	5
Household GH_3-5												
1	58	62	52	55	64	61	64	62	64	63	58	64
2	6	6	5	5	6	8	7	7	9	8	13	8
3	16	12	10	14	18	15	13	17	15	17	11	12
4	4	3	11	7	1	-	3	4	3	3	1	6
5	1	8	8	6	4	4	3	-	0	-	-	1
6	-	1	3	3	-	-	1	-	1	-	-	-
7	3	-	-	-	-	2	-	-	1	2	1	1

Source: Food diaries

a teacher, in the school kitchen, and in the school garden, and totals around TjS 1200 (about US$ 148). Together with remittances from two external household members, which arrived irregularly during the lean period and amounted to a total of around four monthly salaries, this income makes it possible for this household to make purchases that go beyond their everyday needs, allowing them to service their loan payments and make agricultural investments, such as the purchase of mineral fertilizer. It stands to reason that the larger arable land area and the input of fertilizer contributes to a higher subsistence rate for potatoes, which in turn substitutes financial expenditures on food. The livelihood strategy of this household appears to be more secure than that of household GH_1-5 due to its broader base.

With the opportunity to spend an average of around TjS 1000 (about US$ 123.5) per month on food purchases, almost three times the amount of money per person is available in this household compared to the first example, and food is purchased much more frequently. The portfolio of purchased products is more diverse, and includes vegetables, confectionery, dairy products, and meat in addition to long-life staple foods. Consequently, the dietary pattern of this household differs from that of household GH_1-5. As before, dish categories 1 and 2 still dominate the menu throughout the year with 711 and 125 mentions, respectively, with bread and milk tea being served consistently for breakfast and in most cases for lunch, but carbohydrate-based dishes were recorded somewhat less frequently than in the first example and almost exclusively in the evening. It is striking that, with 213 and 22 mentions, respectively, mixed dishes and dishes based on vegetable protein are consumed significantly more frequently than in the first case, while animal protein, and dairy-based dishes are consumed less frequently. Mixed dishes are consumed evenly throughout the year, dishes based on plant protein were recorded particularly in the winter and spring months. These characteristics can be seen as indicators that this dietary pattern is more balanced over the course of the year and that the diet can be considered more diverse than in the household GH_1-5 (Table 2, 3; Fig. 3).

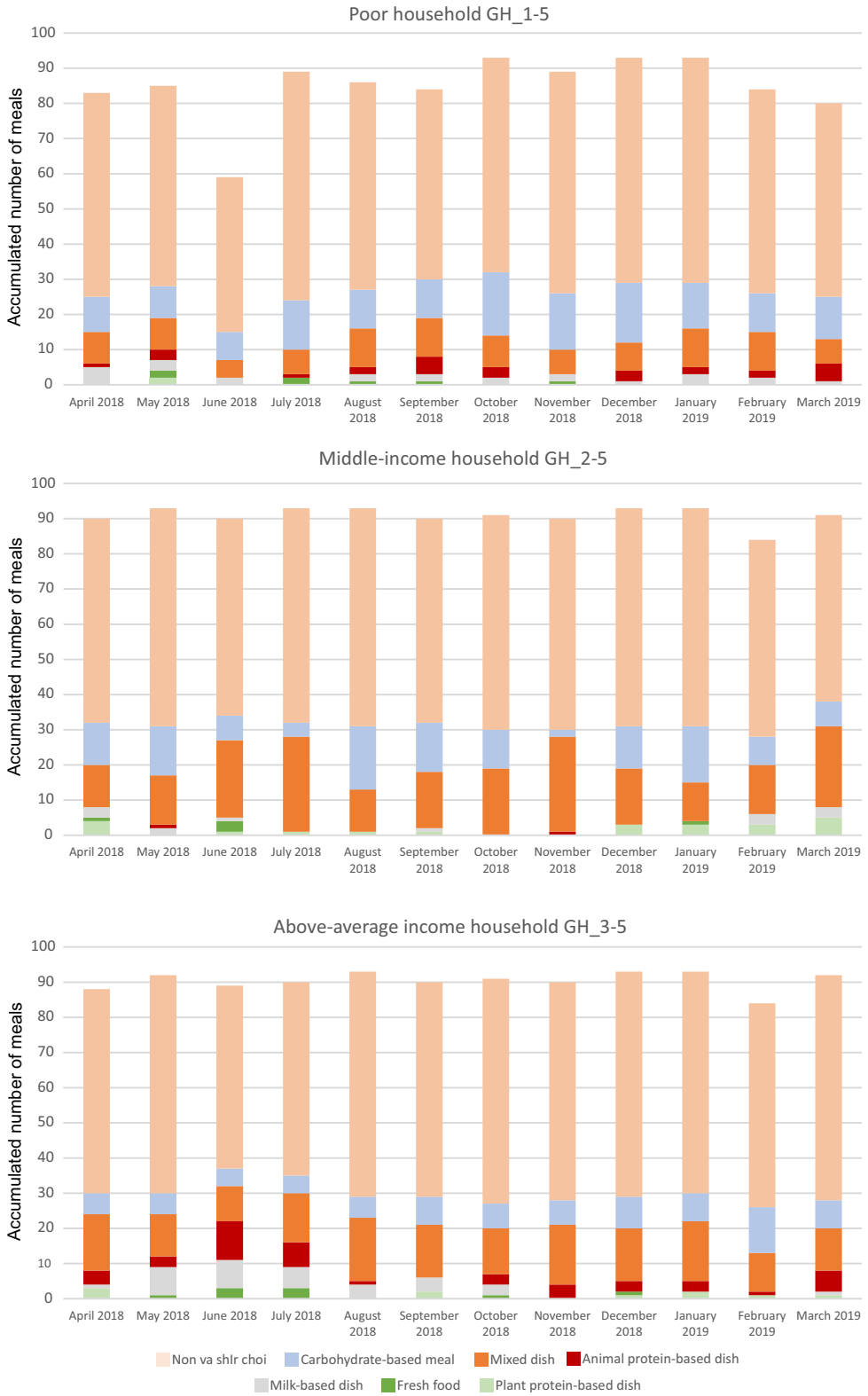

Fig. 3: Stacked charts of the monthly household food consumption by dish categories. Design: A. Dörre 2024 based on the food diaries

3.3.3 Food consumption of an above-average income household

The third household, GH_3-5, is representative of the socio-economic layer of the community that has an above-average income, and has no big difficulties in covering the costs of everyday consumption. The household, consisting of six adults and six children, has 350m² of arable land per household member, which has been consolidated in terms of spatial location through land swaps with neighbors and is used for the cultivation of wheat, potato, and some legumes. They additionally have 20 apple trees, 40 apricot trees, and a kitchen garden. The household's livestock includes three dairy cows and 30 sheep and goats, which are herded during the summer months by a household member offering shepherding services to the community on a pasture on Lake Zorkul, just over 100 km east of Zong. The level of self-sufficiency of this household with wheat varies between three and four months, and with potatoes between six and seven months. The regular monthly income of a household member working at the school of around TjS 400 (about US$ 49) is supplemented by unquantified seasonal income from driving services for tourists and continuous income from running a general store, which is the main economic pillar of the household. The trading activity makes it possible to purchase products directly from the central markets in Tajikistan's capital of Dushanbe, thus saving costs. Additionally, it allows them to become a middleman and benefit from the price mark-ups when selling the products in Zong. Livestock sales to the capital in the fall episodically generate additional financial income. Even though the household does not receive any remittances, its economic situation is stable enough to invest up to TjS 150 (about US$ 18.5) per household member in food every month, and to grant loans to neighbors and acquaintances. Of the three sample households, GH_3-5, therefore, has the broadest portfolio of monetary income and the privilege of the most robust livelihood strategy.

As in the two previous cases, bread and milk tea are consumed most frequently throughout the year, with 727 mentions. This is consumed by the household at the start of the day and at lunchtime. This is followed by mixed dishes with 170 mentions, which are served almost exclusively in the evening. This also applies to carbohydrate-based dishes, which were mentioned only 88 times the lowest number of mentions among the three households presented. This fact corresponds with general observations that carbohydrate-based meals are consumed less frequently with higher financial incomes. However, with 47 and 35 mentions, respectively, animal protein-based dishes and milk-based dishes were served relatively frequently and mostly in the evening in spring, summer, and fall. This can be interpreted to mean that animal products are highly valued, and therefore are purchased only if the necessary monetary resources are available. This assessment is supported by diary entries stating that a substantial amount of monetary capital was invested in the purchase of meat and sausage products, eggs, fish, and dairy produce. Fresh food is explicitly mentioned nine times and is served for dinner, especially in spring and summer. However, entries on almost daily food purchases document that, in addition to luxury goods such as sweets and nuts, fresh fruit and vegetables are frequently purchased by this household as well, and, without being explicitly mentioned, were most likely served as an accompaniment to the main meals. Dishes based on vegetable protein were mentioned ten times for dinner and especially during the lean period (Table 2, 3; Fig. 3). Finally, it should be emphasized that this household received and entertained guests much more frequently than the other two households presented for various occasions, including religious celebrations such as *Eid-i ramazon* (Eid al-Fitr) and *Eid-i qurbon* (Eid al-Adha), social occasions such as collective work and secular celebrations such as the Gregorian New Year, International Women's Day, Navruz, and the birthdays of household members. Such acts of commensality can be understood both as a representation of the affluence of the host household and its partial transmission of support to people beyond the boundaries of the household, which is conducive to the reproduction of prestige and thus the generation of social capital.

A comparison of the three vignettes shows that the food consumption patterns generally correlate with the socio-economic status of each respective household. An exception is dish category 1, which is highly valued within the entire region, all three socio-economic strata of the community, and the three individual households. At the same time, it remains uncertain from the food diaries what kind and quality of greasy matter was used for individual servings of category 1 dishes. Observations revealed that in less affluent households, highly valued butter (*maska*) was often substituted with margarine or, in particularly deprived households or during difficult economic periods, with vegetable oil. No statements can be made on the basis of the entries about the quantity of food consumed or the quality and nutritional value of the ingredients. What is certain is

that more financial assets and a more diverse portfolio of income-generating activities allowed more frequent consumption of mixed, protein-based, and milk-based dishes, the ability to buy luxury foodstuffs, and the capacity to host guests. Fresh dishes were mentioned comparatively seldom by all three households. However, ownership of fruit trees and kitchen gardens, as well as purchases of fruits and vegetables documented in the food diaries suggest that fresh produce could be consumed more often than was explicitly mentioned.

What do these insights about the food system of Zong mean beyond the scope of this specific case? The discussion section contextualizes the results in light of the food security concept and provides reflections on the research methodology.

4 Summary and discussion

In summary, the following can be said about the studied food system. The physical availability of food as the first domain of food security results from local agricultural production and the processing of these products, local stockpiling, imports processed via markets, and subsidized aid programs provided by state and non-state actors. Following the nationwide privatization of land use rights at the end of the 20th century, food production capacities, which are largely fragmented and run by individual farmers, cannot meet the needs of both local communities and individual households due to the limitations discussed above. Local experts also see the underfunded economy as an important reason for the low productivity. Some, therefore, advocate pooling individual resources in order to make joint investments and generate economies of scale (KIFA 2018, KIVE1 2018). However, the view that "a bit of collectivization would be good" (KIVE1 2018, translation by the author) is met with skepticism on the ground. This is partly due to dissatisfaction with the performance of the farmers' association imposed externally by the state, whose main activity is not the pooling of locally available resources for food production, but the collection and transfer of the land tax to the district administration. Due to the structural difficulties and limited economic potential on the ground, local capacities are not sufficient to invest in modern technologies, infrastructure, seeds, and fertilizers to generate substantial increases in production and value-added processing of local products. External investment remains essential, and this requires active promotion.

As seen at the regional level in Gorno-Badakhshan, food produced externally and imported mainly through retail channels is also available at the local level in Zong to fill the gaps between local production and demand. Apart from temporary bottlenecks in the course of the dissolution of the USSR and during the subsequent civil war in Tajikistan, extensive imports of foodstuffs to the GBAO and their distribution to the settlements have been taking place since Soviet times (GKTSSRPS 1988: 33–34, Bliss & Mamadsaidov 1998: 18–19, 38–39, Herbers 2001: 371–373, Kreutzmann 2002: 40–42). The central difference between the socialist and post-Soviet periods is that before the dissolution of the Soviet Union, general access to imported and state-subsidized food was largely possible without physical and economic barriers in both urban and rural areas thanks to the general existence of professional wage labor in various sectors of the economy and a secure supply infrastructure. In 1983, 144 out of 150 households in Zong received regular income from wage labor, in particular, from the aforementioned state enterprise as the central employer, which enabled the people to purchase food locally in state stores at guaranteed and affordable prices (IKZKS 1983–1985, GI ZA 2018). Under the market economy conditions of the post-Soviet period, however, not only were collective and state enterprises that had previously been regarded as important employers dissolved in all Central Asian societies, but state subsidy and social security programs were also thinned out. Along with the loss of economic security and the release of individual households to take responsibility for their own survival, there was an increasing socio-economic stratification of the communities. For the businesses that have taken the place of state-run stores and are subject to commercial logics, settlements with poor transport infrastructure and low purchasing power are of secondary interest, which is why a lack of shopping facilities can be observed, particularly in places far from the regional administrative and market centers.

For the segment of households considered poor in such settlements, the availability and physical and economic access to sufficient, safe, and nutritious food that meets their own needs and preferences, as the FAO (1996) defines food security, is therefore considerably more difficult. In contrast, households with a higher income and a more extensive livelihood portfolio have greater mobility options and more stable economic access to food. This is ultimately reflected in the food consumption patterns of individual households and their members, as the three vignettes have shown. There are close links between the socio-economic status of individual households, the diversity

of dietary patterns, and the degree of food insecurity. Multi-local livelihood strategies, differentiation of income channels, and reliable social networks reduce the exposure of households to food insecurity and its associated risks, increase their adaptive capacities, and thus reduce vulnerability to food insecurity.

Even if the study presented cannot be seen as representative for Gorno-Badakhshan per say or the high mountain regions of Central Asia as a whole, the community of Zong can be understood as a microcosm in which some characteristic features of central domains of food security in the study region come to light in locally specific manifestations, i.e. with regard to the spatio-temporally unequal availability of food, unequal physical and economic access to food, and the unequal use of food. At the same time, it is important not to conceptualize settlements such as Zong as closed entities, but to understand them as dynamic communities embedded in social networks through which cross-scale and level-bridging exchanges, communications, and mobilities of people, goods, finances, and immaterial aspects take place. The same perspective – linking rural settlements, distant markets, and urban agglomerations; highland and lowland regions; and places of production and consumption – must also apply to individual households that form the community of the study.

Against the background of the lack of research on local manifestations of food insecurities in Central Asian mountain regions, one contribution of this study to the academic debate is to provide empirically based and multifaceted insights into food-related challenges of a rural mountain community, as well as the lived experiences of the people affected. To pursue this goal, a case study approach was applied. The community of Zong, its representatives, and individual households contributed to the research, which shows how differentiated quantitative and qualitative information collected with the active participation of the people in the research focus can complement aggregated statistical data on food insecurity in mountainous regions of the world. While aggregated statistical metrics do not allow us to make satisfying statements about local manifestations of food insecurity at the community level, a combination of both macro-level and micro-level perspectives and data enables contextualized insights about food security-related issues in concrete local settings, while simultaneously and explicitly considering social and ecological frame conditions during the analysis and classification of the gained findings. The second contribution of this study to academic research, therefore, lies in the realm of the methodological implementation. With the help of an approach that combines quantitative and qualitative empirical research methods, it was possible to provide an example of how data can be collected that enables the presentation of snapshots, but also diachronic changes in both the food supply situation of the case study village, as well as dietary patterns of individual households of the studied community. In order to develop a differentiated and comprehensive understanding of the realities of local people's lives and develop context-appropriate problem-solving strategies, participatory research methods play a special role, giving local actors the opportunity to articulate their knowledge, assessments, and understandings about existing challenges and preferred development scenarios. The active participation of representatives of the studied community in research activities can also lead to awareness building and empowerment of those involved, as has previously been observed in other contexts (Igonya et al. 2023: 29, 40, Sofoulis 2005: 448). For example, a representative of household GH_3-5 noted unprompted how the food diary exercise contributed to an unexpected gain in knowledge (Fig. 4).

5 Conclusion

The central question of this study was how food availability, the access to food, and dietary patterns play out in a remote rural mountain settlement in the Pamirs of Tajikistan under the conditions of a challenging socio-ecological environment. The paper has illustrated how these conditions influence the food availability in a specific location, how different factors and parameters contribute to unequal access to food within the chosen community and effect the nutrition patterns of individual households, and which dynamics these patterns exhibit over time.

The first conclusion is that the structural causation of the discussed challenges highlights that comprehensive food security in rural high mountain regions of Central Asia cannot be understood as a purely local task and ensured solely by the local people's own efforts, but is only conceivable with the involvement of, and in close cooperation with, governmental, non-governmental, and entrepreneurial non-place-based actors and institutions. In addition to targeted support for particularly vulnerable social groups and local agricultural production capacities, measures to diversify the region's economic base and thus non-agricultural income opportunities, as well as a closer integration into regional, national, and international markets and production networks should be mentioned in this context.

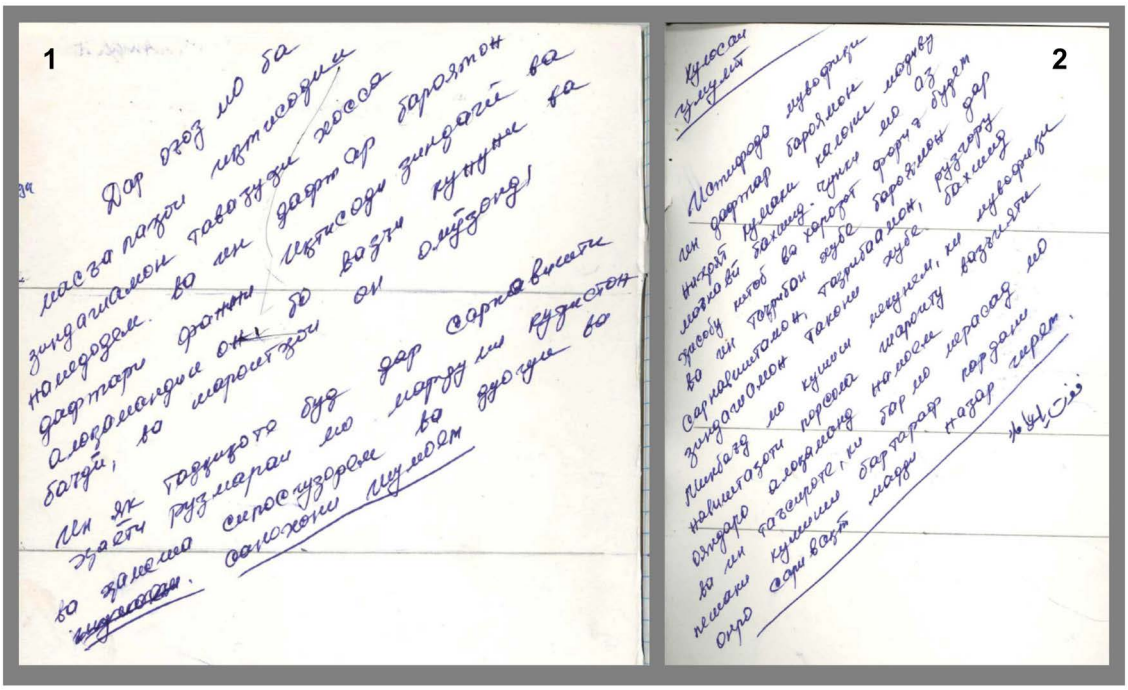

Fig. 4: Quotations from the food diary of the household GH_3-5

The entry says: 1 "In the beginning, we did not pay much attention to our economic life, and this notebook has helped us to learn about economic life and its relation to current and upcoming situations and conditions. This was a research about our […] destiny in the mountains. And we are grateful […];" 2 "General conclusion: Using this notebook helped us in our material and spiritual lives because we were far from calculating our daily expenditures. This was a great experience and helped us a lot in our life. We will try in the future to use last year's notes to connect to the conditions of our future lives, and if there are any issues, we will try to solve them on time." (Translated by Ch. Goibnazarov)

The second conclusion, which is based on methodological and topic-related insights, is that tailor-made strategies are necessary to effectively tackle the problem of food insecurity in specific local settings, and that differentiated and empirically-based analyses are crucial for the formulation of such approaches. To this end, political decision-makers, government institutions, and non-governmental organizations involved in such procedures need to understand that local communities – with their knowledge, understanding, and perspectives – should be explicitly included in problem formulation, the design of desired future outcomes, and the elaboration of appropriate strategies in order to achieve tailor-made goals. This study provides an example of what such an analysis can look like.

Acknowledgements

The residents of Zong Village, and especially the village elder and his household, were generous with their time and energy, and shared food and tea, opinions, wisdom, and knowledge about the social and ecological conditions, customs, and institutions utilized in the region, for which I am deeply grateful. I would like to thank Chorshanbe Goibnazarov for providing me with useful contacts and helping with translations of handwritten documents; Mary Elizabeth Wilson for both reviewing and editing earlier drafts; and the anonymous reviewers for their valuable comments. Research for this study was kindly supported by the CrossCulture Programme of the Institut für Auslandsbeziehungen e.V. in Stuttgart (Germany), the Geo.X - Research Network for Geosciences in Berlin and Potsdam, and the Centre for Development Studies of the Freie Universität Berlin.

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Interviews

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KIC Key Informant Interview Clinic (2018) Personal communication with the physician and nurses. Zong Village, March 12, 2018.

KIES Key Informant Interview Elementary School (2018) Personal communication with the headmaster of the elementary school. Zong Village, March 12, 2018.

KIFA Key Informant Interview Farmers' Association (2018) Personal communication with the head of the farmers' association 'Khurram Bokiev'. Zong Village, March 12, 2018.

KIK Key Informant Interview Khalifa (2018) Personal communication with the religious leader. Zong Village, March 11, 2018.

KILH Key Informant Interview Local Healer (2018) Personal communication with a local healer. Zong Village, March 17, 2018.

KIM1 Key Informant Interview Mirob 1 (2018) Personal communication with the water master of the neighborhoods Dirch and Gholib. Zong Village, March 16, 2018.

KIM2 Key Informant Interview Mirob 2 (2018) Personal communication with the water master of the neighborhood Zong. Zong Village, March 12, 2018.

KIRMNRM Key Informant Interview Regional Manager For Natural Resource Management (2018) Personal communication with the regional manager for natural resource management of the Mountain Societies Development Support Programme. Khorog, October 11, 2018.

KISC Key Informant Interview School (2018) Personal communication with the deputy of the headmaster of the central school. Zong Village, March 10, 2018.

KISH Key Informant Interview Shepherd (2018) Personal communication with a shepherd. Zong Village, March 19, 2018.

KISK Key Informant Interview Shop Keeper (2018) Personal communication with a shop keeper. Zong Village, March 11, 2018.

KIVE1 Key Informant Interview Village Elder (2018) Personal communication with the village elder. Zong Village, March 9–21, 2018.

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KIVO Key Informant Interview Village Organization (2018) Personal communication with the head of the VO Zong. Zong Village, March 14, 2018.

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