

Refereed article

# Commercialization versus De-intensification? Markets, Livelihoods, and Agricultural Change in Northern Pakistan

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## Summary

Based on a case study in northern Pakistan, this paper investigates the complex processes of change that have reshaped local farming systems there in recent decades. In Pakistan, agricultural policies emphasize intensification and productivity growth as overarching, nationwide goals. In an empirical investigation of changing farming practices in the mountain district of Nagar, guided by an assemblage-theory perspective on agricultural change, the paper questions this lopsided view. The case study reveals a significant shift from subsistence- to market-oriented crop production in recent decades, but also an emerging tendency among farmers to invest less time and effort in sophisticated and productivity-enhancing practices — in other words, a certain de-intensification of the latter. These processes may seem contradictory, but make sense for local households who adapt their farming strategies to a changing social, political, and economic context. Following political reforms and major road improvements, new livelihood opportunities, lifestyles, and ideals have emerged in the community and contributed to a significant shift away from farming aspirations, despite a general process of agricultural commercialization. The paper concludes that processes of agricultural development cannot be adequately addressed by the narrowly defined productivity goals of related policies in Pakistan, as for smallholder farmers the maximization of production is not necessarily a priority. Instead, more holistic approaches are needed that focus on safeguarding the agricultural resource base while also supporting the aspiration of local farming households to diversify their livelihoods.

**Keywords:** agrarian change, intensification, commercial crop production, Gilgit-Baltistan, Karakoram, assemblage theory

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## Introduction

For many decades now, agricultural intensification has remained a dominant policy paradigm. Starting about ten years ago, however, a new form of this paradigm would become popularized: ensuring the food security of a growing world population (FAO 2011) while also meeting the increasing demand for biomass for energy and industrial use (McDonagh 2015; OECD 2018); a “sustainable intensification” is called for (see, for example, Mockshell and Kamanda 2018; Struik and Kuiper 2017). Similar to intensification, sustainable intensification has been defined as an increase in agricultural production per unit of land — but with the added goal that negative environmental impacts be reduced and ecosystem services improved (FAO 2011: 9; Jain et al. 2020).

This policy paradigm has been subject to criticism related to, among other things, its questionable assumptions of social-ecological win-win situations, its reliance on a technical fix for solving food crises, and its lack of plausible solutions to critical issues such as rebound effects (McDonagh 2015; Padoch and Sunderland 2013; Rasmussen et al. 2018). Despite these criticisms, the discourse on sustainable intensification implies a notion of intensification being *inevitable* and “essential for global political social stability and equity” (Tilman et al. 2002: 671) given projected population increases and dietary shifts. This notion is shaped by a decade-long dominance of agricultural-intensification policies (Clay 2018; Padoch and Sunderland 2013; Tilman et al. 2002), and rooted in a rather outdated but nevertheless influential research tradition that postulates intensification as a general principle of agricultural change. Based on theories first formalized by Boserup (1965) and then later modified or refined by others (e.g. Pingali et al. 1987; Ruthenberg 1980; Turner and Ali 1996), various scholars continue to conceive of intensification as a general pathway to “agricultural development in low-income countries” (Riwthong et al. 2015: 11) — as driven by population growth and other contributing factors (e.g. Binswanger-Mkhize and Savastano 2017; Headey and Jayne 2014; Raut et al. 2011).

Intensification has been defined in various ways, but is usually understood as an increase in agricultural production per unit of land through reduced fallowing, increased inputs (labor, fertilizer, technology, and similar), and innovation in farming practices (Brookfield 2001a: 200; FAO 2011: 9; Riwthong et al. 2015: 11; Smith et al. 1994: 538). Despite emergent approaches to enhancing agricultural productivity based on principles derived from Ecology or Agroecology (Mockshell and Villarino 2018; Wezel et al. 2015), the dominant framing in agricultural policies continues to be about “modern,” high-input, and technologically advanced ways to increase production (Clay 2018; McDonagh 2015). As Brookfield (2001a, 2001b) points out, this notion of intensification has led to a rather narrow understanding of agricultural change that overemphasizes technical aspects and

inputs while neglecting important aspects such as local diversity of practices and forms of social organization.

A case in point is Pakistan, where since the “Green Revolution” of the 1960s–1980s, agricultural policies have continued to be dominated by a narrative of intensification as an essential — if not inevitable — pathway to agricultural development (see, for example, Niazi 2012; Zulfikar and Thapa 2017). The “Pakistan Vision 2025,” providing core policy guidelines for the National Planning Commission, aims at “boosting yield and productivity” (Government of Pakistan 2014: 82) and closing the large yield gaps identified for major crops “through enhancing technological intensity” (Government of Pakistan 2014: 46). Productivity growth in the agricultural sector is also a prime goal of the “National Food Security Policy” (Government of Pakistan 2018); a strong emphasis on modernizing and intensifying production is also reflected in the recently announced plan to refocus China-Pakistan cooperation toward the latter country’s agricultural sector (Consortium for Development Policy Research 2018; State Bank of Pakistan 2018). Although the National Food Security Policy acknowledges the need to address environmental challenges while “achieving an average growth rate of 4% per annum [in the agricultural sector]” (Government of Pakistan 2018: 1), more holistic approaches that take into account the wider social-ecological context (e.g. agroecology) are not mentioned at all.

Furthermore, policy objectives are formulated nationwide, and there is little regional differentiation besides goals to increase “production of critical food items mainly in the remote areas of Pakistan” (Government of Pakistan 2014: 66) and to capitalize on “the potential of mountain agro-ecological zones” (Government of Pakistan 2018: 1). However, agricultural systems across the country are very diverse, and what seems to work in one part may not make sense or may even be counterproductive in another. This is particularly relevant for the semiautonomous region of Gilgit-Baltistan, for which no regional agricultural policy has been published so far. Thus there is a need to question top-down imposed, generalizing productivity goals by taking a local perspective: as will be shown in the following, from the perspective of local farmers themselves, here different policy priorities may be more desirable in fact.

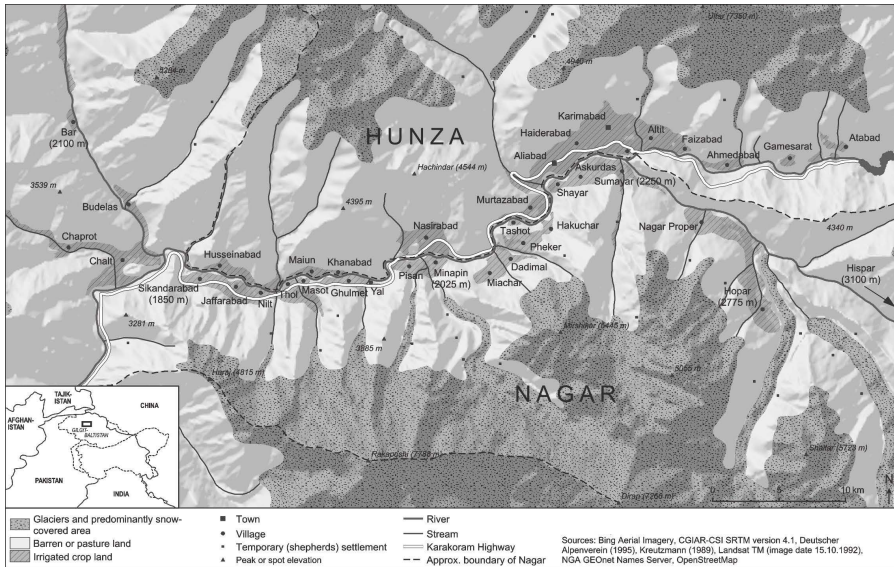
Based on a case study on Nagar District in the mountains of Gilgit-Baltistan, this paper aims at scrutinizing whether intensification and productivity growth as overall policy directions make sense in the local context. To do so, I draw on in-depth field research conducted in 2014, 2015, 2016, and then again in 2019 on recent processes of agricultural change. Since agricultural developments do not occur in a vacuum, understanding changes in farming strategies and practices requires a holistic perspective that takes into account both direct (farm-related) and indirect (pertaining to the off-farm sector) factors and their relations to wider social, political, economic, infrastructural, and ecological processes of change. For this purpose, I follow an empirically guided research approach inspired by recent

conceptualizations of agricultural systems as “assemblages” (Dressler et al. 2018; Dwiartama et al. 2016; Forney et al. 2018; Gengenbach et al. 2018; Sharp 2018).

In the following I will first provide a brief introduction to the case-study area and the assemblage-inspired research approach, before presenting in detail the empirical insights generated. I find that in Nagar, many current developments in the farming sector can be described in terms of two parallel processes of change: commercialization of crop production and a shift toward less intensive production practices respectively. These processes may seem contradictory, but make sense for local farming households who adapt their strategies to a dynamic social, political, and economic context. In the paper’s final section, I discuss the relevance of these findings to national agricultural policies and conclude by offering some thoughts on bottom-up research approaches.

## **Study area and research approach**

This paper focuses on Nagar District, a rural mountain community in the semiautonomous region of Gilgit-Baltistan in northern Pakistan. The population of about 60,000–70,000 people resides in 24 settlements, located mainly on the left bank of a major river separating Nagar from neighboring Hunza District (see Figure 1 below). Surrounded by steep mountains, the villages and agricultural fields are located on river terraces and debris fans situated at around 1,900–3,100 meters above sea level. While the valley bottoms are characterized by an arid to semi-arid climate, the mountain areas above 4,000–5,000 m are characterized by high precipitation (Hewitt 2014) and farmers take advantage of meltwater streams from glaciers and permanent snow fields to irrigate their cropland through complex related systems. Wheat, potatoes, fodder crops (mainly alfalfa), and tree fruits are major crops produced in and around the villages. Traditionally irrigated cropland is divided into three categories, although this distinction is increasingly becoming obsolete. Ordered by their cultivation intensity, these three categories are: arable land (*hárki*), the most valuable type of land; orchards (*basi*); and, irrigated alfalfa slopes (*jut*; see Figure 2 below). Local farming systems have been described as “combined mountain agriculture” (Ehlers and Kreutzmann 2000: 9): irrigated crop production is complemented by animal husbandry (mainly cattle, sheep, and goats) that utilizes the high pastures situated near the glaciated areas during the summer months. Farms are predominantly small-scale and managed by households themselves, with an average farm size of around 0.25–0.6 hectares, depending on the village (Spies 2019: 151).

**Figure 1. Map of Nagar District, Gilgit-Baltistan**

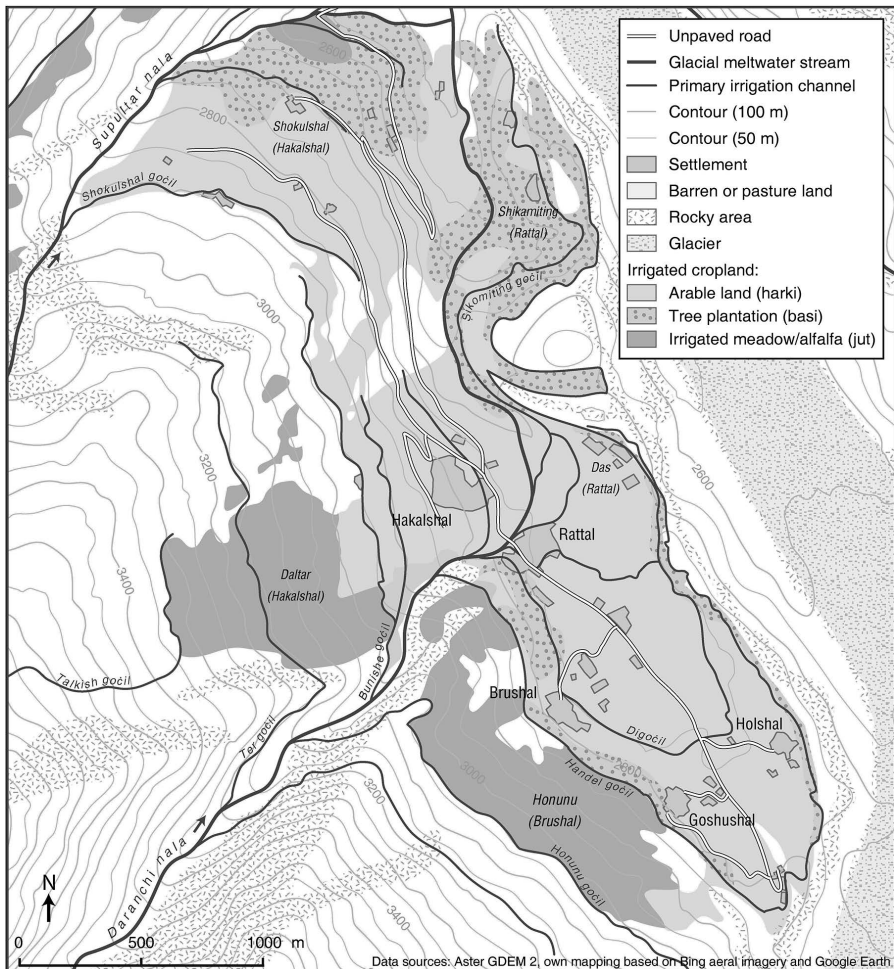
Source: Author's own compilation.

For centuries, Nagar was a relatively isolated princely state governed by an autocratic ruler, or *tham* (Frembgen 1985). The majority of the population were subsistence farmers, and mobility and education were restricted to the local elite. Only in 1972 would the *tham* finally be deposed and the community of Nagar formally incorporated into the political administration of Pakistan. In 1978, the Karakoram Highway was completed, passing through the Hunza-Nagar Valley and connecting Pakistan with China (Kreutzmann 1991, 2020). These two important events of the 1970s would trigger far-reaching changes in the formerly isolated mountain community, coming to affect many aspects of life there — including agriculture.

With greater political freedom and enhanced road access, a number of interrelated developments took place in subsequent decades. International development organizations, in particular the Aga Khan Rural Support Programme (AKRSP), would launch numerous projects — mainly in the fields of education and agricultural modernization. Both governmental and nongovernmental organizations invested in public infrastructure such as link roads, water supply, basic health centers, and schools. Access to education significantly improved, not only through the creation of new schools but also through related migration to other parts of Pakistan — at least for households with sufficient financial means for that. New income opportunities became available through work migration to the urban centers of lowland Pakistan, through employment with the Pakistan Army, through

new job opportunities in the local administration, and, facilitated by improved road access, through trade too (Benz 2014, 2016; Kreutzmann 2020; Malik and Piracha 2006). As will be discussed in greater detail below, the Karakoram Highway not only facilitated access to new consumer goods but also opened up new markets for local agricultural products. Overall the community of Nagar has witnessed profound processes of social change in recent years, ones that have also affected local farming systems.

**Figure 2. Agricultural land use in Hobar, Nagar District**



Source: Author’s own compilation.

To investigate these recent processes of agricultural change, I draw on a total of 11 months of field research in Nagar, guided by an understanding of farming systems as dynamic sociomaterial assemblages. Rather than postulating certain “root causes” to agricultural change such as population growth or market signals, the assemblage approach assumes that change is always coproduced by a variety of factors and actors at the same time. An assemblage can be understood as a complex, open, and dynamic system made up of manifold heterogeneous components that can be human and nonhuman, material and immaterial, social and ecological, small and large, with causal relations rarely occurring in a straightforward and (uni)linear manner. Instead, the dynamics of assemblages are characterized by multicausality, often involving complex feedback loops, and can lead to outcomes entirely unexpected (Anderson and McFarlane 2011; see, for example, Briassoulis 2017; DeLanda 2006, 2016; Dittmer 2014; Müller and Schurr 2016).

An agricultural assemblage can be described as a more or less durable arrangement or cofunctioning of diverse actors and elements, including farmers, practices, soils, water, infrastructure, farming inputs, and markets, among others (Spies 2019). Each of these elements are subject to dynamics of their own, and are embedded in larger societal and environmental contexts that need to be taken into account when investigating change. Consequently, such processes do not occur along universal development pathways but are always specific to sites in time and space, thus being dependent on the historical contingencies of a particular combination of more or less influential actors and elements. An assemblage approach to agricultural change hence implies that changes on the ground can only be understood through detailed empirical analysis that proceeds without limiting one’s scope to a prescribed set of key factors.

The empirical data for this paper was collected during a total of about 11 months of field research conducted in Nagar in 2014, 2015, 2016, and during a brief revisit in 2019 too. Research methods were primarily qualitative. The main data sources were semi-structured and focused interviews as well as informal discussions with more than 100 local informants — mainly middle-aged and elder farmers, but also other local experts such as village elders, community activists, and agricultural traders. Interviews were complemented with observations, transect walks, and mapping, both to verify reported developments and to identify new themes that were then elaborated on in subsequent interviews. Moreover, NGO reports and other gray literature were consulted for additional information and used for triangulation of interview data. Most interviews and informal discussions were held in collaboration with local research assistants who interpreted between English and the local languages, Burushaski and Shina. My research assistants were knowledgeable and active members of the community of Nagar, and served both as door-openers to the community and as valuable sources of knowledge in their own right. Due to a local culture of strict gender separation, I was not able to interview women — which unfortunately results in a strong male bias in my

interview data. Research activities were primarily conducted in four villages across Nagar: Hobar, Minapin, Sikanderabad, and Sumayar. During the course of my research, however, I visited all villages of Nagar except Budelas to carry out additional observations and interviews.

## **Processes of agricultural change in Nagar District, Gilgit-Baltistan**

In Nagar, the physical environment imposes strict limitations on agricultural development, as the steep mountain slopes and erosion-prone river terraces do not allow for any sizable expansion of farmland. Most of today's cropland had already been put into use by the 1950s, as a comparison of historical map data (Deutscher Alpenverein 1995) with the current situation (see Figure 1 above) reveals. Since the 1970s, however, the population of Nagar has increased from around 25,000 at the time (Government of Pakistan 1972) to about 60–70,000 people nowadays (own estimate based on Government of Pakistan 2000; Kreutzmann 2020). Recognizing the increasing scarcity of arable land as a major challenge to food security, development programs by the Food and Agricultural Organization of the United Nations (FAO), AKRSP, and the Pakistani government would put an emphasis on agricultural modernization as a way to increase productivity (AKRSP 1988; Husain 1992; Whiteman 1985). As will be discussed, while these efforts have certainly had some effects various other actors and processes have also been at play in shaping local farming systems — some of which may have had more pronounced impacts than external interventions have. In the following, I scrutinize what constitute major processes of agricultural change in Nagar in recent decades: a commercialization of farming systems fostered, among other things, by access to new markets and, occurring simultaneously, changes in farming practices that can be described as a de-intensification of labor input.

### **Commercialization of crop production**

From the 1980s up until at least the first decade of the new millennium, subsistence production of wheat and barley would increasingly be replaced by the harvesting of potatoes as a cash crop. Starting around the same time and receiving a major boost in the last decade, tree fruits produced for markets in lowland Pakistan — mainly apricots, apples, and more recently cherries — are gradually becoming a dominant element of local farming systems. Today, potatoes and cherries are the main cash crops in Nagar, followed by dried apricots, apples, and walnuts. Overall, a major — if not the biggest — share of crops in Nagar are today produced for the market. The reasons for these developments are manifold, but a number of key factors and actors can be identified that I address in the following by focusing on potato and cherry production.

First, external organizations and individual actors have been instrumental in the commercialization process. Already in the 1980s, FAO and AKRSP, in



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collaboration with local development activists, would promote the production of potatoes and fruits as cash crops by providing training, distributing seed potatoes, establishing fruit-tree nurseries, and establishing first market linkages to agricultural-trade enterprises. Initially farmers sold their produce mainly to external buyers, with major boosts only occurring when local businessmen took over the potato trade in the 1990s and when local traders started to buy cherries from farmers in the subsequent decade. These developments must also be understood in the context of emerging migration networks: some of the first potato traders from Nagar would live and work in Pakistan's major cities, where they were able to develop business networks and accumulate the financial capital that would enable them to later invest in agricultural trade.

Second, the shift to market-oriented production would not have been possible without major improvements in road access. The Karakoram Highway has played a critical role herein, as has the construction of new link roads making transportation much more cost-effective: for instance, up until the late 1990s, the remote village of Hopar could only be accessed by four-wheel-drive jeeps and by tractors. Subsequently, when a new road was constructed, the bulky potato bags could now be loaded directly from the fields onto small trucks (see Figure 3 below). Moreover, successive road enhancements and improved maintenance of the Karakoram Highway have significantly reduced the transportation time from Nagar District to the main marketplaces in the cities of the Punjab. Transportation via the Karakoram Highway has become much more reliable during the last decade due to Chinese-supported road maintenance, making the marketing of fresh cherries less risky and more profitable. According to local fruit traders, this factor has played a major role in the recent boost of cherry production: as they are harvested during the hot summer months, fresh cherries are highly perishable and need to be transported as quickly as possible in air-conditioned transporters to wholesale markets in the Punjab.

**Figure 3. Potato harvest in Hopar, Nagar District.**



Source: Photo taken by the author himself, September 27, 2015.

Note: The potato bags are transported on small trucks to the Karakoram Highway, before being reloaded onto larger trucks for transport to wholesale markets in Islamabad and Lahore.

Third, market developments have also played a role in the increasing profitability of cash-crop production in Nagar. In Pakistan, potatoes are consumed as a vegetable crop in curries, as an ingredient in various snacks, and — especially in urban areas — increasingly in the form of fries and potato chips. Most potatoes in Pakistan are produced for the domestic market, with growing consumer demand having led to a more than threefold increase in the total area under potato cultivation in the country since the early 1980s (Arifullah and Chishti 2008).

Seasonality is an advantage for Nagar: potatoes here are harvested in autumn, when the stocks of Punjabi and Sindhi potatoes deplete and prices increase. Likewise, traders report a growing demand among the urban middle class for “exotic” mountain fruits, in particular cherries. Moreover, an impressive boom in domestic tourism in the region since 2015 (Kreutzmann 2020: 446) has added to these developments, as cherries can now be sold directly to visitors from lowland Pakistan at high prices. In summer 2019, a delegation of Chinese businesspeople and food-quarantine experts visited several cherry orchards in Nagar and subsequently announced the large-scale importation of local cherries to China, starting summer of the following year. As a result, local informants anticipated significant increases in local cherry prices; due to border closures and terminations

of business relations in response to the coronavirus pandemic, however, this venture seems highly unlikely to be realized in the next one to two years at least. Nevertheless, cherries remain the most profitable cash crop in Nagar today: from about 0.05 ha of cherry-orchard land, farmers reported earnings of up to PKR 75–100,000 — more than the highest reported gross incomes from potatoes harvested from a similar size of land during the period of observation, amounting to PKR 55–60,000 in 2014.<sup>1</sup>

Fourth, a major factor in the shift from subsistence- to market-oriented production is a government subsidy for the staple crop, wheat. The subsidy was introduced in the 1970s to provide Gilgit-Baltistan with affordable wheat produced in lowland Pakistan (Kreutzmann 1989). Since then, the subsidy has successively increased, with consumers in Nagar paying about PKR 1,600 for 100 kilograms of wheat in 2016 — less than half the market price in lowland Pakistan at the time. Consequently, for households in Nagar it is much more profitable to produce cash crops and use the income to purchase subsidized wheat for their own consumption: farmers report that from the income from selling one bag of potatoes (around 105–110 kg), they can usually buy at least one large bag of wheat grain (around 100 kg). Local potato yields, however, are several times higher than those of wheat, generating around 10–33 tons/ha versus 2–6 tons/ha respectively. Potatoes need significantly more water than wheat, but glacial meltwater in Nagar is relatively abundant during the summer months when irrigation is most crucial for achieving high yields.

Fifth and finally, at least in regard to the recent shift toward cherry production, broader socioeconomic developments have been very influential too. While the long waiting period from planting trees to first harvest creates an economic burden for farmers, many of them are motivated by the fact that producing cherries is much less labor-intensive than cultivating arable crops. Most farmers simply plant the trees, water, and occasionally fertilize them, and bargain a price with local traders who usually buy the harvest of a whole orchard for a lump sum. In most cases, the traders then take care of the harvest themselves. As discussed in the following, such arrangements make sense for local households who are increasingly shifting their focus away from agriculture toward other sources of livelihood, having broader implications for local farming strategies.

### **A de-intensification of farming practices?**

Throughout Nagar, especially in lower-altitude villages close to the Karakoram Highway, more and more agricultural fields are being converted into cherry orchards (see Figure 4 below). In the village of Minapin, personal observations in 2016 and 2019 revealed that new cherry orchards have been established all over

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1 At the time of the research conducted between 2014 and 2016, USD 1 equaled around PKR 100–110. In Nagar, farmers usually measure their land in *kanāl* (1 *kanāl* ~ 0.5 ha).

the village, with informants reporting a considerable boost to this development in recent years. Local traders estimate that the amount of cherries produced for the market more than doubled between about 2010 and 2019, with the trend continuing to this day. In 2019, the local community organization reportedly established a tree nursery in Minapin with a total of 8,000 new cherry rootstocks to satisfy the growing demand among farmers for such trees. As one informant commented, tongue-in-cheek, about the many farmers who had recently planted cherry trees on their arable land: “They want to become richer and richer. They don’t want to do hard work, they just want to sit at home and earn money” (Field Note, Minapin, September 30, 2016).

**Figure 4. Conversion of arable land into cherry orchard in Miachar, Nagar District**



Source: Photo taken by the author himself, May 24, 2015.

As previously mentioned, a major advantage of producing tree crops rather than arable ones is the former’s lower labor requirements. To manage orchards, there is no need for excessive application of fertilizer, for ploughing and preparing the fields, for sowing or planting crops. Harvest is generally less labor-intensive compared to arable crops, and the space between mature trees can be utilized for extensive grazing of livestock. Some farmers regularly apply pruning and thinning, but, generally speaking, little time is invested in maintaining the trees. This makes orchards an appealing alternative to cultivating fields, especially as farming households in Nagar today have to deal with a particular challenge: the declining availability of agricultural labor. Boys and girls are now going to school and

increasingly strive for a higher education; adult men, as well as some women, are preoccupied with jobs and off-farm businesses in the region or in the cities of lowland Pakistan. To some extent, this reduction in available household labor has been balanced out by a shrinkage of average farm sizes by possibly more than 50 percent since the 1970s as a result of population growth and partible inheritance.<sup>2</sup> However, not only the physical availability of household labor but also other factors need to be considered here: in all parts of Nagar, informants reported that people's interest in farming has strongly declined over the last few decades. An elder farmer in Minapin put it as follows (Field Note, Minapin, September 21, 2016):

There is no benefit in agriculture, because the land holdings are very small nowadays. So, the young generation does not like agriculture. Therefore, it has become very difficult to cultivate land. The young generation does not like to do it. And fathers have the desire for their sons that they become government employees or businessmen. Nobody wants to see his son as a farmer. There is no benefit in agriculture, young people say, we are not crazy.

“Are you happy as a farmer?” [he rhetorically asks my research assistant, a university student spending his spare time working on his family's land]

The younger generation strive for employment in a secure government job, in the private sector, or for any other profession unrelated to agriculture, something their parents' generation is generally supportive of. There has been a strong shift of livelihood priorities away from farming, both in response to new opportunities in the off-farm sector and also out of sheer necessity: land holdings have become too small to rely on farming as one's main source of income. Despite the high commercialization of crop production, farming is losing its relative importance: in 2014, less than one-fourth of the average household income in Nagar was derived from agriculture (Spies 2018).

Economic considerations aside, certain intangible factors have played an important role as well. Modern ideals about development and lifestyle have increasingly gained a foothold in the community through media, education, mobility, development agencies, and international and domestic tourism. As an informant from Nagar put it during a visit to Germany: “Nagarkuč [people from Nagar] behave like city people, even though they live in villages” (Field Note, Berlin, March 1, 2017). Especially younger Nagarkuč consider farming an outdated, backward profession, while much social prestige can be gained by becoming a successful businessperson, by landing a higher-ranking government job, and increasingly through one's educational achievements too. Besides the shift toward cherry orchards with low labor input, various other changes in farming practices can be observed as a result of these evolving livelihood priorities and newly discovered aspirations away from agriculture. These changes can be described as a

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2 Estimate based on the abovementioned population increase from 25,000 to 60–70,000 inhabitants since 1972, and yet only a small expansion of cultivated land.

form of de-intensification, as farmers reduce labor input and accept production decreases as a trade-off.

Elder farmers, who still highlight the importance of agriculture as an economic basis of Nagar life, often complain about a general loss of effort and motivation in the farming practices of their fellow villagers. As an elder in the village of Sikanderabad explained (Field Note, Sikanderabad, September 20, 2014):

The crop productivity has decreased. In the past, when people like me were young, we worked hard. Nowadays, young people don't pay proper attention to crop production, so the production has decreased! So it is important to work hard.

Generally, there appears to be limited enthusiasm among younger people to invest their time and energy in getting the most out of the land — even if they have no other business to attend to. Moreover, traditional farming skills and know-how are no longer passed down to younger generations, as an elder informant from Hopar described: “The main thing is that old people know about agriculture, but young people don't anymore” (Field Note, Hopar, April 19, 2014). As an example of this observed decline in sophisticated cultivation practices, respondents often referred to irrigation: farmers adopt their irrigation schedule to their convenience, rather than to crop requirements, and often under- or overwater their plants. This negatively affects yields — not only through reduced plant growth, but also through increased risks of pests and plant diseases.

In Sikanderabad, elders report that they used to sow wheat already in October or November, as still practiced in Minapin, in order to increase yields and to achieve an earlier harvest. Today, most farmers in Sikanderabad sow wheat in the spring, with a major reason for this change of practice being the reduced labor requirements and input costs: rather than ploughing some fields in autumn for sowing wheat and others in spring for planting potatoes, it is less costly and time-consuming to plough them all at once. Generally, ploughing seems to have become less frequent: In the early 1980s, Whiteman (1985: 35) observed that in Gilgit District — which, by then, included Nagar — fields sown with spring wheat were usually tilled with oxen-driven ploughs both in autumn and spring. In Nagar today, fields are commonly ploughed only once per year — even though the practice has become much easier through the proliferation of tractors and mechanical ploughs occurring since the 1980s. Thus, mechanization has not, as one might expect, necessarily led to more intensive tilling practices.

Another case in point for the decline in sophisticated practices is the preparation of soil ridges for the irrigation of potato fields (see Figures 5a and 5b below). While the traditional water-saving technique is to manually divide the fields into small rectangular plots for individual irrigation, farmers are now increasingly shifting instead to the labor-saving method of preparing long soil ridges with the help of a modified mechanical plough. Even in notoriously water-scarce villages such as Sikanderabad, this “modern” practice is becoming more and more commonplace.

**Figures 5a and 5b: Handmade (a) and tractor-made (b) soil ridges for potato cultivation in Pheker and Minapin, Nagar District.**



Source: Photos taken by the author himself, April 8 and March 24, 2015.

Note: The arrows illustrate the water flow during irrigation.

In Minapin and Hopar, respondents also reported significant declines in yields of alfalfa, cultivated mainly on the slopes above the settlements, explaining it as resulting from a lack of care: out of convenience the slopes are often overwatered, and farmers abstain from regularly reseeded the crop and from occasionally renewing the plants to maintain high yields. Another observable change that can be described as a form of de-intensification is the abandonment of cropland: more remote fields, often located around seasonal settlements situated in close proximity to pasture areas, are increasingly being left barren. Personal observations between 2014 and 2016 revealed many abandoned field terraces around Hopar, Minapin, and Pisan; similar changes have likely occurred in other parts of Nagar too. Again, the primary reason for this development can be found in shifting livelihood priorities, as the cultivation and maintenance of these remote fields are extremely labor-intensive and time-consuming.

Traditionally, remote cropland close to pasture areas is cultivated by shepherds during the summer months — but throughout Nagar, animal husbandry is currently in a process of significant decline. With it having become increasingly difficult to find young men who are willing to spend the summer months in the pasture areas looking after the animals, total livestock numbers have significantly decreased in many local villages in recent decades. In Hopar, for instance, AKRSP (1985) reported a total of 2,054 cattle and 7,849 goats and sheep for the sub-settlements of Brushhal, Goshushal, Holshal, and Rattal (see Figure 2 above) four decades ago. Today, these figures are likely no higher than 1,500–2,000 cattle and 4,000–5,000 goats and sheep respectively (estimates based on Spies 2019: 263). At the same time, the number of people living in Hopar has more than tripled since the 1970s (Spies 2019: 126) — resulting in a major decrease in livestock numbers per household over the years.

Overall, these changes in local practices imply that many farmers follow a strategy of selective de-intensification: they reduce labor input and deliberately accept a resultant decrease in agricultural output. Yet, this is not the case with all described changes. Particularly the shift toward cherry production allows for major reductions in labor input, while at the same time significantly increasing output in the sense of cash income.

Moreover, certain forms of intensification are also evident in Nagar — in the form of agrotechnical innovations promoted by FAO, AKRSP, and the Pakistani government. Inspired by earlier successes on yield improvements through the Green Revolution occurring on the plains of Pakistan, new semidwarf varieties of high-yielding wheat were introduced to the region in combination with subsidized mineral fertilizer (AKRSP 1989; Husain 1992; Whiteman 1985). While these innovations were only slowly adopted — among other reasons, due to their inhibiting effect on straw production — the majority of farmers in Nagar now cultivate the higher-yielding semidwarf varieties and apply chemical fertilizer. However, this development is inextricably connected to two other processes that



would gather momentum in recent decades: first, farmers only began the large-scale use of mineral fertilizer with the commencement of commercial potato production in the 1990s; the largest share of this new input is consumed by potato production due to its higher profitability. Wheat, the target crop of the intensification endeavors of the 1980s, is not a priority anymore. Second, the decline in livestock numbers has significantly reduced the availability of farmyard manure, with farmers having to compensate for the resultant loss of soil fertility by using mineral fertilizer.

Furthermore, through government-supported credit schemes, the 1980s were a period of significant agricultural mechanization: by the early 1990s, the majority of farmers had access to tractors with mechanical ploughs and wheat threshers. Today, the vast majority of farmers in Nagar rely on agricultural machinery for ploughing their fields and threshing wheat — usually by renting it from fellow villagers who invested in the machinery. While this process of mechanization should not be considered agricultural intensification — the use of tractors did not lead to an increase in production — it has significantly mitigated the problem of labor shortages among farming households.

Overall, Nagar has seen a tendency in recent decades of farmers shifting away from sophisticated, labor-intensive production practices, primarily as a result of changing livelihood priorities. However, these developments do not mean that farmers will entirely abandon crop production in the near future or leave it in the hands of a few specialized large landholders: households usually keep their land as a valuable asset, while selling farmland to outsiders — even if they belong to a neighboring village — is highly disapproved of by local communities. Thus, while farmers do not see the point in increasing productivity at any cost, farming is still considered an important safeguard of local livelihoods in the dynamic sociopolitical environments of both Gilgit-Baltistan and Pakistan at large.

### **From general pathways to factors and actors**

Farming systems in Nagar District have been subject to far-reaching changes that can only be understood when looking at the broad variety of factors and actors that have shaped this remote mountain community in recent decades. A specific interplay of social and economic developments has led to complex changes in farming systems that I have summarized as processes of commercialization on the one hand and of a certain de-intensification of farming practices on the other: farmers have shifted from predominantly subsistence production to the cultivation of cash crops, while simultaneously investing less time and effort in sophisticated and productivity-enhancing practices. Both phenomena have much to do with the emergence of new mobilities — of people, goods, ideas — that have affected farming practices in manifold ways. The observed commercialization would not have been possible without major improvements in road access, but migration has also played an important role in the formation of new market networks by local

traders. Moreover, I have outlined the importance of migration and the emergence of new livelihood opportunities, lifestyles, and ideals in shaping farmers' decisions to shift to less labor-intensive practices too.

These multifaceted developments reveal a considerable contradiction between the growth- and productivity-oriented agricultural policies of Pakistan and local realities on the ground. As this case study has shown, for smallholder farmers the maximization of production is not necessarily a priority: households have to use their labor resources wisely, and there is often good reason to de-intensify farming practices as a trade-off for economically more attractive — and socially more rewarding — opportunities in the off-farm sector. In practice, this means that policy interventions to enhance the “production of critical food items mainly in the remote areas of Pakistan” (Government of Pakistan 2014: 66) are not bound to work well if farmers do not see the worthiness of investing more time and effort in something that may only slightly increase their overall household income. Moreover, measures to further capitalize on “the potential of mountain agro-ecological zones” (Government of Pakistan 2018: 1), for example through the promotion of higher-value fruit production, are only meaningful when taking into account farmers' own priorities in light of recent socioeconomic developments. For instance it would make sense to promote extensive rather than intensive orchards, which not only require less labor and other inputs but are also more adapted to the local environment and socioeconomic context.

While this paper focused on Nagar District, these findings may also be relevant for other parts of Pakistan: particularly — but not exclusively — those in mountain areas, where some of the identified key factors and processes also prevail. Smallholders still constitute the vast majority of farmers in Pakistan, and the decrease in landholdings per household as a result of partible inheritance has been a common phenomenon across the country — as have the shifts in livelihood priorities toward off-farm incomes and in the aspirations of younger generations away from farming (see, for example, Farooq 2014; Mughal 2019). The close interrelations between farming practices and wider processes of social change need to be properly understood in their local manifestations before making assumptions on appropriate agricultural-development interventions. Rather than promoting agricultural growth as the overall policy objective, it may be more beneficial to follow more holistic approaches to rural development that focus on safeguarding rather than further exploiting the agricultural resource base while also supporting the aspiration of local farming households to diversify their livelihoods.

For this purpose, there is a need for more case-study-based research on local agricultural developments that avoids the narrow productivity lens that also dominates much agriculture-related scholarship in and on Pakistan. More generally, I argue that to properly understand the situation on the ground, postulating specific pathways should be avoided altogether by following a more radically empirical research approach. In this paper, this was attempted through the

lens of agricultural assemblages. A key principle of the assemblage approach is to reject any predefined development trajectory, instead emphasizing the diversity of factors and actors that need to be taken seriously when investigating — and trying to influence — change. The degree and type of effect each of these contributing elements has on changing farming practices can only be assessed through empirical observation. An empirically guided and open research approach not only avoids imposing a “deterministic template” (Brookfield 2001a: 199) on very complex agrarian developments but also helps identify alternative, less resource-consuming strategies that make sense for local farmers. Such approaches have been neglected by the agricultural-intensification policies (including sustainable intensification) that continue to be favored by policymakers in Pakistan and elsewhere.

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