International Labour Organization

1919·2019

EIGHT WAYS TO GROW NEPAL'S AGRICULTURAL SECTOR

A RAPID MARKET ASSESSMENT AND RANKING OF AGRICULTURAL SUB-SECTORS

- TEA
- DAIRY
- CARDAMOM
- FRESH VEGETABLES
- POND FISH
- GOAT (MEAT)
- GINGER
- LENTILS

the LAB
MARKET SYSTEMS DEVELOPMENT FOR DECENT WORK

DANIDA Nepal-Denmark Development Cooperation
UNNATI | INCLUSIVE GROWTH PROGRAMME IN NEPAL

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First published 2019

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ISBN: 978-92-2-133721-8 (print)
978-92-2-133722-5 (web pdf)

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Printed in Switzerland.

Contents

Acronyms

CBS	Central Bureau of Statistics
CCI	Chamber of Commerce and Industry
CEAPRED	Center for Environment, Agricultural Policy Research, Extension and Development
CTCF	Central Tea Cooperative Federation
FGD	Focus Group Discussion
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
ICIMOD	International Center for Integrated Mountain Development
ILO	International Labour Organization
MEL	Monitoring, Evaluation and Learning
MFI	Micro-Finance Institute
MPI	Multi-Dimensional Poverty Index
NCF	National Cooperative Federation
NEFSCUN	Nepal Federation of Savings and Credit Cooperative Unions
NTIS	Nepal Trade Integration Strategy
MOAD	Ministry of Agriculture and Livestock Development
RMA	Rapid Market Assessment
WHO	World Health Organization

Units of conversion

Calendar

The Nepali calendar is lunar and follows a different calendar system than the Gregorian/Western calendar – also respectively referred to as Bikram sambat (BS) and Anno Domini (AD). According to this system, the Nepali calendar 'started' 56 years before the Gregorian calendar, with the Nepali new year beginning in mid-April. Like the Gregorian system, there are 12 months, each month beginning around the middle of a Western month.

In Nepali reports and databases, both calendars are used interchangeably – where data is presented against Western years (with a forward slash between the two years), this has been converted from a Nepali calendar year. For example, the Nepali year 2075 corresponds to mid-April 2018 – mid-April 2019 and would be shown as 18/19.

Western	2018	2019

Nepali	2075	2076

Units of measurement

Nepal has a number of local units of measurement that are used in different parts of the country and are mentioned at points in the report.

1 ropani	508.74 m^2
19.65 ropanis	1 hectare
29.53 kattha	1 hectare
1.48 Bigha	1 hectare

Acknowledgements

The proper completion of this report would not have been possible without the ILO staff from the Geneva and Nepal offices – Merten Sievers, Nabin Karna, Elisa Mandelli and Isaac Cowan-Gore. Thanks in particular go to Nabin and his office which helped arrange much of the domestic transport and other logistics during field visits.

Though it would be a challenge to list all of the people involved individually, the consultants would like to acknowledge the generous amount of time and insight provided by each and every person, as well as their willingness to adjust their schedules to make themselves available, often on short notice. These include members of government at national, province, municipal and ward level; leaders of various organizations in the cooperative, government and private sectors; members of aid-funded programmes; donor representatives; international consultancies; and of course the many women and men (young and old) that participated in the focus group discussions throughout provinces 1, 2 and 3. It remains a challenge to capture such a wide variety of perspectives but we hope that this report properly represents the views held by those we spoke with.

Source material

Sources for graphs, tables, maps and pictures are listed alongside the image themselves. If absent they were developed (or in the case of pictures, taken) by the consultants.

1 Summary

This rapid market assessment (RMA) was conducted between mid-October 2018 and end of January 2019 on request of the ILO Nepal office. The context of this assessment was the completion of the UNNATI Inclusive Growth Program, rounded off in December 2018 and for which the ILO led one of three components. The UNNATI program included four value chains; dairy, orthodox tea, cardamom and ginger. The assessment was requested given the interest of the ILO Nepal office, together with the Ministry of Agriculture and Livestock Development (MOAD), to build on the experience and successes of the UNNATI program, though potentially selecting other, or additional, sectors to focus on.

It was agreed in the ToR that the geographic focus would be on provinces 1, 2 and 3. The logic of this choice was two-fold; the UNNATI program had been active in these provinces, in part because there are already so many ongoing programs in Western Nepal, and in part because this would allow field visits to cover both the sectors in the UNNATI program as well as other identified sectors. The overarching objective of the assessment was to identify sectors that have the greater growth potential, and therefore opportunity to improve income and quality of jobs.

The report is structured as follows:

Following the executive summary contained in this section, section 2 provides a description of the methodology and limitations of this Rapid Market Assessment. Section 3 then provides a broad-based context within which the Nepalese agricultural sector exists and then moves down stage-by-stage to become more specific, providing a summary of some key agricultural support services (though by no means exhaustive) and then drawing some key conclusions from trends across the eight selected sectors. Section 4 is broken down by sector to assess each of them stage-by-stage along their supply chains. These sector-specific assessments are the basis for the recommendations provided in section 5, which are both sector-specific and multi-sector ranging, with a view to helping identify where interventions could be better designed to support multiple sectors simultaneously rather than keeping them separate.

1.1 Agriculture, support services and labor in context

The agricultural sector is the highest employer in Nepal at 66% of the population, though this figure includes a very diverse array of quality of jobs that includes everything from subsistence to (small-scale) enterprise farming and wage-employment that is seasonal and part-time to permanent. Together with remittances, the more commercial-oriented end of farming (including in smallholdings) has helped reduce poverty in Nepal over the years, while primarily subsistence farming and on-farm labor has helped people survive.

While the government's strategy to help raise farmers from subsistence to small-scale enterprise farming is the right one, the agriculture sector will continue to face a number of challenges. It competes in a market-place where low barriers to trade and transport costs mean global competition in (low perishability) commodities. It faces increasing risks from climate change and land fragmentation. And, while federalization will likely benefit the sector in the long-term, the transition which has largely removed direct support services to rural farmers is challenging in the short-term. With off-farm labor in cities and abroad offering better and more consistent income, the workforce in agriculture is ageing, feminizing and declining.

Government and aid-funded programs do continue to provide a wide selection of services however, including access to finance and insurance, tools, fertilizer, inputs and training (though training is not as widespread as before). Support of both cooperative and private sector structures also benefit smallholders and wage-employed labour, as does the establishment and strengthening of capacity of sector-specific governing bodies. Nevertheless, one of the key constraints in developing agriculture is the comparatively higher and more stable wages that non-farm employment offers. Evidence in the more developed supply chains however suggests that income improvement and their stability can draw people back into the agriculture sector.

1.2 Learning from and across sectors

A sector-ranking tool was developed to enable broader lessons learned to be drawn from across the eight sectors assessed. The tool follows the breakdown by stage as outlined in the sector-specific chapters and ranks each stage on a scale of 1-4 (emerging, establishing, expanding, leading). The intent is not to provide a scientifically rigorous ranking, which would be challenging given how divergent the sectors are, but rather to help understand the relative strengths and weaknesses within and between each sector (see section 3.3 for more detail). The summary of the ranking is provided in the graph below on the left-hand side. Analysis of this ranking together with insight from the sector-specific assessments reveals key insights. More developed supply chains with stable pricing give smallholders greater confidence in investing in production (e.g. part of the process of moving from subsistence to small-scale enterprise). A component of stable pricing is improved transport and storage which in turns helps supply to meet demand at the right place and time. Perishability, while without technology it can be a barrier, once overcome, it becomes an asset as consumers will select local produce over imported options. On a related note, marketing product quality helps decommodify products and distinguish them from lower cost, but lower quality, varieties.

Graph 1: Ranking by sector (from most to least developed).

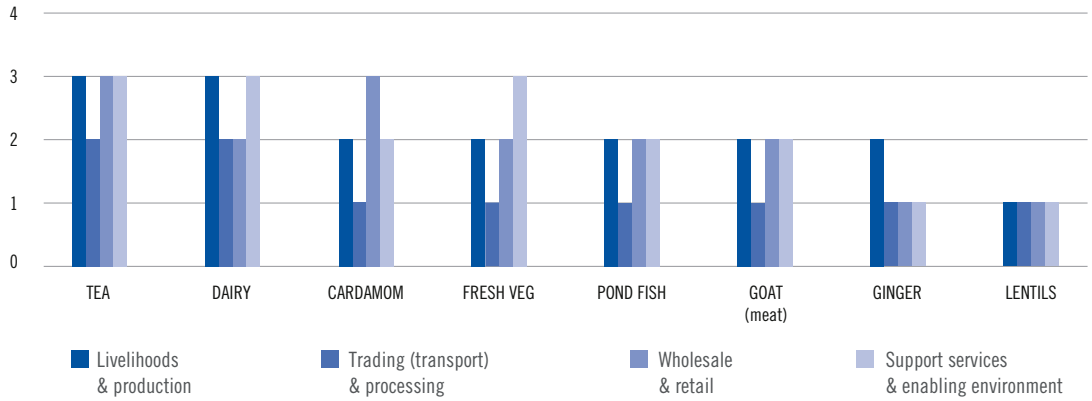


Table 1: Employment by sector[1]

Sector	Employment [1]
Tea	100,000
Dairy	950,000
Cardamom	67,000
Fresh veg	3.2 million
Pond fish	100,000
Goat	3.02 million
Ginger	400,000
Lentils	600,000

1.3 Sector-specific assessments

While the employment figures as summarized in the table above illustrate the scope of households benefiting from various sectors, the more in-depth assessments reveal the variety in quality of income and employment. Though this varies by location, land-size, etc. it can be concluded that there is a positive correlation between the sector rankings and proportion of household income coming from that product; in other words, the more developed and reliable a sector, the more income smallholders can generate from it.
Based on the assessments, the eight sectors can be loosely categorized into three clusters (and are grouped as such within the sector-specific recommendations).

The **tea, dairy** and **cardamom** sectors are all relatively reliable sources of income for many producers and processors along the chain. While quality standards exist and are applied to some degree in each of them, the sectors would all benefit with further rollout of these standards, especially the farmers themselves. In the dairy sector, a majority of the milk is delivered unpasteurized through informal channels to the retail sector or directly to consumers. In a national market where there is a rising demand for dairy products, improved quality control and trust building around brands will help improve the sector overall. Tea and cardamom face similar barriers in needing to increase their reach to retail markets in countries other than India (which dominates wholesale purchase of these products from Nepal) as well as in investing into their own processing plants and strengthening the brand of

1. Employment includes self- and wage-employment, e.g. smallholders at the base of the supply chains and processors, transporters, etc. along the chains.

their products. The tea sector, especially orthodox tea, has invested more in reaching these international markets, but both have a lot of growth potential internationally. In addition, in the case of cardamom, building greater awareness and capacity relative to grading standards at the base of the chain will help improve famers' income.

While **fresh vegetables** are considered a high value selection of crops by smallholders, most are hesitant to invest more in them due to unstable pricing. This is caused by the seasonal peaks and troughs of harvesting seasons together with weak coordination along the supply chain, such that markets become over- and under-supplied throughout the year. As a result prices can be as much as 9 times higher at one point versus another depending on the season and the supply. In this chain as well as in **pond fish** and **goat (meat),** improving capacity of transport and quality control are key factors to encouraging greater investment into the sectors. Both pond fish and goat have tremendous potential for import substitution and require improvements in production to raise yields. For pond fish, there's an opportunity to build on the current momentum given existing government support which is already helping smallholders move into (semi-)commercial practices. In the goat sector, animals are more typically used as a savings and emergency cash resource and scaling up can be a challenge. Nevertheless, improving access to breed varieties and agro-vet services can help supply a large consumer demand, improve rural household incomes and create jobs in the areas of services and input supply.

While both the **ginger** and **lentil** sectors are considered attractive markets, their supply chains are relatively underdeveloped. At production stage both products benefit from being able to be preserved for longer periods, allowing famers to choose on the basis of price whether to sell or keep until next season. Lentils have the added benefit of being able to be sold into the seed market as well, and are nitrogen fixing which helps in crop-rotation. However, both suffer in terms of global competition; more ginger and lentil is being produced and exported around the world. This creates export competition for ginger, and domestic competition for lentils where imports from Australia and Canada undercut prices of domestic varieties. While there is plenty of growth potential in these markets, it is not recommended that an ILO programme focus directly on them.

1.4 Recommendations

One of the challenges within Nepal's agricultural sector is retaining (young) people at all stages of the supply chain, including in production, where the majority of most self and wage employed people in the sector are working. Given off-farm work opportunities for many people, a key part of promoting more small-scale enterprise development and retaining people in the agriculture sector will be the prospect of a higher and more consistent income alongside better and regular work. Given the ILO's core expertise, the key recommendation is to develop policy that ensures agricultural investment is clearly linked to promoting decent work (for both producers and wage-employed) as a means to retain workers and attract people back into the sector. As a part of this, ILO should lead and work with key partners to intervene in six sectors to improve aspects of their supply chains and governance that will strengthen the sectors, improve income and increase job quality and numbers. The two sectors not recommended to be focused on directly, ginger and lentils, may act as part of research to improve agricultural policy that balances sector-specific interventions with supporting smallholder livelihoods that are based around diversified sources of income. Further multi-sector and sector-specific recommendations are listed in sections 5.1 and 5.2.

2 Methodology and limitations

This RMA was conducted by an international lead consultant, Thomas Tichař, and two Nepali nationals, Sichan Shrestha and Suhrid Chapagain. The framing and process of data-collection was developed using two ILO manuals as reference, *ILO Value Chain Development for Decent Work guide* and *ILO Guidelines for Value Chain Selection*. The RMA approach is a model designed by the ILO to relatively quickly gather data on a number of sectors using a market systems framework to help select and prioritize those sectors that are most likely to increase and improve work opportunities through interventions. Data was collected using a literature review, 1-1 interviews with key stakeholders and field visits to relevant locations to conduct FGDs and personal observation.

The assessment preparation was started in mid-October 2018 in writing the ToR and conducting an initial long-listing of sectors based on (government strategy) literature as well as skype interviews with ILO staff and a number of key stakeholders. Based on this, around ten sectors were chosen that were then brought down to eight based on discussions with the country-based consultants and agreement with ILO. Preparations for the lead-consultant country visit were completed in early November with the visit itself lasting four weeks from mid-November to mid-December 2018. All three consultants were allocated 10 days of field time and due to time constraints and the scope of work, most of the field visits were conducted individually. Field visits were conducted in multiple townships and rural areas across the provinces 1, 2, 3 where the program is intended to be implemented. Selection criteria and questionnaire outlines for semi-structured interviews were agreed before field visits took place while the ranking tool was developed in mid-December, after most field visits were completed.
Interviewees included representatives from the following organizations and institutions:

- National-level representatives of key coordinating bodies in the private, cooperative and government sectors.
- Business owners and leaders, and local-level CCIs.
- Government representatives at ward, municipal, provincial and national level.

- At least one local-level cooperative from each of the eight sectors, as well as multi-sector cooperatives and informal farmer groups.
- (I)NGOs and aid-funded programmes currently active in Eastern Nepal.
- Donor agencies.

The report was compiled over 6 weeks between mid-December and end of January, 2019.

Limitations

Time constraint. Due to budget restrictions all country- and field-visits had to be conducted in 2018, which did not provide for much preparatory time. This made the selection of products, and then identifying the right people to interview, challenging at times.

No verification of findings. The findings of this report are based on a literature review and interviews with key stakeholders and FGDs. However, the findings have not been presented back to key stakeholders to confirm findings, collect feedback and gain greater buy-in from them. This wasn't possible due to budgetary constraints and the fact that there was no option for a second country-visit by the lead consultant.

Framing of program. ILO staff in the country office were readily available during the lead-consultant's country visit to ensure the trip ran smoothly. Some preparation on framing of the program – identifying key people to speak with and the literature to review as well as holding prior meetings with donors – would have helped with the framing and narrowing down of the assessment.

3 Agriculture in Nepal

While section 4 looks at the eight selected sectors in detail, this section addresses some of the wider contextual and cross-sectoral trends that affect the Nepalese agricultural sector. It highlights the key external and internal challenges agriculture faces but which must be addressed to help improve the sector, followed by an overview of a number of support services and characteristics of the more developed supply chains. The third part provides a comparative overview of the eight sectors to identify common strengths, weaknesses and opportunities using a ranking tool designed for this assessment.

3.1 Agriculture in context

While the agriculture sector still (self- and wage-) employs around 66% of the population, its contribution to GDP has steadily declined, from 49% in 1990 to 27% in 2017[2]. During this time period, poverty rates in Nepal have also declined from 42% in the mid '90s to 25% in 2010/11[3] (though as illustrated below this differs markedly by province). Research shows that a combination of commercial agriculture, off-farm labor, migration and remittances has lowered poverty rates – though evidently the relative impact of each of these factors varies on a case-by-case basis. However, while commercial-scale farming has been shown to reduce poverty, on-farm labor and subsistence farming tends to function more as a coping strategy than a pathway out of poverty[4]. With this in mind, the government's strategy (as reference in the Agricultural Development Strategy) to promote a transition from subsistence to commercial farming makes sense from a food security, economic growth and poverty reduction perspective. However, effective intervention design needs to take into account that the agriculture sector, for the foreseeable future, will have to compete on multiple fronts with forces that are beyond the control of any program or government. Globalization, in terms of cost of transport, remittances and trade, has been both positive and negative for Nepal. Many point the finger at India as a dominant power, but as is evidenced in the case of

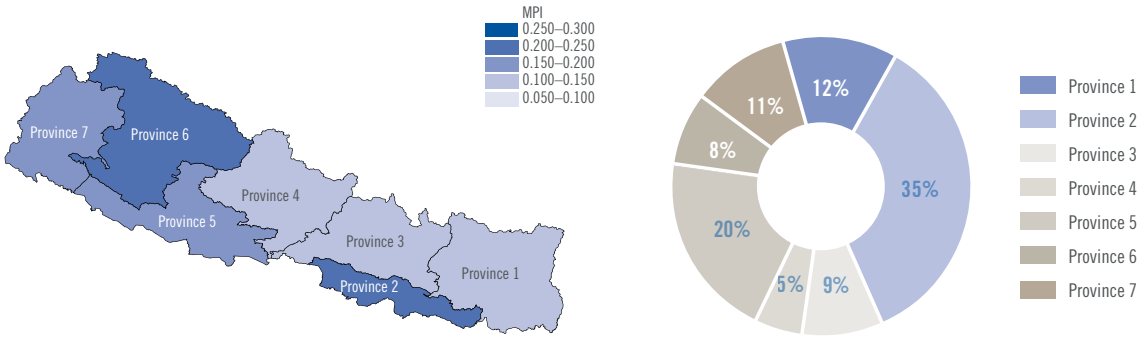
2. World Bank database https://data.worldbank.org/
3. World Bank 2016a.
4. World Bank 2007 and Hatlebakk.

lentils, cheap freight costs mean bulk products produced at scale overseas can, and do, reach Nepal from all over the world. As a relatively small and under-industrialized country, Nepal will continue to face comparative and competitive disadvantages in terms of labor, land and production costs – both with other sectors in the country as well as from other countries, while also having to manage increasing risks from climate variability. These key points are highlighted in brief in this section and help shape the recommendations made.

3.1.1 Poverty across Nepal

The highest prevalence of poverty is in province 2 and 6 within Nepal, as indicated in the MPI (multidimensional poverty index) map below. However, given population distribution across the country, it is in province 2 that the largest amount of poor people reside, as indicated in the pie chart. Taking provinces 1, 2 and 3 together, the provinces that the ILO program intends to focus on, this encompasses a majority of the poor in the country. Of these, over 90% live in rural areas – in other words, they are mainly smallholder farmers or landless laborers and their families.

Map 1: (left) multidimensional poverty index (MPI) map by province, (right) distribution of MPI Poor by Region. 2014 figures.



Source: Nepal Multidimensional Poverty Index 2018, Government of Nepal, National Planning Commission, 2018.

This distribution of poverty is highlighted to illustrate the disparity of poverty across provinces. Provinces 1 and 3 include many farmers who have some reserves to invest into a small-scale business, while in province 2 the vast majority of smallholders are compelled to make decisions based on shorter term needs. The design of interventions must take into account the degree of poverty of groups targeted and be calibrated to peoples' different needs and constraints if they are to be successful.

3.1.2 Labor demand

Nepal's agricultural sector has long competed in demand for labor with off-farm sources of income, particularly when it comes to younger males; labor migration has been a long-standing tradition in Nepal for skilled, semi-skilled and especially unskilled workers, though the patterns have changed over the years. While in the '80s and '90s over 75% of workers sought opportunities in India, between 2009-2015 85% of all registered

> "Everything is here, but abroad is a monthly income and regular hours. Here everything is a risk; you have to be an entrepreneur, lead everything yourself, be flexible, attend events. You have to deal with market uncertainty."
>
> **Male youth participant in FGD, Ward 2, Dhankuta**

labor migration went to the Gulf states and Malaysia[5]. This is accompanied by an enormous rise in migration, from a few thousand in the mid-90s to a peak of 0.5 million in 14/15, according to labor permits requested. The most recent figures of 16/17 were still at almost 400,000[6] though numbers are estimated to be higher given unregistered labor migration to India.

This trend is not likely to decline in the future as remittances officially contribute almost 30% to GDP[7] and they are identified as helping lift (especially rural) households out of poverty[8]. The migration trend is also heavily gendered with almost 95% of labor permits requested by men[9]. And while the main motivating factor is of course income, the long-standing trend has also exerted greater social pressure for men especially to work abroad[10]. This was reflected in discussions during field visits, where younger men first noted that they could earn more abroad, but also acknowledged they would go abroad even though they expected to earn more in agriculture at home (NPR20,000 vs NPR15,000 abroad p/month according to one discussion). As the quote above indicates, it is not just about the amount of income, but also about regularity and stability of income. Another young man noted that after coming back from working in Malaysia he had gained more respect from people in his village. This helped him build his confidence and pursue his interest in dairy farming, which he is now earning a steady income from.

Similarly to labor that chooses to migrate outside of the country, urban jobs within the country also outcompete with on-farm labor. During field visits, multiple accounts were given of workers declining jobs either as a smallholder farmer or as an employee in a factory. A tea factory owner indicated that he is happy to pay the minimum wage of NPR13,500 but if this was raised, he would struggle with his profit margins. However, another factory owner who received assistance from the UNNATI program has not only raised the wage for all her employees (men and women) but also provided them with long-term contracts.

Finally, agriculture tends to have a negative social stigma, such that when young people acquire any kind of education, they are encouraged to seek off-farm employment.

3.1.3 Women in agriculture

As young people, especially men, seek employment in cities or abroad, agriculture is feminizing in Nepal. Women tend to be more disadvantaged in seeking off-farm employment[11], and earn less as farm laborers – one study indicated men would earn NPR300 while women only NPR200 on a daily basis[12]. Additionally, for the women and girls that are left at home, this has generally meant increased workloads as agricultural responsibilities have increased while also maintaining the household work. In terms of whether this leads to a longer-term or meaningful change in household decision-making, there are mixed results: according to one study, in some cases women have taken on greater economic roles, while in others men still make major

5. Labour Migration for Employment. p1,7.
6. Ibid, p8.
7. A lot of remittances are sent through unofficial channels and so estimates are that remittances contribute as much as over 40% to GDP.
8. World Bank 2016b, p6.
9. Labour Migration for Employment. p8.
10. Adhikari & Hobly.
11. Rahut, D, et al.
12. Sunam, R.

decisions over the phone from a distance and any greater freedoms exist only as long as the men are abroad[13].

This was reflected in conversations with women during FGDs, wherein household responsibilities remain the responsibility of women no matter how much they work elsewhere – though there were some notable exceptions of men taking on more responsibilities and there being more equal household decision-making. On the other hand, a group of women that produced fresh vegetables and also sold them stated that they had full control of the income and how it was spent, regardless of whether their husbands were abroad or not. This view was confirmed later by a discussion with a businesswoman who noted that, if women own and control the whole process (e.g. production and sales), they can then control the income. As such, it is a positive change that women have started to own land, in part from remittances and in part due to the government policy of giving a tax concession (25%) if the land is purchased by women[14]. Women tend to be heavily under-represented in cooperative memberships[15], as evidenced by the Central Tea Cooperative Federation (CTCF) which, despite pro-women policy, only has a membership of 21% (see case study box 3 section 3.2.2 below).

3.1.4 Land fragmentation

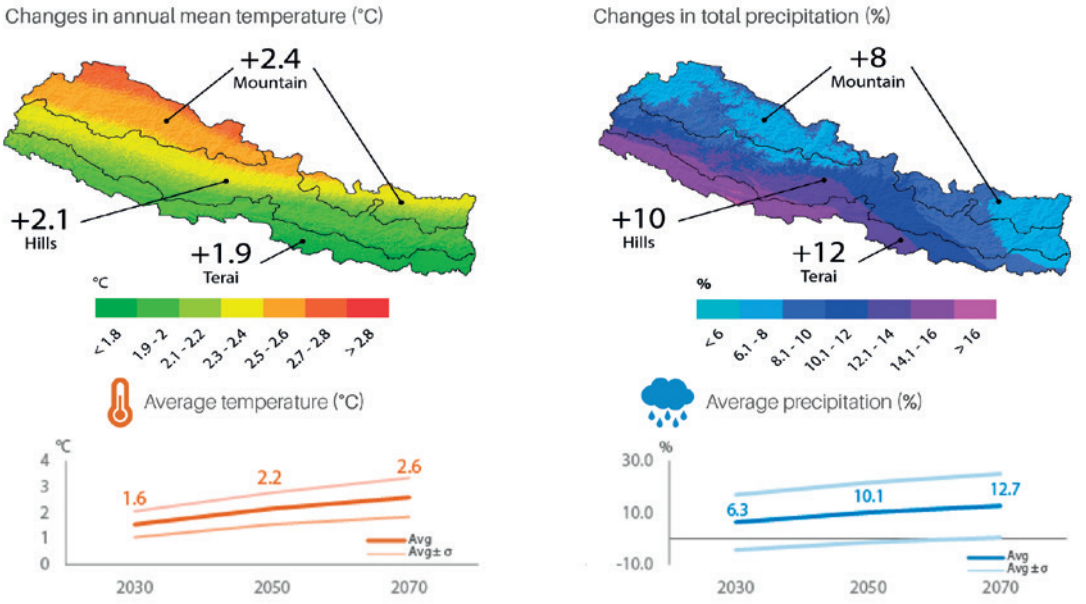
Land fragmentation is widely cited as an inhibiting factor for agricultural development in Nepal, driven by the division of land between siblings during inheritance and the country's unadjusted land tenure system[16]. The result can be a patchwork of land wherein multiple people each own one small piece, or even that some people end up owning multiple small pieces of land spread out over a wide area. This is reportedly being exacerbated more recently due to population growth and infrastructure development, including instances where people choose to urbanize what was previously farm land given the lack of policy restrictions regulating land use that would inhibit farming. According to CBS figures, average land holdings have declined from 1.11 hectares in 1961/62 to 0.68 hectares in 2011/12[17]. Multiple consequences were raised in a study on the impacts of this fragmentation: interviewees noted that more time was spent on farming, raising costs of inputs such as labor, fertilizer and pesticides, and conversely the use of agricultural machinery was limited due to the small size and scattered nature of patches. This has led to declines in current productivity while deterring people from making further investments to potentially improve yields in the future. However, some respondents also reported that there are advantages to land division, indicating that it makes it easier to grow different types of crops in different plots in the same season, which helps minimize the risk of food insecurity[18].
This issue is currently being discussed in government to try to address this but as of the time of writing there is no new policy on the table.

13. Ibid.
14. Adhikari & Hobly.
15. When asked why during an FGD, it was said that only one household member could receive cooperative membership, which tended to be the man, though aspects around different caste backgrounds were also cited.
16. Dhakal & Khanal
17. Dhakal, S.
18. Dhakal & Khanal.

3.1.5 Climate change, livelihoods and value chains

With a relatively under-industrialized agriculture sector, rural livelihoods are heavily impacted by changes in temperature, rainfall patterns and access to groundwater. Given its geographical location and topography, Nepal is forecast to be particularly impacted by climate change. "By 2050, the mean annual temperature is projected to increase overall while projected precipitation data indicate an increase in volume and intensity of rainfall in the monsoon (June–August) and post-monsoon (September–November) seasons as well as a decrease in winter precipitation. Changes in micro and macro climates lead to more extreme events, such as droughts and floods, and to changes in seasonal weather patterns[19]." As the maps below show, temperatures are predicted to rise by between 1.9-2.4c in most of Eastern Nepal and the Terai, while changes in precipitation are expected to be less pronounced in province 1 but more so in provinces 2 and 3. These are already impacting agriculture in different ways in Nepal and though – given the wide variety of climates available due to the three agro-ecological zones – there is some scope for farmers to adapt, forecasts show that impacts will be largely negative for crops, livestock and fisheries[20].

Map 2: projected changes in temperature and precipitation in Nepal by 2050.



Source: Climate Smart Agriculture in Nepal. World Bank, June 2015.

Problems that were already identified during field visits are an increase in diseases and insects, more erratic rainfall, and a decline in yield due to temperature changes. However, few farmers mentioned climate change explicitly given that, from a smallholder perspective, these changes are simply additional risks to the ones that they already experience in terms of managing their livelihoods. As mentioned before, households that have managed to diversify their off-farm income through urban or overseas employment have fared better than those that have had to remain focused on farming – except for the sectors that have gained sufficient support to help prompt smallholders into becoming micro-entrepreneurs, such as in tea and dairy. During FGDs, few farmers indicated that their households depended on more than 50% income from one crop source (with only notable exceptions of those

19. Barrueto, Andrea Karin, et al.
20. World Bank, 2015.

already better off), instead relying on anywhere between 3-8 crop types and labor sources. Indeed, the amount of people diversifying their income has actually increased[21], which makes sense from a risk-management as well as income-smoothing perspective. Various programs take environmental impact into account and ICIMOD (the International Centre for Integrated Mountain Development) has developed manuals specifically on climate change adaptation and livelihoods for various crops, including cardamom, as well as integrating an ecosystems approach (see case study box 1 below for more detail). Diversifying crop types also helps farmers have both steady work and income throughout the year, as well as adopt complementary practices, such that one crop or livestock helps support another. A common example of this is using livestock manure as an organic fertilizer and urine as an insect repellent. Similarly, planting specific flowers and other 'weeds' around plots of land can prevent insects and disease from spreading, as well as encouraging bee pollination. And finally, selecting different varieties of the same species of plant for their greater tolerance to heat or dryer climate as well as their shorter growth cycle, helps mitigate risks.

Box 1: Diversified livelihoods and a value chain approach

ICIMOD (the International Centre for Integrated Mountain Development) works across eight countries of the Hindu Kush Himalaya, with their headquarters in Kathmandu. Their programs support a holistic approach to livelihoods, integrating environmental sustainability with markets and women's roles in sustainable livelihoods. Environmental sustainability is understood as both the impact of climate change on rural livelihoods as well as the impact of livelihood options on the local environment. They therefore bring an ecosystems approach while selecting livelihood options as well as diversification of options and extension to non-farm activities to build resilience and consistent year-round work for farmers. They recently completed a program focused on the cardamom sector, which included developing manuals for farmers to improve adaptation practices, strengthen market linkages, diversify product line and introduce new products complementary to cardamom to reduce dependency on one crop and enhance income while building resilience of the farmers in the mountain.

This design was a program-specific application of their Resilient Mountain Solutions (RMS) approach which "combines economic, social, and environmental dimensions of sustainable development with climate change adaptation, resilience, and preparedness for future risks towards an integrated approach to resilient mountain development." ICIMOD is working with the Nepalese ministries of Environment & Forestry, and Agriculture & Livestock to apply this approach at greater scale through a model called climate smart villages (CSV); together with CEAPRED (the Center for Environmental and Agricultural Policy Research, Extension and Development), villages in all seven provinces are being supported to improve the livelihoods of village members through this more integrated approach. ICIMOD intends to build on this and its other prior experience working with municipalities and communities to help plan climate smart strategies once the provincial planning and budgets are finalised.

This case study was written up based on interviews with Anu Shrestha and Surendra Joshi and from materials sourced through the ICIMOD website.

With this in mind, a market systems approach that focuses on a few specific products and value chains can only be successful if it takes into account livelihood diversification from a sustainable income, labor and environmental perspective that households depend on to minimize risk exposure.

21. Scoones, I.

3.2 Agricultural support services and enabling environment

This section covers a selection of some of the key support services that currently exist for the agriculture sector, based on both literature reviews as well as field observations. It should be noted that this isn't a comprehensive overview but highlights some of the components that stood out and came up regularly during interviews.

3.2.1 Government support services

Based on the 2015 ratified constitution, Nepal is in a transition phase towards a federalized structure that includes three spheres of government: central, provincial and local (consisting of Nagarpalika, or municipal, and Gaunpalika, or village/rural). This transition should in principle provide a considerable opportunity for increased inclusion by devolving power and increasing accountability between 753 local levels of governments. However, in practice the services to rural townships have been removed and the new structures are still not in place – while in turn taxes have been raised, causing a rising cost on daily essential goods and sale of items, such as buffaloes and goats.

However, while direct services have been removed, the agricultural sector and promotion of small-scale enterprises remains a priority for the government. As such, multiple ministries, apart from the Ministry of Agriculture and Livestock Development, continue to provide services, including the Ministry of Industry, Commerce and Supplies, and the Ministry of Land Management, Cooperatives and Poverty Alleviation. Similarly, most major aid-funded programs partner and/or work through government entities (including most programs mentioned in the sector-specific chapters) that focus on regular support services to build the capacity of farmers and other value chain actors. One example of this is the ILO's input to support new legislation on contract farming in the country.

Box 2: Ward facilitation of access to finance

Despite the government mandate that banks provide low interest loans to farmers, in practice few have been able to access this due to the paperwork required. However, in a number of areas ward offices are acting as a bridge between farmer groups and local bank outlets. In Dhankuta the president of Ward 2 supported 22 dairy farmers to get a commercial loan with a 6% interest rate as per the government mandate. His office acted as a facilitator between the farmers and bank staff to ensure the paperwork was properly filled out and to help verify prior income that the farmers indicated they had.

Finally, the Nepal Agricultural Research Council (NARC) is a government-run scientific research body that conducts research to support formulation of policies and strategies for sustainable agriculture. It covers a diverse range including field crops, horticulture, livestock, fisheries, on-farm water management, agro-forestry, related natural resources, socio-economic aspects of the farming system, post-harvest operations, gender issues and policy.

Some examples of the government services are as follows (by no means a comprehensive list):

Mechanization. A CBS 11/12 report showed Nepalese farming to still be labor-intensive, with only 22% of households using a tractor and 20.96% using threshers. In response, the government provides subsidy for a limited number of farmers to purchase machinery, and the Prime Minister's modernization project has targeted commercial farmers in the Terai to improve their mechanization. The government is also starting a customized hiring service of farm equipment, involving private sector and farm cooperatives to help increase productivity.

Fertilizer. The Agriculture Inputs Corporation and Salt Trading Corporation are each government-funded to supply and distribute subsidized chemical fertilizers (nitrogen, phosphorus and potassium) through cooperatives and private dealers. This fulfills about 35% of total requirements while the rest comes from other sources (usually from fertilizer unofficially imported from India). This distribution program has helped stabilize fertilizer prices throughout the country.

Irrigation. With most farmers in Nepal relying on rain-fed farming, irrigation is another critical input to extend harvest periods and diversify commodities. At present, surface and ground water irrigation facilities are available to around 1.43 million hectares (out of a total 2.04 million hectares connected with irrigation facilities), with government planning to provide surface irrigation facilities to a further 122,100 hectares of land. The Ground Water Resource Development Board is responsible for providing shallow and deep tube wells for irrigation.

Access to finance. In 2011 the Nepal Rastra Bank (the central bank of Nepal) gave a directive for commercial banks to disburse 10% of their lending portfolio into the agriculture sector and provide a refinancing rate of 6.5%. Banks are also encouraged to open up rural branches through the provision of an interest free loan by the central bank to pay for setting it up. In practice however, this initiative has taken a while to gain traction, in part because of banks' services not being properly designed for the agriculture sector, and in turn an unwillingness to establish themselves in more remote, rural areas (see section 3.2.3 below on 'access to loans' and case study box 2).

An integrated interest subsidy guideline was published in 2018 by the Ministry of Finance to provide loans to multiple target audiences[22], with the provision being that, if the loan is paid back on time, the government will reimburse 6% of the amount.

Access to insurance. What has been more successful is the 2013 agricultural insurance directive to develop viable commercial livestock and crop insurance products; while crop insurance is taking more time to become established due to the challenges of agreeing to the terms of insurance, subsidized livestock insurance has very much taken off, and was spoken about very positively by both farmers and insurance agents. More recently, index-based weather insurance has been trialed, including through the DfID-funded Sakchyam program that, together with Sikhar insurance company, designed and piloted the Weather-Based Crop Insurance Scheme (WBCIS) in Jumla to provide cover for apple farmers in case of hailstorms.

22. Commercial agriculture and livestock, Literate youth self- employment, Returnee migrant youth program, women entrepreneurship, Dalit community business development, High and technical management, and rebuilding earthquake damaged buildings.

3.2.2 How cooperatives and the private sector support small-scale enterprise

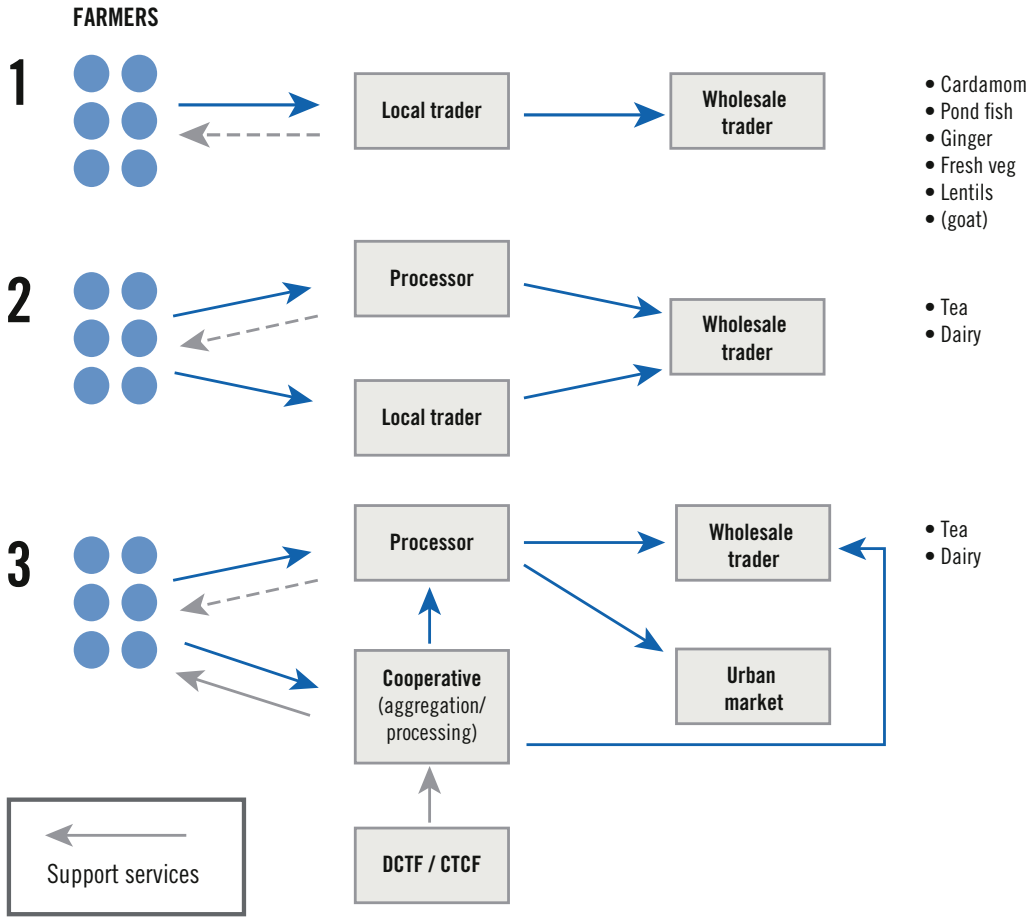
Under the 3-pillar structure of Nepal, the government, the private sector and cooperatives all play a role in promoting agricultural development. During field discussions, contrasts between the strengths of the private sector and those of cooperative structures were often cited, with diverging opinions on which of these two types of actors bore the highest impact on small-scale enterprise development. A number of the value chains however, illustrate that the two models complement one another and that they thus leverage each of their respective strengths. The eight sectors assessed in this report provide examples of greater and lesser degrees of collaboration and how this in turn provides stability and therefore supports smallholders to invest in and improve production. Figure 1 (below) has three models that illustrate how developed the bases of different supply chains are[23].

1. This first model shows the simplest connection to market: farmers sell to local traders who then sell onto wholesale traders. There is very little backward linkage in the form of information or technical support provided. Hence, despite products like cardamom and fresh veg being high value crops, farmers are hesitant to make more than minimal investments into them, as the supply chains provide no price stability. Without greater access to information or degree of oversight, farmers tend to be price 'followers'; they adjust their product output based on rising or declining market prices. However, when many farmers do this, it causes price fluctuations as supply and demand tend to follow one another rather than being synchronized and managed. This in turn makes farmers perceive the product as risky and therefore unable or unwilling to make larger or longer-term investments.
2. In both tea and dairy, farmers were found to have multiple actors to whom they could sell their product, including traders, small or medium-sized factories (e.g. processors) and, in the case of dairy, to DDC (Dairy Development Corporation) which sets a minimum price for their own purchase and, as the largest buyers, also for the sector. Although the context and constraints were different depending on the situation, the general rule of thumb is that, with 2-3 buyers accessible for farmers, the chances of selling their produce is sufficiently high to encourage them to make longer term investments in that sector. However, support services, in the form of simple feedback to farmers on quality or yield, more formalized training or access to loans, existed only on a limited scale.
3. In areas where cooperatives are more developed, they complement the private sector actors and provide much stronger backward linkages to farmers, which in turn usually improves quantity and yield – though in practice the quality of those services vary. The strongest cases of the sector encouraging small-scale entrepreneurship were found when cooperatives provided a variety of support services to their members (which helped improve quality and yield), and when they acted as an aggregation point as well as, in some cases, a processor. These would then link into private sector companies to deliver the refined products to domestic or export markets.

   Though tea and dairy vary hugely in their supply chains, given the nature of the products, in the absence of more specialized (private or government) services, the cooperatives play a key role in strengthening both forward and backward linkages.

23. These models are not illustrative of how all farmers are connected to these supply chains as this will vary based on location. Note that this is more focused on connecting into formal markets, and so doesn't include sales into local village markets.

Figure 1: Three levels of supply chain development



The degree of development in each of these models may highlight an obvious point, namely that with multiple buyers a farmer has a higher chance of selling their product. However, the key takeaway is that it is not the product's market price in and of itself that makes it a worthwhile income for farmers or those further up the chain, but rather how developed and supported the supply chain is overall, as this will ultimately determine how beneficial this market is for the majority of workers involved in it.

As a result, it is important to emphasize that local-level cooperatives that aren't connected to markets will not necessarily benefit farmers. In the case of tea, the Central Tea Cooperative Federation (CTCF) has emerged as an important player in supporting the Nepalese orthodox tea industry (see case study box 3 below). However, tea farmers close to Dhankuta were mostly unable to gain access to markets despite being members of an established tea cooperative that even received support from CTCF (though CTCF doesn't make any purchases from them). Most of them have decided to reallocate their land to other produce as a result even though some had already made large investments in the crops.

Out of a total 108 tea cooperatives registered with the NCF, 101 are members of the CTCF (including five coordinating bodies) spread across 15 districts. Set up in 2010 with an initial 27 cooperatives it has quickly grown over the years, now supporting over 6000 farmer households. Overall its mandate is to support tea farmers and the sector more generally, through access to training, loans, improve income and employment and access to markets, domestically and internationally. It works through a number of national and international bodies to strengthen the sector and promote Nepalese tea abroad. To date. 31 processing factories have been established and, according to the CTCF secretary, about 20% are either organic or rainforest certified.

While only 10% of tea produced in Nepal is consumed domestically about 80% is sold wholesale to India and the remaining 10% to 3rd countries. So while Nepalese tea is in fact drunk internationally, it is usually blended and branded by Indian manufacturers.

With support from government and various donor programs (including ILO support through UNNATI) the CTCF continues to help build a tea industry in Eastern Nepal. It recently launched a tea brand, and is planning to establish a Marketing Facilitation Desk to help link tea factories internationally and market Nepalese tea directly to retailers.

Where are women in CTCF?

According to the most recently provided data, membership figures of the 94 cooperatives include 6115 people, of which just 22% are women. Though this is an overall average and the membership breakdown by gender varies from 0% to 58% in different cooperatives, none are representative of largely female percentage of producers in tea. This is despite gender-sensitive membership rewards wherein women receive a 2% greater share if they join, and if they lend out pay 2% less interest.

3.2.3 Access to loans: MFIs, cooperatives and banks

Access to finance is a major constraint in many developing countries, limiting smallholders' ability to start or grow small-scale enterprises. Despite the challenging geography (e.g. reaching clients in remote, mountainous areas), access to some sort of finance is relatively widespread across the country because of a variety of credit services available through microfinance institutions (MFIs), cooperatives and banks. However, despite them being widely available in principle, actually receiving a loan remains a challenge. A common reason for this is simply that many smallholders lack the technical skills and/or business acumen to produce a product (or selection of products) at a scale that would allow them to either successfully apply for, or pay back, the loan. Beyond this, specific constraints were cited pertaining to each of the loan structures (see table below for summary); MFIs are considered most accessible, but also with the highest interest and least flexible means of paying out – on a monthly basis regardless of the fact that the type of agricultural product or livestock may require a different repayment scheme. People often said that the MFI loans would be used for consumption rather than investment.

Table 2: Lending market overview

	Cooperatives (sector-specific / savings & credit)	MFIs	Banks
Typical loan range[24]	Max NPR50,000 (though often lower)	Max 500,000	Max 2,500,000
Strengths	Lower interest (15-18%) Loans invested in production Platform for facilitating group bank loan	Easily accessed Large array of MFIs (120) drives competitive products	Lowest rates (??) Government-mandated to provide agriculture loans
Weaknesses	Reliance on member savings and restrictive loan policy (10% of total coop credit) limits credit availability	High interest (18-24%) Not structured to rural livelihoods (Inflexible repayment)	High risk perception of agriculture due to lack of sector experience or tailored products

24. Based on FGD discussions, though loan ranges vary considerably in practice, in part due to whether collateral is included or not.

Cooperative loans were always referred to in positive terms, given the trust that is built through cooperative membership. It was also always described as being invested into a specified agricultural product (rather than used for consumption). Development programs like SAMRIDDHI also use cooperatives to help facilitate smallholder access to bank loans. A major constraint of co-operatives was highlighted in discussion with NEFSCUN, which has a policy of making only 10% of the capital of saving & credit cooperatives under its umbrella available for loans so as to prevent them from being over-exposed to defaults. This may be prudent policy in principle, but in practice it means only large-scale member cooperatives can provide enough loans to help their members, and the sector more generally, to expand.

Banks seem overly constrained and unwilling to venture into agriculture in general, and especially into smallholder production; few banks have sufficient experience engaging with actors along the supply chain, except for large-scale commercial businesses. As such, neither their specific loan products nor their wider infrastructure seems well-adapted to provide credit. Some changes are taking place following the government program for banks to provide 10% of their portfolio to the agriculture sector, which is encouraging banks to explore this sector more, and the work aid-funded programs like SAKCHYAM are doing with MFIs, coops and banks to improve loan provision (in all sectors, not just rural). However, by comparison to the MFI and cooperative background, the formal banking sector has comparatively little experience in credit provision. It would make for more sense if banks, MFIs and cooperatives were linked up to complement one another's strengths in loan provision as well as respective geographic coverage.

3.3 Learning across sectors

While each of the eight sectors selected for this assessment have constraints and opportunities that are idiosyncratic to the specific product, there are also inevitably commonalities across sectors that are inherent to any agricultural value chain. More and more government and aid-funded programs and institutions calibrate their services to addressing both sector-specific as well as cross-sectoral issues to help unlock systemic constraints across product lines and supply chains.

3.3.1 A ranking tool for comparing markets

To help identify common constraints and opportunities, this assessment developed a ranking tool to compare and contrast how developed each of the value chains are at each stage. The tool is divided into four stages and has four levels, or rankings, as summarized in the table below (the full table is in annex 6.3). Sectors are too diverse to be easily categorized and can't be ranked on one level, both because of variations within and differences between their supply chains. As such, this ranking is not intended to be a scientifically rigorous analysis of the product chains, but instead highlight the relative scale of development of each of the sectors, and therefore provide a general benchmark for what kind of interventions would be most appropriate, as well as where interventions could support multiple sectors. These learnings are reflected in the recommendations.

Table 3: Sector ranking tool summary

	Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
1. Emerging	Primarily subsistence focused, with sales of surplus. Limited understanding of market needs, seek off-farm income.	Traders mostly in transport, providing limited value-addition or feedback to producers.	Wholesale and retail barely distinguished, little diversification and price unstable.	Support services available but not widely accessible, either through government, coops or private sector. Limited loan or insurance provision.
2. Establishing	Income and price stability sufficient to reinvest in limited technology, improved management leading to better yield.	Aggregation points established, grading / value-addition known but not always applied, seasonal employment.	Quality and product differentiation for wholesale, sometimes retail, some packaging and limited branding.	Support services generally available through farmer groups/coops, government, private sector. Access to small loans and some insurance.
3. Expanding	Good understanding of market requirements, (climate) risks, stable income and more small-scale businesses established. Apply technology and skills to extend seasons.	Multiple buyers along supply chain, quality standards known and applied, employment longer-term.	Wholesale and retail, quality recognized and trusted, products diversified and consumer trust.	Alongside support services, product-specific coordinating platforms established that represent multiple actors along supply chain. Banking and insurance mostly available.
4. Leading	Small-scale businesses resilient through technology, access to information, insurance. Apply GAPs and decent work standards.	Farms compete with larger businesses to integrate production with value-addition, or have contractual agreements. Decent employment along chain.	Economies of scale, quality, branding allow for competitive products in international market. Connected into global market with brands to target consumer preferences.	Sector supported by government, coordinating platforms to ensure quality, labor standards, access to information for all supply chain actors. Banking, insurance calibrated to sector.

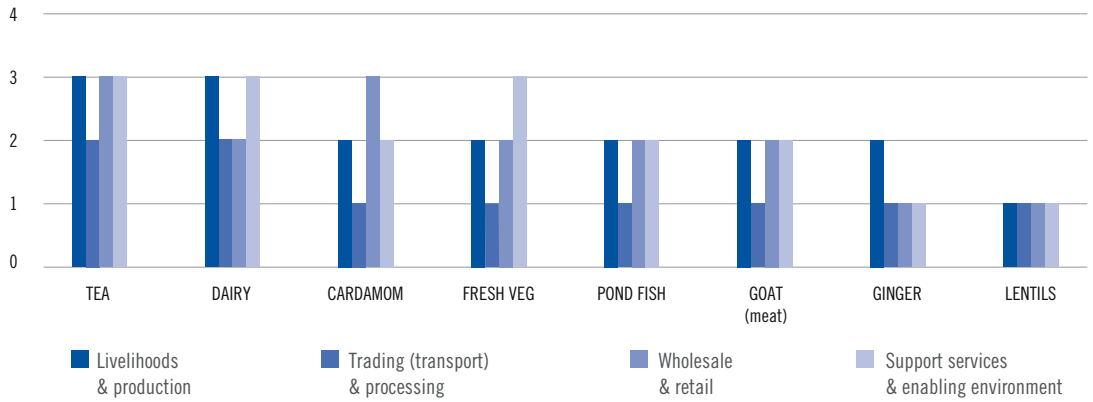
3.3.2 Sector ranking and comparative analysis

The rankings as shown in graph 1 illustrate that there is a range of development across the sectors assessed. Tea and dairy are leaders in establishing relatively secure supply chains, overseen by governing bodies, and government and aid-funded programs encouraging both private sector and cooperatives to crowd into the market. By contrast, in the ginger and lentils sector, the supply chains are relatively weak and fragmented; there is little aggregation or value-addition along the chain, or packaging and differentiation at the end of it. The other sectors in between vary between these poles. A number of key learnings can be derived from this:

Smallholders are sensitive to consistency of price and market demand

There is a correlation between how much smallholders are prepared to invest in any one product and how developed the rest of the supply chain and support services are for that product. Farmers are clearly pragmatic and readily respond to both current market prices as well as price consistency over time; the fact that dairy and tea are each relatively established sectors in Nepal is reflected in a smallholder base that is prepared to take the risk of investing their own money (or losing collateral through a loan) to scale up production and move into small-scale commercial farming in that product. Put another way, there is little value in only focusing on smallholder capacity development without also addressing limitations further up the chain. Without the supply chain as a whole improving, even technically capable smallholders will be disinclined to invest land, money or time into improving their yield in that product.

Graph 1: Ranking by sector (from most to least developed).

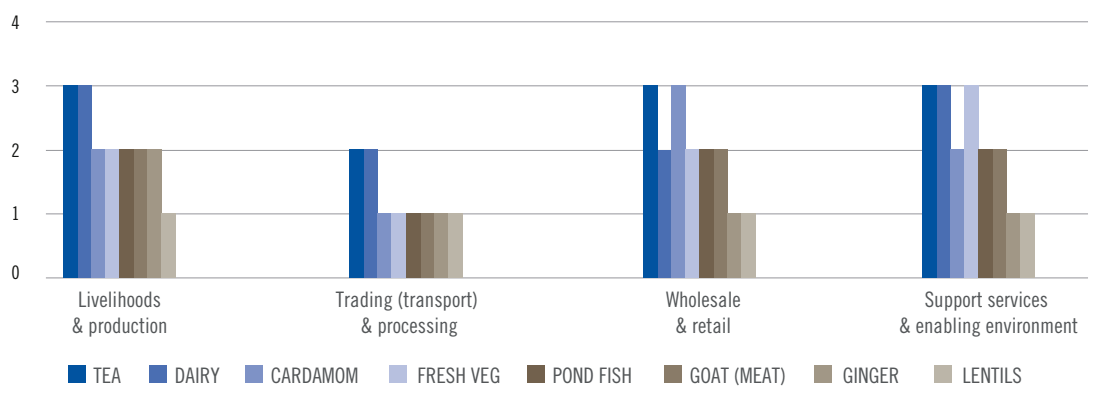


Perishability is both a constraint and a benefit

Perishability of a product is considered a barrier because of the additional costs of transport and storage, but once these are addressed, it can actually become an asset as it helps insulate the local market against global competition – and by contrast low perishability increases exposure to global markets. Nepalese lentils for example, while providing more nutrition than imported varieties, has seen little investment in distinguishing the sector to either domestic or foreign buyers. Instead, the country's lentils compete as total commodities and so are mainly assessed on price rather than nutritional value, and without investment in the sector, the cost of production remains far higher than foreign imports from as far away as Australia and Canada that benefit from greater economies of scale.

On the other hand, dairy, pond fish and fresh veg all have high degrees of perishability and yet are considered high value sources of income for producers. Of the three, farmers are most hesitant to invest into fresh veg because of price instability. This is due to the supply chains generally being limited to traders that provide little value-addition or coordination of supply to markets, causing inadvertent peaks and troughs of produce arriving to markets[25]. The dairy sector solves this in part by the fact that the DDC (almost always) guarantees purchase at a fair rate. This underwrites the industry, allowing private sector and cooperatives to establish themselves and compete, thereby even driving prices up in some areas, to the benefit of producers. By contrast, a number of innovative traders in the pond fish sector have managed to overcome the perishability of dead fish by transporting them live – a great example of private sector innovation.

Graph 2: Sector ranking by stage



25. Due to unsophisticated transport, they also lose around 15% of fresh produce in-transit.

Transport and storage is under-invested in

Graph 2 illustrates the ranking by stage rather than sector, highlighting that, of all stages, transport and processing tends to be under-invested in. Transport and storage constraints are already noted above in relation to perishability, especially in relation to fresh vegetables. Similarly, despite the dairy chain being relatively developed, at peak periods of production 'milk holidays' still take place – whereby buyers refuse purchase because they have no more capacity – even though there is a high national-level demand for the product. With few exceptions in the cooperative sector, buyers will push the risk of overproduction onto the farmers, causing them to take the loss.

Even for less perishable products, lack of appropriate transport and storage can be prohibitive to developing the sector; goats for example are, for obvious reasons, easily transported and looked after and yet some still die along the way because of inappropriate transport. For dried crops, storage will likely become a greater issue in the future as, with rising temperatures, they will need to be kept cool and dry.

Quality promotion attracts domestic and foreign buyers

Tea and cardamom, unlike lentils and ginger, are able to provide a substantive income to producers and other supply chain actors. Both benefit from a natural advantage of yielding high quality varieties in the mid-hills, but have also managed to build their reputation around this and thus secure higher prices. In addition, cardamom, though its value chain is less developed, may be an exception as a Nepalese product in that the country until recently was the world's number 1 producer, so possibly had greater influence over global, and thus domestic, prices.

In the case of tea, foreign aid as well as government have invested considerably in building up the sector, especially to benefit the producers, through a cooperative network in Eastern Nepal. This has managed to grow the orthodox tea sector as a high-end product. Both tea and cardamom are both still subject to wholesale pricing as their retail export sector is still at a nascent stage. Continuing to push their brand and expand exports beyond India is clearly key for these sectors.

More broadly, Nepal will continue to struggle to compete with larger countries (India especially, but also Australia and Canada) in the pure commodity market. By contrast, establishing themselves in niche, higher end markets like tea, cardamom and fresh fish have helped improve income of actors along the chain, both for the wage-employed and producers. Grading and enforcement of quality standards are key prerequisites for reaching niche markets, and will be key to helping grow multiple agriculture sectors.

4 Sector-specific assessments

This section provides a detailed assessment of the eight selected sectors by taking a value chain and market systems approach. Each of the chapters are broken down into an overall introduction of that market, followed by a stage-by-stage analysis of the supply chain; this starts with livelihoods & production, followed by trading (transport) & processing, then wholesale & retail. The support services & enabling environment look at the state of the services and oversight bodies for that sector. These assessments are the basis for the comparative ranking in the previous section.

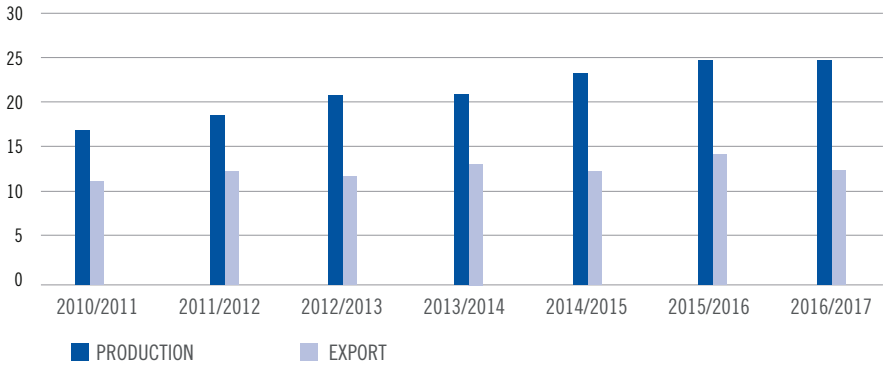
4.1 Tea

4.1.1 Introduction

Like in much of the rest of the world, tea is drunk on a daily basis in Nepal across the country. So while it is one of the smaller players in the global tea market, making up 0.3% of global exports, as a high-value product that has a stable domestic consumer base, its production has increased over the years, as well as its export, though to a lesser degree (see graph 3). While Nepal exports tea to more than 35 countries, its main export is to wholesale buyers in India, purchasing 88% by volume. Its largest buyers are in Darjeeling, just across the Eastern border, which explains the concentration of production in that part of the country (see map 3 below).

Nepal grows two types of tea, called Orthodox and CTC tea. Orthodox is the higher quality type, and while export data differentiates between green and black tea, it doesn't for tea by origin. However, field interviews confirmed the generally accepted perception that the vast majority of exports are made up of orthodox tea, while CTC is mostly used in domestic consumption (see box 4 below for explanation of orthodox and CTC teas).

Graph 3: Tea (thousand tons; orthodox and CTC).

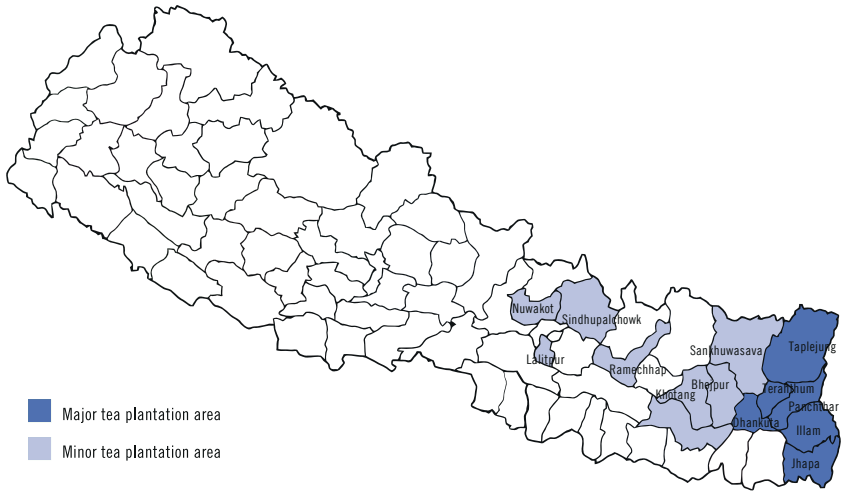


Source: NTCDB, 2018

Tea production comes from both larger scale plantations (or gardens) as well as smallholder farmers, employing approximately 70,000 people directly, and indirectly an equivalent of around 30,000 full-time equivalent (FTE) jobs, the majority of whom are women. Smallholders and larger businesses are both involved in growing orthodox and CTC teas, though more smallholders are involved in orthodox (see case study box 4). There are 157 tea gardens (63 orthodox, 94 CTC). Similarly, there are 44 private tea factories of which 19 specialize in orthodox tea and 25 in CTC tea[26]. Smallholders are mainly organized around cooperatives, of which there are 97 with 6,200 members. 22 of these cooperatives have their own processing units[27].

Green orthodox tea has a greater potential to benefit the Nepalese tea sector given its higher export prices and niche market as well as its longer history of being supported by the cooperative sector and aid-funded projects to support smallholders – including the UNNATI program. A tea brand that has recently been established is also specifically for orthodox tea, while no such equivalent exists for CTC. However, given that the larger-scale tea gardens also employ many people (and especially women), it is included in this chapter.

Map 3: Major and minor tea production.



Source: ITC 2017c

26. ITC, 2017c.
27. ITC, 2017c.

4.1.2 Market overview

Figure 2: Tea value chain map

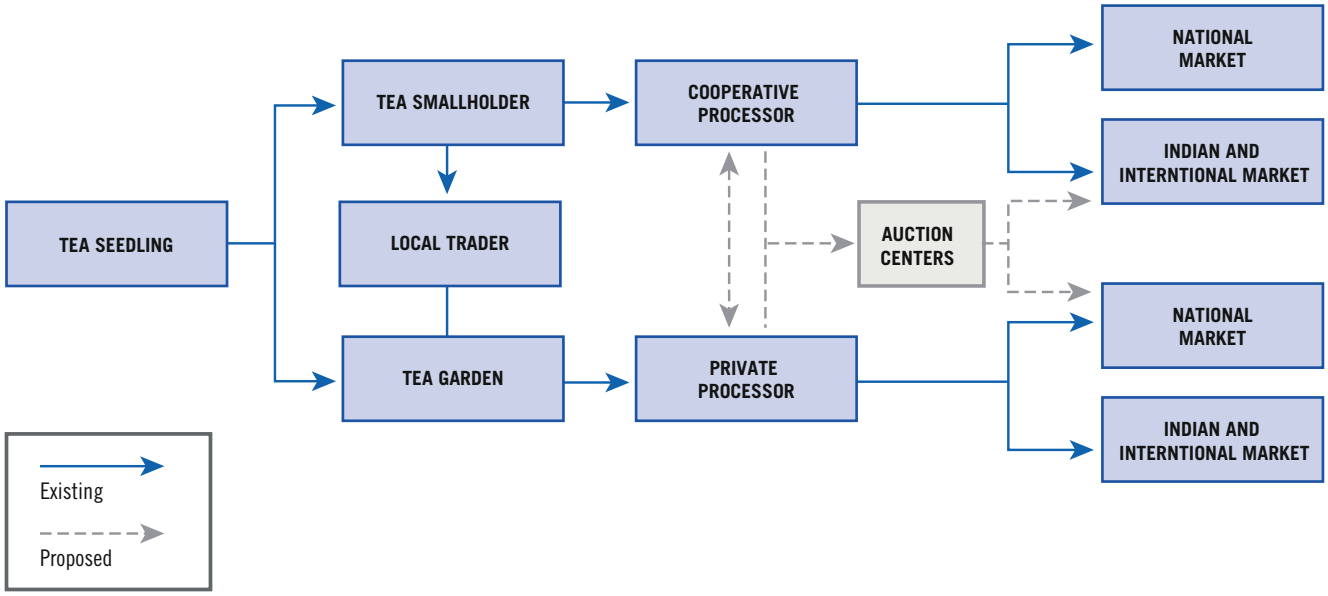


Table 4: Tea sector comparative evaluation

Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
Production and supply chains through cooperatives are generally well established, which delivers quality green leaves to processors.	Limited outreach support to farmers more remotely located from processing units deters them from investing in tea production.	Orthodox tea is sold in bulk mainly to Indian traders, who then package and brand it as Darjeeling tea (along with Indian production).	A dedicated Board (Tea & Coffee Development Board) provides support to value chain actors, but the strategies developed (NTIS, 2016; ITC, 2017) face funding challenges.
Organic certification, Good Agriculture Practices (GAP) exist but are not yet widespread among producers.	Cooperative based processing units are new to this function and require more technical information and exposure for best practices.	Few Specialized teas are as of yet branded and exported globally from Nepal.	Nepalese seedling plantations do not have their own seedling patents.
Cooperatives and private sector actors provide embedded services to support disease management and quality control.	Organic is seen as a potential niche market, but it is costly for smallholders and commercial producers, so private processing units struggle to source enough – and many are themselves not organic certified.	Compliance with quality standards remain a challenge, such as Maximum Residue Level.	Insurance, organic standards and GAP all exist and are in demand in the tea sector, but there are limited amounts of staff in the field to provide these.

4.1.3 Livelihood & production

Tea is grown from seed or cuttings, and after five years of growth, leaves can be plucked from the bush from April to October (hand-picked regeneration within 7-10 days and machine picked regeneration 15-20 days). The plucking is relatively labor-intensive, with pluckers typically working 8 hours a day yielding about 20 kg for high quality (defined as hand-picking the top two leaves and the bud, which is then further processed). Lower quality varieties include more of the stem and additional leaves being picked, or collected with a trimmer.

Box 4: CTC and orthodox tea types

Nepal produces mainly two types of tea: *Camellia assamica* for crush, tear and curl (CTC) tea and *Camellia sinensis* for orthodox tea. CTC tea is cultivated at low altitudes or on the plains of Terai whereas Orthodox tea is grown mainly in mid hill regions. CTC tea refers to a method in which the leaves are passed through a series of cylindrical rollers with hundreds of sharp teeth that crush, tear and curl the tea into small, hard pellets, while orthodox refers to a traditional production process where the plucked tea leaf is partially dried/withered, rolled and then fermented to give a light color, unique aroma and fruity flavor. Ideally, orthodox tea is produced with only the top two leaves and a bud from each branch.

Both CTC and orthodox tea can be refined to make either black or green varieties (as well as others, though these two are the most commonly drunk both within Nepal and worldwide). Orthodox tea normally attracts a higher price than CTC tea because of its quality, market demand and higher cost of production; the table illustrates that on average per hectare yield of CTC is 4.7x as much as Orthodox tea, and while commercial-scale gardens allocate as much land to each of the two types, in total smallholders allocate almost 2.5x as much land to Orthodox rather than CTC, showing a strong preference for the former.

		Plantation Area (Ha)	Production (T)	Production (T)/hect
Orthodox	gardens	7,560	2,600	0,34
	small holders	9,238	3,180	0,34
	total	16,798	5,780	0,34
CTC	gardens	7,725	11,700	1.51
	small holders	3,718	6,760	1.82
	total	11,443	18,460	1.61

Orthodox and CTC yield 16/17. Source: NTCDB, 2018

A smallholder is considered anyone who has a tea plantation under 200 ropanis (10.17 Ha) of land – a much higher portion of land than in other sectors[28] (though most still have a diversified source of income like any other smallholder). Therefore, it has tended to be lead farmers and entrepreneurs that have mostly grown tea, although with a growth of the industry, more marginalized farmers with smaller plots have allocated land to tea bushes as well. Marginalized farmers consider orthodox tea as a regular source of income and typically designate about 20-30% of their land to its production in Eastern Nepal's hilly districts. This is not a widespread practice however, and the allocation of land to tea is closely tied to farmers' proximity to available processing centers. One field visit to a tea cooperative that was too far removed to 'plug in' to any supply chains found that all the members were switching the land allocated to tea to other products, while many of those interviewed in Eastern Nepal said they would like to increase land allocated to it (for more detail and a case study example of CTCF, the tea cooperative

28. A typical smallholding is about 1.5 hectares.

union, see case study box 3 in section 3.2.2 above). When both cooperative and private sector processing units are able to source from the same farmers, this can lead to price competition – while usually orthodox tea averages NPR60/kg, it can be driven up to NPR90/kg while the price of CTC ranges between NPR7-17/kg.

Private sector processing units usually have both their own land on which they employ pluckers, as well as buying in from smallholders. Some factory owners that were interviewed noted that labor shortage is an issue as they have to compete with off-farm labor which pays better. Asked why they don't pay more, one indicated that this would make his business unprofitable. Another however had raised the income for factory workers she employed. By contrast, for obvious reasons smallholders pluck their own tea and so don't have those constraints. Another advantage smallholders that also own cows (for dairy) have is that they can use the manure as natural fertilizer, which helps with organic farming. Many smallholders reported that they produced organic tea without being certified as such due to the cost of accreditation, which meant they couldn't sell it for a higher price.

Incidences of disease were reported in field visits, even though both cooperatives and private enterprises provide services to farmers to manage this and produce high quality green leaves. Insurance options also exist, but because of the limited amount of insurance agents with technical expertise in the field this wasn't widely available in practice. Field interviews also suggested that, with the increase in processing plants established (in part through the UNNATI program), demand from these plants may be a challenge to fulfil.

4.1.4 Trading (transport) & processing

Picture 1: Organic Orthodox Cooperative led tea processing unit in Ilam (**Source:** Republica)

Depending on the distance from farmer to processor, farmers either deliver the tea leaves themselves or the bags are collected by vehicle, sometimes by the processing units or otherwise aggregated by a trader and sold to the processor.

There are only a few private enterprises with a larger processing capacity of 100,000 kg for CTC/ 50,000 kg for Orthodox whereas the majority of both private and cooperative units can process about 2000 kg. There has been a recent increase of processing units thanks to the support from UNNATI and also NTCDB (which has in turn driven price competitiveness) though the technical capacity to use them has been noted to be lacking in some cases, which in turn can have an impact on the leaves when processing them. Good Manufacturing Practices (GMP) and HACCP standards exist but are not widely practiced due to lack of access to training. One processing unit that was visited was found to have an up-to-date awareness in Occupational Health and Safety standards (from ILO UNNATI training), but is still not regularly monitored.

11% of plantations have been organically certified; 30% are in the process of conversion. It was noted that there's a risk in applying for it as if farmers are rejected, they still have to pay for the assessment – and if they receive it, they also have to pay for the annual auditing. Only larger processing units have the resources from sales to be able to comfortably cover such costs.

4.1.5 Wholesale & retail

Unlike cardamom and ginger which have regional level wholesale markets, the Nepal Tea and Coffee Development Board (NTCDB) has launched auctioning facilities in Birtamod but they are struggling to convince tea stakeholders to get involved. Orthodox tea wholesale is currently carried out directly in Silguri (India, near the Nepalese border). Only a small portion of orthodox tea is sold within the districts and in Kathmandu through retail shops to domestic tourists, while the majority is exported to India which is then sold to Indian brands which mix it in with Indian-produced tea. There are only a few private processing units which have gained market traction internationally and thus most of the sector depends on export to India.

However, with strong support over the years from aid-funded programs, tea cooperatives have developed robust supply chains with consistent, quality tea in Eastern Nepal and they are actively pursuing buyers in countries around the world – though penetrating and establishing new markets is recognized as challenging due to international competition. This is an area where more collaboration with the private sector, which has greater experience in reaching international markets, would help.

Another key issue is identifying and patenting seed varieties that are Nepalese by origin. While there are a large variety of seedlings native to Nepal, there is currently no control of their use within or outside of the country. By contrast, in India, various specific varieties such as Gumti, Takda, Happy Valley and PhurvaTsering have been patented, which allows ownership of these to be recognized internationally.

During the interviews, organic certification and getting branded as Nepalese tea to other markets were considered to be the key priorities. A voluntary code of conduct that helps producers prepare for organic certification also exists and that is proposed to be rolled out more widely.[29]

4.1.6 Supporting Services and Enabling Environment

The NTCDB is an institution that promotes tea and coffee value chains in Nepal and helps implement government policies and strategies (National Tea Policy (2000), Nepal Trade Integration Strategy (2016) and Agricultural Development Strategy). Representatives indicated various initiatives are already being promoted (Nepal Tea brand, bilateral interactions, multi-stakeholder platform, etc.) but more funding and programs are needed to support entry into global markets. Alongside various ministries that support the tea sector, the following aid-funded programs are, or have been, involved.

29. Khanal, S. et al.

Table 5: Aid-funded programs in tea sector

Organizations/programs	Area of support
UNNATI	Tea Value Chain Development including support to establish tea processing unit
Agriterra Netherlands	Capacity building of cooperatives
ITC	Export Strategy
SNV Nepal (finished program)	Capacity building of tea stakeholders, Technology transfer and innovation for small holders

Costs of organic certification and annual auditing is recognized as a prohibitive factor for smallholders and small-scale processors to become certified. Third party service providers are working on a group-based accreditation system and helping build the capacity of Nepalese auditors as a means to reduce costs. However, while certification is seen as a catalyst to export tea, farmers are also limited by a lack of access to organic fertilizer and bio-pesticides in larger quantities[30].

4.2 Dairy

4.2.1 Introduction

The dairy sector accounts for around 9% of GDP and provides both fresh dairy and dairy derived products to consumers. Nearly 950,000 families are engaged in milk production, the majority of which comes from buffaloes, delivering 71% of production while the remainder comes from cows[31]. Despite the perishable nature of dairy, the sector has considerable growth potential: per capita availability of milk is about 61L/annum, while actual consumption is just below that at 58L/annum (on average), both of which are far below the FAO recommended minimum consumption of 92L per person per year.
And while annual milk production is rising by around 4%, with increased population and changing food habits, demand for milk and milk products is increasing by 8%. Put another way, of the average 4.8 million liters produced daily, about 15% (or 700,000 L/day) is supplied to dairy companies while 35% goes to restaurants and other entities, and the remaining 50% is consumed by farmers themselves or sold locally. One article indicated that demand for milk and milk products is 800,000 L/day so an additional 100,000 could be supplied to processing plants to fulfill demand[32]. Annual averages however hide the considerable variation in supply throughout the year, determined by the availability of fodder; the period of Aug/Sept until Dec/Jan is referred to as the flush season (up to 875,000 L/day) whereas Feb-March to Jun-July is known as the lean season (down to 490,000 L/day)[33], with a corresponding peak in collection in November and trough in June[34]. However, producers and value chain actors without enough linkages to processors or consumers can struggle to sell milk during the flush season.

30. Adhikari, K.B. et al.
31. FAO. Note in the goat chapter that some goat milk is used to make cheese, but it contributes a negligible amount to the dairy sector.
32. Kathmandu Post. July 18, 2017.
33. Ibid.
34. FAO.

The dairy sector is made up of a wide variety of actors (see box 5 below). Though a lot of the dairy produced flows through informal channels, there has been considerable public and private investment into supporting the sector.[35] The Dairy Development Cooperation (DDC) is a government-owned entity which on a daily basis collects 225,000 liters of milk all over Nepal through its supply chains, including farmers and cooperatives. DDC sets a milk price which, as the largest buyer in the county, is used as a benchmark reference for other value chain actors when buying from farmers and selling to consumers. Because of this, dairy is exceptional in being one of the few value chains where prices for farmers and consumers are well known.

Alongside government support, there has been a recent increase in private dairy plants with medium-sized facilities (that can process 10,000-30,000 L/day), and two larger dairy powder plants have been established that can each process nearly 200,000L/day. However, the powder plants don't function optimally in part because of a lack of consistent supply throughout the year.[36]

Box 5: The major dairy value chain actors

Milk producers (farmers), milk producer cooperative societies (1,750 MPCS), milk chilling centers (MPCS, DDC, private), milk processing facilities (DDC: 31 districts, 55 chilling centers, 225 KLD processing and cheese plants; private dairies 250+, 3 large/ 30 KLD+, 6 Medium 10-30 KLD); milk distribution (DDC, private, informal); milk retailers (DDC booths, private dairies, retailers, informal hawkers.

Source: Joshi & Joshi.

Normally the dairy sector competes with imports of powdered milk, but as of August last year the government banned these imports to help improve domestic production. However, other milk products like ghee, butter, ice-cream, etc. are still imported, mainly from India as well as other countries.[37] The branded products from Patanjali and Amul are well known to Nepalese consumers.

Dairy is generally regarded as a good means to help improve smallholder household income[38] - FGDs indicated that as much as 50-60% of household income can came from its sales – but because of the supply chain constraints and weak market governance, the market still doesn't benefit as many producers as it could. It is also reported that milk is adulterated at various points along the chain (e.g. it is diluted to sell more) – at production, processing and retail nodes.[39]

35. According to the Nepal Dairy Association (NDA), the country's dairy sector has drawn investments of NPR15 billion.
36. Joshi & Joshi. The two processing plants are Chitwan Dairy P. Ltd. and Sujal Dairy.
37. Rimal, Tilak Ram.
38. NDDB.
39. Heifer and Joshi & Joshi.

4.2.2 Market overview

Figure 3: Dairy value chain map

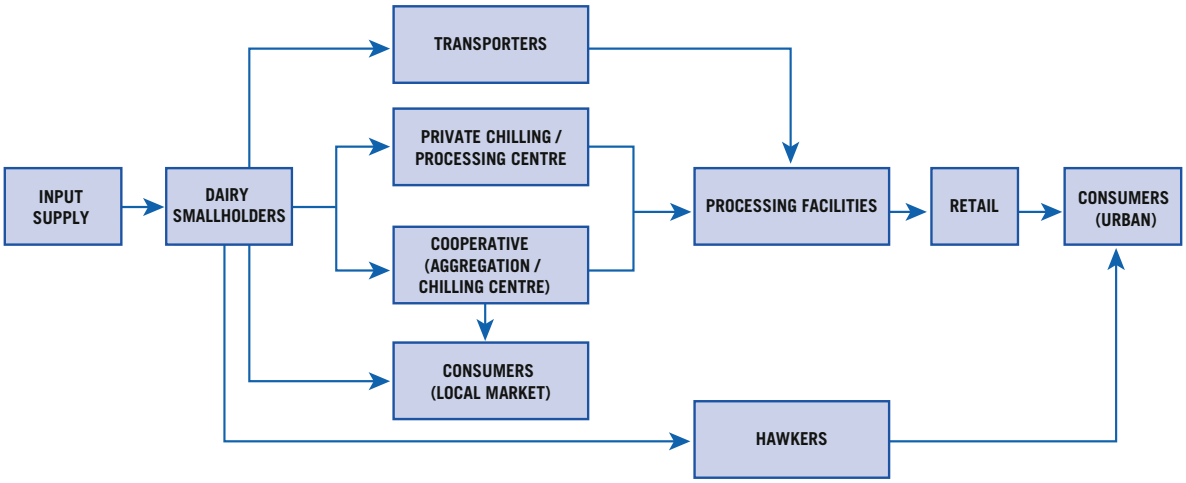


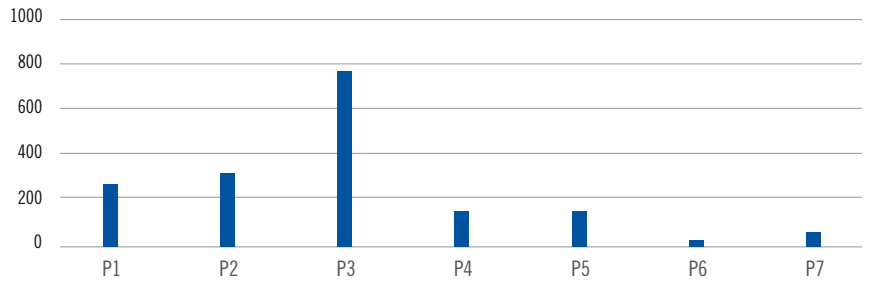
Table 6: Dairy sector comparative evaluation

Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
Cattle/buffalo milk is a major source income (50-60%) for many households. Smallholders are willing to expand but constrained by issues of financing, lack of sustainable market and quality control. Unhygienic supply of milk is still carried out by farmers and testing devices (for milk fat and bacterial content) are not available at all milk collection nodes.	Outside of winter time, transporting milk for more than 6 hours is challenging without specialized chilling vehicles. Increase of private sector small-scale processing plants close to smallholders has helped drive up price (through competition) but disrupted flow of milk to big processing units.	Apart from Himalayan dog chew and DDC products, milk products specializing in different market segments are absent – due to a lack of specialized technology, technical information and understanding of consumer preferences. Reports of milk adulteration at processing plants prompts urban consumers to seek out unpasteurized milk directly from farmers. Real need to improve quality control and (re)build trust.	Insurance services in cattle are already established and practiced. Dairy enterprises are also insured but milk transportation is not. Wide selection of government mechanisms to support dairy value chain actors, including pro-poor cattle raising though ward level interventions. Low level of innovation/ upscaling by value chain actors blamed on import competition and milk product pricing.

4.2.3 Livelihood & production

Dairy producers have already introduced different breeds, with 41% of cow owners and half of buffalo owners including a portion of cross-breed varieties in their stock, which helps increase dairy production. Broadly speaking, there are three different types of producers: subsistence farmers, small-scale commercial farmers and firm-based enterprises. The majority of farmers are subsistence (1-3 cattle), but with government support and investment from overseas returnees there has been an increase in commercial-scale dairy farming (5-20 cattle). There are only a few firm-based enterprises (100+ cattle), most of which are vertically integrated with market nodes (e.g. department store, private dairy, cheese factories, etc).

Graph 4: Dairy coops by province.



Source: NCF

Of the subsistence and small-scale commercial farmers, about 86,600 (or 11%) are linked to one of the 1,732 dairy cooperatives in the country[40], 46% of which are in province 3 alone (see graph 4.; 79% are in provinces 1, 2 and 3)[41].

Despite many subsistence-scale farmers earning around 50% or more of their household income from dairy, they are unable to expand due to land size as well as investment and human resource constraints. However, some subsistence farmers are able to link to commercial-scale farmers and receive a loan to purchase additional cattle, especially if the commercial-scale farmer operates a processing unit as it will in turn help him/her.
At commercial-scale, farmers face constraints regarding technical information and technology transfer. And the limited number of firm-based enterprises face competitive risks and lack of innovation in product development.

Picture 2: Innovative commercial farmers using automatic milking machine in Ilam

An overall constraint is that, while cost of production will vary by location, market prices are set nationally by DDC, giving a natural advantage to some over others; being located closer to a paved road provides a natural advantage, such that private, cooperative and DDC led processing units compete for these locations. Such competition can drive prices above the DDC minimum benchmark, providing a greater income for dairy farmers fortunate enough to be within reach of more than one processor.
Another constraint is that production costs have been increasing[42]; farmers are using 78% straw, green forages, concentrates and grains for animal feed from their own land[43] which can improve yield and quality but also requires investment.

Picture 3: Commercial farmers with own chilling units to minimize risk

Many smaller scale farmers are unaware of good hygiene practices, but they also purposefully adulterate their supply (by adding sugar and/or water) to try to improve their income, which in turn can ruin the quality of all the milk once it is mixed in with others. To try and address this, more analyzers are being introduced at chilling/collection centers although this is still not available everywhere.

40. KUBK.
41. NCF registration data, December 2018. Note that registered dairy cooperative totalled 1,668.
42. Heifer, Joshi & Joshi and field-based feedback.
43. NDDB.

4.2.4 Trading (transport) & processing

Picture 4: Small Processing unit in Dhankuta, preferred by farmers for sales

As mentioned before, dairy gets to market through both informal and formal channels. Local collectors collect milk directly from farmers and deliver by bicycle, motorbike or vehicle. This is because of a lack of availability of specialized chilling trucks, which in turn translates into a more limited geographical range between production and market before the milk goes off.

Producers tend to prefer selling to DDC and enterprises that make products (like the small-scale paneer factory illustrated in picture 4) and are able to guarantee purchase. However, larger processing plants or even cooperative plants may decline purchase because of oversupply (and lack of onward linkages) or delay payment due to lack of liquidity. Having a consistent access to buyers or consumers further along the chain is thus key. Some processing units (both private and cooperative) provide embedded services to supplying farmers, including financing for cattle.

Processing units in general face a number of challenges. Consumer trust is a big issue, as stories go around that processing plants adulterate their milk. Additionally, processing units generally lack the skilled human resources and technology needed to diversify their products and hence cater to different market segments. Nevertheless, there are already some courses from the Council for Technical Education and Vocational Training (CTEVT) that help address this.

There are two powder dairy plants in operation in Chitwan and Pokhara, which helps suppliers continue to purchase and deliver milk (and thus avoid 'milk holidays', or pausing purchase while farmers still produce). However, value chain actors complain that imported low-cost milk powder undercuts this, whereby 20% of supply comes from India.[44]

4.2.5 Wholesale & retail

DDC operates its own booths and retail franchise, while farmers and entrepreneurs from nearby urban areas also operate retail outlets (small dairy shops). Cooperative processing units also sometimes have their own in-house retail outlets, though the majority of milk products are sold through common retail outlets in urban areas. These common retail outlets have a range of products and, apart from DDC products (around 5% margin as their brand is most trusted and sold), other cooperative and private dairy products compete in sales (10-20% retail margin).

The most challenging issue that retail outlets face is customer trust, given the stories of milk adulteration; even though the government has strict regulation, instances of adulteration of varying degrees have been found at each stage of the chain, including retail. This consistently drives urban consumers to seek out unpasteurized milk with as few as possible actors between them and the farmer. Despite the potential health risks, consumers still prefer this to the unknown effects of adulterated products. A recent consumer survey revealed 34% of customers felt there is no improvement in the quality of milk and milk products, but on a more positive note 86% said access to milk supply has increased compared to 5 years before.[45]

44. Kathmandu Post. July 18, 2017.
45. NDDB.

In terms of product diversification, supermarkets still sell imported products like yoghurt, ghee, butter, suggesting that import-substitution of these products could also help improve the local dairy sector.

4.2.6 Support services & enabling environment

The MOAD provides support to actors along the value chain from farmers to retail through different mechanisms, as summarized in the table below, while the Nepal Dairy Development Board (NDDB) is a strong advocate for value chain actors. Private sector and cooperatives both have associations that represent them as well. While the government-subsidized insurance program is helping increase insurance of livestock in Eastern Nepal, coverage for milk transportation still needs to be developed.

A recent directive issued by the Department of Food Technology and Quality Control requires milk producers to implement best hygiene practices when producing, storing and distributing milk to comply with good manufacturing practices (GMP).[46]

Table 7: MOAD support along the value chain

Enabling Actors and Service Providers	Functions
National Dairy Development Board (NDDB)	Policy formulation
Department of Livestock Service	Implementation of government programs
Municipality/ Rural Municipality and Ward	Agriculture Knowledge Center and agriculture technicians. Planning and implementation of programs at municipality and ward Level
Department of Food Technology and Quality Control (DFTQC)	Food and Feed Regulation
National Cooperative Development Board (NCDB)	Cooperative Promotion

46. Khanal, Rajesh.

4.3 Cardamom

4.3.1 Introduction

Picture 5: Cardamom Harvesting (**Source:** FLCEAN)

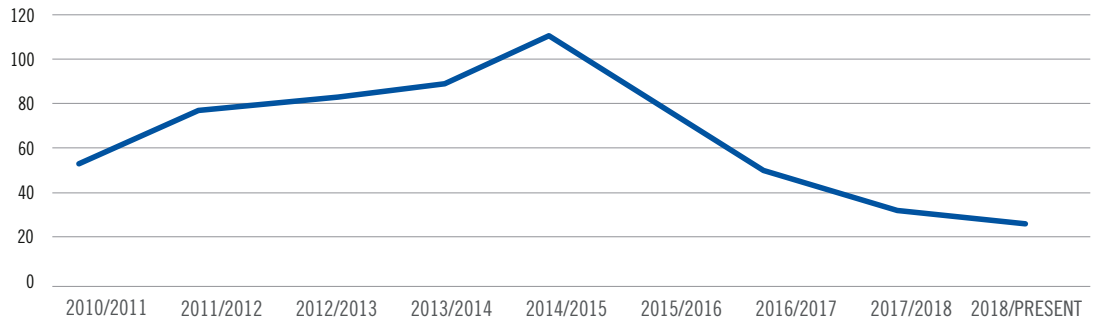
As a spice staple commonly used across Asia and the Middle East, cardamom is considered a high value crop. Nepal's hills provide a naturally suitable altitude and climate for growing the black, or large, cardamom variety[47]. The country is one of the largest exporters, providing an important source of income for the 67,000 farmers involved in its production in Eastern Nepal, as well as the 40 wholesalers in and around Birtamod, the regional trading hub.[48]

Table 8: Cardamom production and land use.

Year	Production (T)	Land used (hect)	Yield per hect (T)
11/12	6,000	16,000	0.38
13/14	5,225	11,501	0.45
2017	4,300		

Source: ITC database.

Graph 5: Average price NPR000/40kg large cardamom.



Source: FLCEAN

2013/14 ITC data indicates that it is predominantly grown in 40 districts in Eastern Nepal (most of State 1) producing 94% of Nepal's total yield. Despite global demand, allocated land and production has actually declined over the years (see table 12). As of 2017 data, it came just below India which produced 4,500 tons, followed by Bhutan with 1,500 tons. New entrants into cardamom production with lower yields are Vietnam, China, Guatemala and Ethiopia. Nepal's cardamom remains recognized as high quality, trading internationally for USD 20+/kg while cardamom from other origins, for example Vietnam, trades at around USD 5/kg. All of Nepal's cardamom is sold wholesale to India which in turn sells it, along with most of its own production, to Pakistan and Middle Eastern countries.

Prices have varied a lot over the last years, with a bubble emerging in the Nepalese market in 14/15 when farmers were receiving NPR 120,000/40kg sack (see graph 5) which has since sunk down to just above NPR30,000/40kg bag. The bubble and the following price drop were likely due to a number of factors, including stockpiling by various wholesalers followed by a flood of cardamom coming from new sources.

47. Among 16 cultivars of large cardamom six cultivares- Ramsai, Golsa, Chibesai, Sambersai, Sawney and Kanti daar, are growing in Nepal (MOAD, 2015).
48. ITC, 2017b.

4.3.2 Market overview

Figure 4: Cardamom value chain map

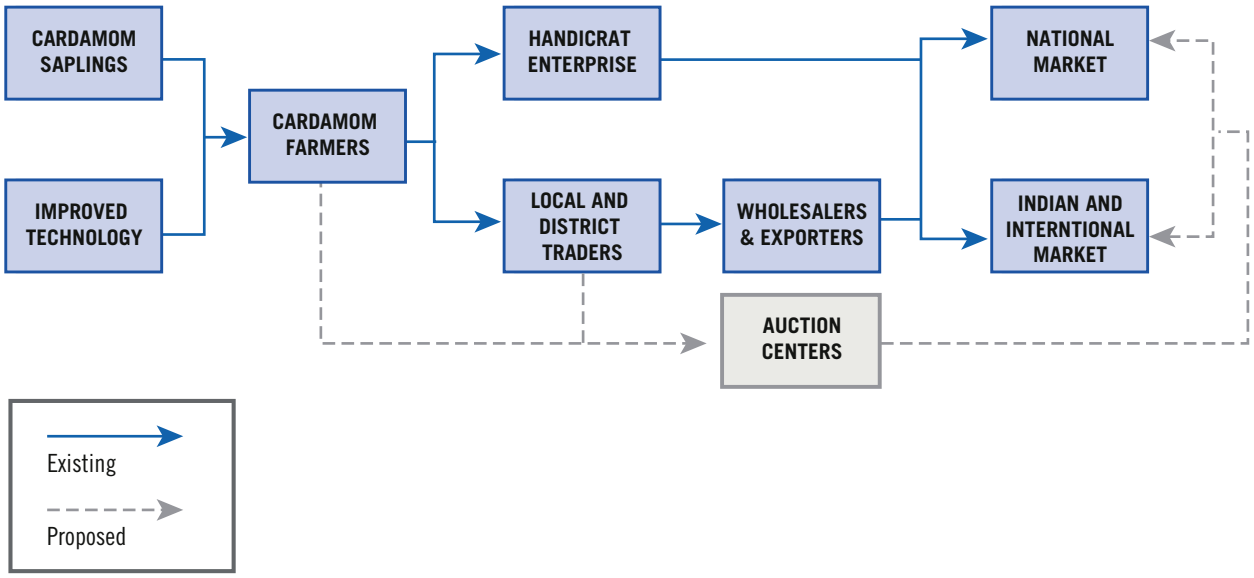


Table 9: Cardamom sector comparative evaluation

Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
Diseases in Cardamom have expanded to new plantation areas due to lack of quality inputs. Organic certification, Good Agriculture Practices are being introduced. Improved (smoke-free) cardamom drying is promoted, but the markets in the Middle East have not given good feedback.	No storage facility support for traders to allow for sales during price-upswings. Quality cardamom trade has increased following introduction and enforcement of quality standards by buyers, as reflected in pricing.	Initial diversification of uses introduced (handicrafts with cardamom leaf) though more can be done – oils, cosmetic, medicinal usage, etc. Nepal is among the largest producers and sellers of Cardamom globally, yet, there is no specialized branding of Nepalese Cardamom in the global market (apart from India).	Adulteration of cardamom with similar looking products reported to occur in Pakistan, thereby decreasing the quality at consumer node; need to distinguish Nepal's high quality (Cardamom Development Board). Lack of technical insurance agents is hindering insurance provision in cardamom production nodes.

4.3.3 Livelihood & production

Large Cardamom is an evergreen, perennial and herbaceous plant grown typically on north-facing hill slopes. It is sensitive to climate and altitude, requiring temperatures of 15-25c, humid conditions and shade, and elevation of between 800 to 2100 meters. The plants survive for 20-25 years, start producing fruit from their third year and mature at 8-10 years, with a full fruit bearing period of 17-22 years. The pods normally vary from 20 mm to 35 mm in size and contain several black seeds inside with a spicy aroma. Large cardamoms are spindle-shaped pods that are light to dark brown in color[49].

49. ITC, 2017b.

Picture 6: Cardamom plantation in Ilam with kiwi intermix

Post-harvest smoke-drying is carried out at production node in a traditional oven (Bhatti) and has a distinctly roasted/smoky smell and taste. While an improved method that removes the smoky flavor has been introduced, the vast majority (95%) still use the traditional method[50], in part because there isn't yet a demand for the non-smoky variant.

Large cardamom is collected between September to November and after drying it can be, in the right conditions, stored for more than one year. Both men and women are equally engaged in cardamom farming, in preparing the farm, planting the saplings, weeding, irrigating or watering, harvesting or plucking the capsules, drying the cardamom and selling the product. It is mostly women who work in processing centers that carry out the value addition work such a cleaning, tail cutting and grading cardamom.

FGDs during field visits indicated that around 60% of household income in Eastern Nepal (Ilam and Paanchthar) came from Cardamom, which has decreased due to yield decline because of disease. Despite this, they are still growing cardamom, but without applying good agricultural practices, including quality inputs, soil management and replacing the older plants with younger varieties.

Aging plants are more susceptible to disease and decline in yield, which has led to enormous decreases in sales for farmers spoken to in Ilam, such that only 5-10% of household income came from cardamom. While in areas where new plantations have been established, like in Paanchthar, there has been a rise in income, although the impact of disease has also been reported.

Table 10: Types of Cardamom disease

Prevailing Diseases	% of total yield affected
Furkey	5%
Chirkey	5%
Rhizome Decay	5%
Bagan Daduwa	30%
Caterpillar	10%
Total	**55%**

Source: Rai and Chapagain, 2014

Soil testing and other studies are carried out in partnership with research institutions on impact of disease and how to improve management practices, including the prevalence of different disease types (see table 14), but this information isn't being disseminated properly to farmers. Similarly, land that has been used for cardamom that then fell prey to diseases isn't left to recover after being cleared, but immediately reused, which in turn promotes the spread of disease.

Nevertheless, sales of cardamom saplings are restricted within the district to avoid the disease spread and serious effort on disease resistant/ tissue cultured cardamom saplings are being discussed.

50. Ibid.

4.3.4 Trading (transport) & processing

There is a network of local and wholesale-level traders that transport cardamom from the various districts to Birtamod in East Nepal, where it is aggregated and either warehoused or sold to Indian traders. Given the relatively large percentage of the production market Nepal and India collectively hold, global pricing is heavily determined by buyers in the Delhi market, the Birtamod traders, and in turn district traders and local traders. At wholesale level, cardamom grading is now fully adopted, but it is not reflected at the level of production; farmers had little knowledge of the three grades and what distinguished each of them, meaning that traders are able to purchase the seeds in bulk and profit off of the quality distinction themselves.

Grading is determined by four factors; a) the size of capsules (the larger the size the better the price), b) Tail cutting (attracts a higher price), c) a moisture content below 12%, d) color and appearance (light brown attracts a higher price). This in turn determines which category the cardamom falls into. As of December 2018 (during field visits), pricing of large cardamom is as follows;

a. Jumbo Jet (JJ), NPR 33,000/40kg bag
b. Standard (SD), NPR 31,000/40kg bag
c. Chalan Chalti (CC), NPR 29,000/40kg bag

After drying, cardamom can be stored for up to a year in the proper conditions before any kind of deterioration sets in. As such, it can also be traded at any time, though farmers tend to have less storage capacity, and a greater need for cash, than traders. It is the traders that tend to carry the price risk as they may choose to hold onto it thinking the price may go up. However, this stock-market attitude to cardamom caused many traders to lose a lot of money after the price dropped from a high of NPR120,000/40kg in 14/15. In discussions with traders, they felt like the current price (between 29,000 up to 35,000/40kg range) worked better as it was more stable and allowed both farmers and traders to make money; farmers put up to 13,000/40kg into production and traders gain around NPR 1,000/40kg on sales, and with this more moderate pricing local traders are able to provide advances, collect money in timely fashion and carry out business with manageable risk.

Picture 7: Moderate grading and tail cutting processing

Picture 8: Smoke-drying (above) and smokeless drying (below)

Box 6: Working conditions at main wholesaler

During a visit with the president of the cardamom trader's association Mr Nirmal Bhattarai, it was observed that he employed around 20 women to do tail-cutting and some other processing at his storage facility in Birtamod. Working conditions were far below decent; there was no furniture or protective gear available and the women squatted on the floor. While some natural light came into the 50m^2 room, it was otherwise quite dark, there was little ventilation and the floor and walls were dirty. We were not given the opportunity to speak with the women.

Drying is mainly done by farmers, though the main wholesaler in Birtamod reported that he also has drying machines and noted many come in without being (properly) dried and would prefer this all be done by farmers themselves. He also noted that, while a heat drying technique which keeps the cardamom's natural, slightly minty, flavor now exists, consumers in the Middle East and Pakistan have become so used to the smoky flavor that they're suspicious of its more purple, less burnt, coloration and flavor (see picture).

Tail cutting and packaging is also carried out in Birtamod before sending it to Indian traders. While the working conditions are not known in general in the sector, during a site visit in Birtamod, it was observed that employment conditions were not met by the president of the trader's association, who has been a beneficiary of the UNNATI program – see case study box 6 for details.

The working conditions at processing nodes: tail cutting, grading and packaging does not meet decent work standards or good processing practices. Case study box 6 is one example of this, though there are others in the sector.

Apart from the cardamom itself, value-added products are being made like handicrafts from cardamom leaves. This is known as "Chandan Fiber" and products like table mats, bags etc. are increasingly popular. Also, cardamom without the capsule (the outer cover) is sold for NPR70-80/kg to the spice industry, while the remaining tail of cardamom after tail cutting is sold for NPR10-12/kg to the incense-making industry.

4.3.5 Wholesale & retail

Birtamod is the major wholesale node market in Nepal, from which 95% of the cardamom is sold to the Indian market, and specifically to traders in Silguri and then Delhi. The major global importer of cardamom is Pakistan. Although there is officially no policy that prevents Nepalese traders from selling cardamom directly to Pakistan, in practice it was reported that large shipments of Nepalese cardamom going by vehicle would be held up for months in transit through India, effectively making the transaction unprofitable for Nepalese traders and ensuring Indian traders retain control of a step in the supply chain. Air shipments have not yet been set up with the Middle East. While there have been bilateral discussions about the possibilities, traditional wholesalers are well knitted through-out the value chain and so it's a challenge to change the current status quo.

In part because of the price peak around 2014, other countries have begun, or increased, their cardamom production (in China and some African countries) though the quality is very low compared to that from India, Nepal and Bhutan. There is a need to keep these separate, as at the moment they are sometimes reaching the consumers having been mixed up, which is a reputational risk for high-quality producers.

4.3.6 Supporting Services and Enabling Environment

The private sector, led by the Federation of Large Cardamom Entrepreneurs Association Nepal (FLCEAN) and Districts Chambers of Commerce and Industries (DCCI) play a major role in providing various marketing and technology transfer services to value chain actors. The government has strongly prioritized such servicesalong with the Cardamom Development Center (CDC) in Fikkal, Ilam to provide services at production node (although the services are not well received and appreciated by the farmers). A separate mechanism is being requested by value chain actors so that government can work through a single window system to prioritize key issues that the cardamom market is facing.

Picture 9: Cardamom Nursery (**Source:** FLCEAN)

Other services like value chain financing are also needed, which would allow buyers (either local or wholesale traders) to pay in cash immediately rather than promising payment only once they've made the sales. Insurance provision for cardamom does exist but it hasn't been rolled out extensively.

Finally, auctioning facilities that were envisioned a decade before have not been established, nor have publicly funded warehouses. While the private traders are facilitating the sector, without more support to the producers on technical capacity and information awareness (such as grading), they carry most of the risk and have little choice but to sell to traders – unlike in other sectors that have cooperatives, which creates competition along the chain.

4.4 Fresh vegetables

4.4.1 Introduction

Smallholders account for almost all vegetable production in Nepal, with 3.2 million vegetable holdings equivalent to 69% of all Nepalese households.[51] Annual production is estimated at about 3.58 million tons, grown on 266,937 hectares.[52] 90% of these smallholders have under 0.5 hectares of land and grow mainly for subsistence (e.g. food security), producing merely 18% of the fresh vegetables sold into market. Of the remaining 10% of smallholders, only 5% derive their main income from them, even though fresh vegetables are considered a high value selection of crops. Per capita consumption of vegetable is 105kg due to increases in production and availability in markets. The vegetable sector contributes about NPR 105 billion (excluding potatoes) or 8.8% of the national GDP.[53] 'Fresh vegetables' includes a wide variety of produce in Nepal; the most widely grown are Pumpkin, tomatoes, chili, cauliflower, bitter gourd, eggplant, cabbage, broccoli, sweet pepper, cucumber, and kohlrabi, and the ones most typically grown for commercial purposes are cauliflower, tomato, cabbage, radish and asparagus beans.

51. Central Bureau of Statistics.
52. Vegetable Development Directorate.
53. Central Bureau of Statistics https://cbs.gov.np

Map 4: Major vegetables production districts of Nepal

Source: Vegetable Development Directorate, 2071/2072 (2014/2015)

Domestic supply is generally able to meet demand, with Nepal importing only 48,000 tons from India, or 1.3% of its total production. It also exports 2000 tons on an annual basis.[54] As a staple part of the Nepalese diet and the perishable nature of such commodities, vegetables need a regular supply to markets. With a selection of different vegetable products, together with use of technologies such as plastic tunneling and irrigation, farmers should be able to spread their supply out over the year, though only a small minority do this in practice. This is because most lack enough land or sufficient capital to be able to make the investment. The sector is also unregulated, such that farmers within similar ecological zones tend to grow and harvest the same produce at the same time. Individual traders in turn do not have the capacity to coordinate overall supply-and-demand. As a result, prices fluctuate wildly so vegetables remain unreliable as a source of income for smallholders. This is reflected in the Kalimati market figures (see case study box 7 in section 4.4.6 below) which illustrate how fresh produce prices vary widely throughout the year. Interviews at various markets including Kalimati further illustrated that prices vary hugely on a weekly basis, depending on the inflow of produce coming from various traders.

With greater consumer awareness of the negative impact on health of (excessive) pesticide use, there is also a growing demand for 'local' fresh vegetables; without standardized certification or other labelling, consumers try to source local varieties, which is another way of describing produce grown without the use of chemicals.

54. Vegetables grown in Eastern districts (Ilam, Dhankuta, Taplejung, etc.) are mostly exported through the Kakarbhitta-Panitanki border to Bangladesh.

4.4.2 Market overview

Figure 5: Fresh vegetables value chain map

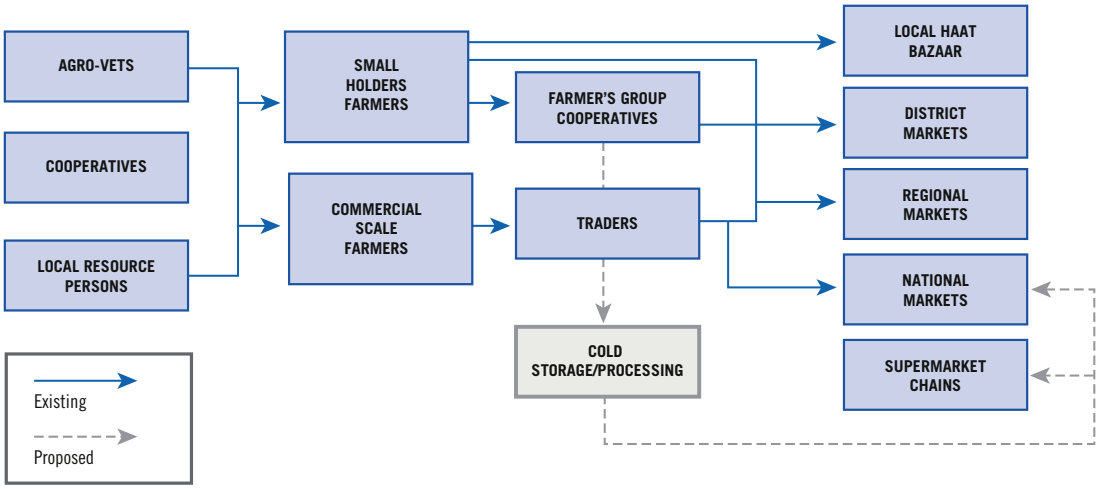


Table 11: Fresh vegetables sector comparative evaluation

Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
Veg grown to supplement income and for 5% of farmers as main business (off-season veg through improved farm management practices).	Smallholders lack production capacity to regularly supply markets.	Large price fluctuations due to unregulated market and little infrastructure for storage.	Inputs (fertilizers and marketing support) generally available through private agro-vets; retail shops exist; more limited through coops to members.
Women are disproportionately involved in production while men control income as they sell the produce.	Limited capacity of existing collection centers compared to that of market traders.	A distinction has been established between the wholesale (regional market centers) and retail (shops, road head, mobile shops selling door to door) in most of the major vegetable markets. Quality is defined based on its origin and grading.	Most farmers have to rely on small loans from MFI and coops with only few able to access agricultural loans at subsidized interest rates through banks, despite great demand.
Farmers use various types of pesticide/ insecticide as recommended by agro-vets. There is less use of bio-pesticides due to high costs and low availability.	Traders generally limited to transport but provide no value-addition.	Diversified consumer preferences allow for price/quality range of produce (with or without pesticide use).	
High demand for hybrid seeds imported from other countries. Nepal lacks production of quality seeds.		Some value-addition (cleaning, grading, and packaging) done by department stores.	
Lack of knowledge and incentives for farmers relative to adequate packaging and other post- harvest management practices		High post-harvest losses due to limited transport infrastructure.	

4.4.3 Livelihoods & production

Input services are generally widely available; private agro-vets exist in almost all parts of Nepal and provide a range of inputs including seed, fertilizer, tools and equipment, and are typically the point of contact for information. The Salt Trading Corporation (STC) is the only business authorized to import fertilizers (DAP, Urea, Potash, etc.) that are made available to farmers through multi-purpose cooperatives at a government-specified price. Farmers are eligible to receive free inputs from the government (and they are also sometimes provided through development projects). Most farmers are now associated with one or more cooperatives for regular savings as well as business promotion.

> "This year I invested about NPR 30,000 in cultivating cauliflower and earned only NPR 10,000 by selling at NPR 8 per kg. I will continue to grow cauliflower in the next season as there is no other option except –'hope for the best'."
>
> **Ms Santa Danwar, vegetable farmer, Kavre, Nagbeli**

As mentioned in the introduction, many smallholders grow vegetables primarily for subsistence on small plots of land (4-8 ropani) while a small minority have scaled up to commercial level by leasing land and adopting modern farm technologies. These are almost all located closer to roads and they produce enough to sell directly into formal markets, e.g. to market traders, while subsistence-scale farmers are typically members of groups or cooperatives that aggregate and then sell onto traders, or individual farmers that simply sell their produce at the local haat bazaar. Some entrepreneurs have taken the 'next step' and started growing vegetables in modern green houses and selling to major market centers.

Table 12: Coops registered with NCF

Province	Agriculture	Veg & fruit
1	1,792	27
2	2,467	6
3	2,301	85
4	880	37
5	1,739	24
6	890	6
7	850	8
total	**10,919**	**193**

One of the strengths of vegetable production is their variety and short cultivation periods, typically around 2-3 months, which helps with a more regular income. The cost of vegetable production can range from NPR 8-20/kg. Other than packing into sacks, value-addition at the farm level takes place irregularly. Some do cleaning, grading, crate-packing and packaging, but during interviews, farmers noted that they do not receive much more for their produce as a result. The sector provides seasonal employment with women mostly involved in production and men in logistics and sales. Except for producers who have consciously switched to organic farming, awareness of proper use of pesticides is very limited so they are often used in excess.

Other than due to the different ecological zones in Nepal (Terai, hills and mountains), there is no specialization in agricultural crops and farmers do not follow a seasonal calendar to take advantage of selling in the off-season, resulting in excess supply at certain times of the year.

4.4.4 Trading & processing

In most parts of Nepal, groups[55] and cooperatives have long-term relationships with market traders and supply produce from their members on a regular basis. There are 10,919 agriculture cooperatives and 193 fruit & veg cooperatives registered in the country (see table 17). Given their informal nature it is difficult to estimate the number of groups. Both structures play a role in aggregation of vegetables while market traders manage the transport to wholesale markets.

There is also a problem of abuse of trust by farmers; when they pack vegetables in jute/plastic sacks (about 50 kg), they keep quality product in the top of the sack and put the lower quality and waste at the bottom and so sometimes cheat the collectors, who don't have the time to check each bag and are challenged to trace them all back later. As a result, collectors have to bear all those losses so they compensate for it when determining the purchase price. There are other losses if the vegetables are not delivered on time due to blockage of road for long hours.

4.4.5 Wholesale & retail

Vegetables are delivered during the night or in the early morning to major market centers in all provinces, usually transported in large trucks (about 8 tons). There, large-scale wholesalers purchase vegetables based on quality and as per the previous day's market price. These are in turn sold to supermarket stores and retail shop owners who visit these centers to make bulk purchases. Other than transport, traders provide little value-addition, with any further cleaning, sorting, grading or packaging being done by retailers.

Alongside these markets, small-scale vegetable collectors in many areas of Nepal collect vegetables from farmers in smaller vehicles and deliver directly to urban retail shops and institutional buyers such as hotels, catering business houses, restaurants, etc. and so avoid the wholesale traders.

Consumers frequently complain about drastically increased prices of vegetable produce. Representatives of the Kalimati market committee indicated that this is because of the lack of consistent supply from producers and weak coordination or specialization across the country, which leads to peaks and troughs in supply and therefore also in price.

4.4.6 Support services and enabling environment

The government's Vegetable Development Directorate (VDD) and District Agriculture Development Office (DADO) are responsible for providing technical services and annual programs to smallholders – though at the moment these are not well-implemented as the local structures are not yet staffed in the transition process. The National Agriculture Research Council (NARC) carries out research on improving new seed varieties and evaluating potential genetic improvements given the geography and soil conditions. NARC also works with the Ministry of Agriculture and Livestock Development (MOAD) to further develop value chains in fruit and vegetables with funding from Korea International Cooperation Agency (KOICA) and the United Nations Development Program (UNDP) in province 3 and 4; this covers production, postharvest loss management, and market linkages.

55. 'Groups' are simply an unregistered collection of farmers, typically around 10-15, some of which go on to register as a cooperative and thus become formalised. Some development programs help these groups register, which helps them get cooperative benefits.

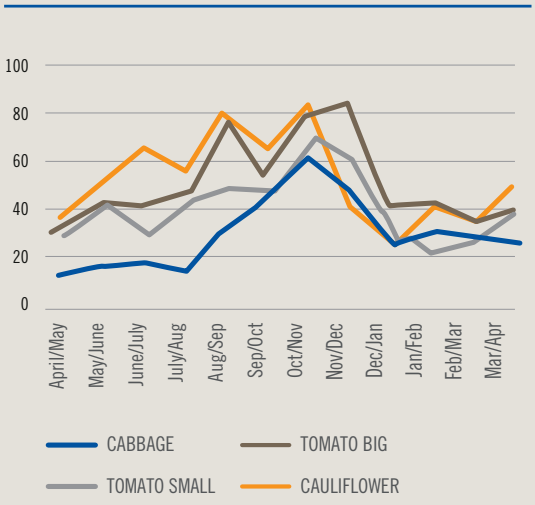
Private sector entities provide a variety of technical inputs and services to the farmers, which can include verbal or contractual buyback guarantee schemes (e.g. they pay for the inputs or services later with the harvested produce). Similarly, collectors typically own a retail shop in the local markets and allow farmers to buy on credit in return for fresh produce during harvest.

Alongside this there has been, and continues to be, a significant contribution in the vegetable value chains by aid-funded programs through NGOs targeting both smallholders and commercial farmers.

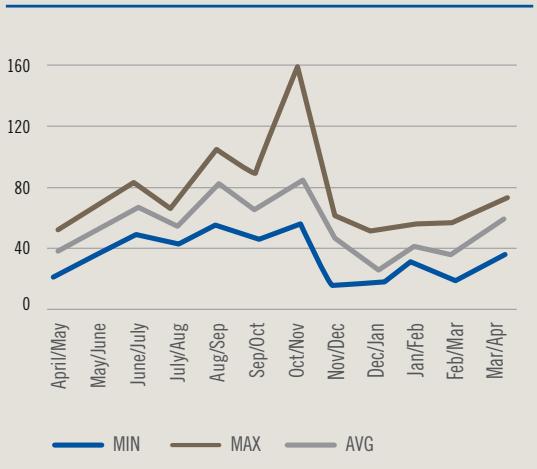
Most of the vegetable market centers do not display wholesale and retail price information except the Kalimati market in Kathmandu, which is the leading vegetable market in Nepal in terms of volume of transaction. It provides detailed information on quantity, variety and price on a daily basis through its website (www.kalimatimarket.gov.np), as well as through radio and TV stations.

Box 7: Price fluctuation in fresh vegetables

As staples of everyday diets, fresh vegetables remain in constant demand and, as such, should be a reliable source of smallholder income. But the combination of seasonality, high perishability and uncoordinated supply chain linkages to markets prompts especially high price fluctuation, making it difficult for smallholders to invest in any of the products. Graph A below shows the fluctuation of average prices for five key products over a year. While there is already a fair degree of fluctuation throughout the year, this hides the price variety that emerges within the month. Cauliflower is a good example of this: graph B show the minimum and maximum pricing of cauliflower within each month, varying from as much as NPR160/kg in oct/nov to a minimum of NPR18/kg in nov/dec (or almost nine times cheaper). All products have a high degree of variation throughout the year, as well as within the month. Small tomatoes are indicative of this wherein within one month the price can vary by a multiple of 4, going from NPR20 to 80/kg. This price fluctuation suggests that a) prices are highly sensitive to supply and demand, and b) there is very little 'buffer' created by managing supply, either in terms of coordinating what farmers grow or when supply chains deliver produce.



Graph A. Average wholesale price (NPR/Kg) trend of selected (NPR/kg) vegetables, Kalimati vegetable market, 2074.

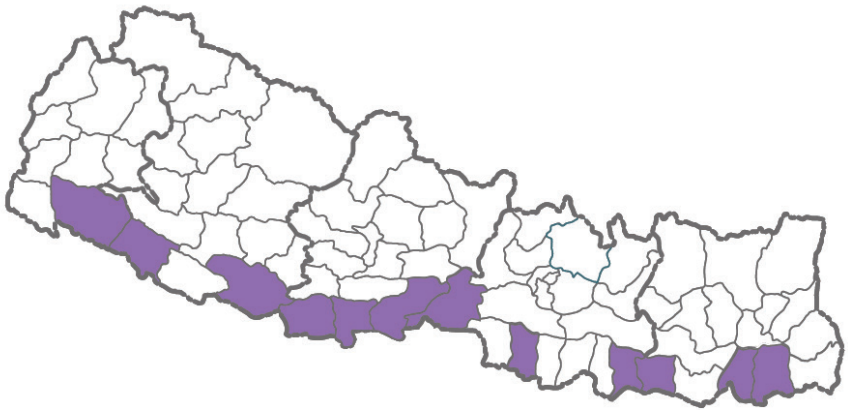


Graph B. Minimum and maximum wholesale price cauliflower, Kalimati vegetable market, 2074.

4.5 Pond fish

4.5.1 Introduction

Map 5: Fish ponds in Nepal.



Source: Sichan Shrestha

Pond fish farming is emerging as a major source of food, as well as employment and economic benefit for over 100,000 people engaged in this supply chain (including production, trading, marketing, and transport). While Nepal has been importing fish seed from India since the 1970s and fish ponds have existed for longer in the country, it is only in the last few years that an industry of pond fish farms and market linkages have been developed – mainly located in 12 districts in the southern part (Terai) across provinces 1, 2 and 5 (see map).

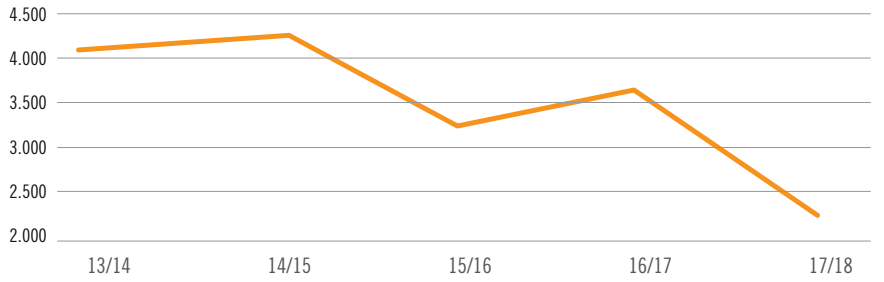
In terms of statistics, fish farming now accounts for 1.32% of national GDP, 4.22% of agricultural GDP, and has an average national per capita consumption of 2.1 kg per year, or about 62,500 tons (though this varies greatly throughout the country given the lack of market penetration into more hilly areas). The most recent 2016/17 data[56] indicates 44,725 fish ponds have been established, producing a total of 55,842 tons of fish, almost double the 31,000 tons produced five years before that. The remaining 7,500 is accounted for by imports from India in both fresh (7,000 tons) and dried form (500 tons).[57]

The Nepalese production increase has come about due to both a 40% increase in the amount of fish ponds in operation as well as a 26% increase in yield (3.8 to 4.9 tons per hectare) – though the latter figure remains low in comparison to fish pond yields in India and other countries, due to the practice of more traditional farming techniques that still prevail in Nepal. Despite the higher cost of domestic fish, consumer preferences have strongly shifted to fresh fish as they're regarded as healthier by comparison to the imported varieties which have been reported to have traces of formalin in them to preserve their freshness over a period of multiple days. So, while Indian fish is still being bought in Nepal, consumers in general have become more discerning in their selection.

56. MOAD 2017.
57. The import data is regarded as unreliable and lower than the actual imports as a lot of fish is brought in through illegal routes bypassing customs and quarantine offices.

Over the years the market has responded both to increasing demand and more varied consumer preferences; up until 2013/14 the Kalimati market in Kathmandu (the country's largest wholesale market for agricultural and live-stock products) was a major hub of fish sales, but with consumer preferences shifting to domestically produced fish and the rapid increase in fish ponds, the total amount being sold through Kalimati has almost halved over five years, down to 2,500 tons (see graph 6), while there has been an expansion of fish outlets in other urban markets.

Graph 6: Kalimati market fish supply (tons).



Source: www.kalimatimarket.com.np

4.5.2 Market overview

Figure 6: Pond fish value chain map

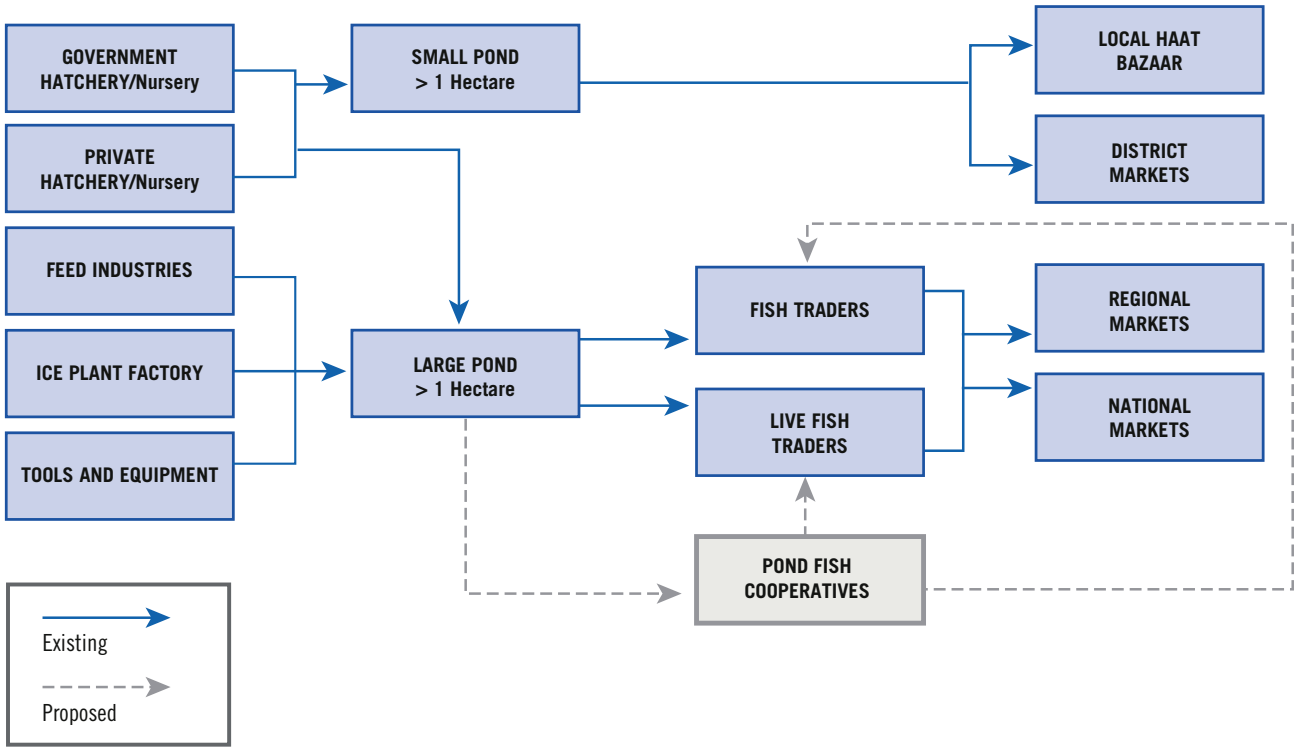


Table 13: Pond fish sector comparative evaluation

Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
Lack of access to quality inputs, including feeds, seeds (brood stock), other modern fish farming knowledge & technology.	Poor harvesting, packaging (using ice and thermocol box), and transport facilities.	High consumer demand for fresh fish without chemical preservatives.	Private entrepreneurs with limited infrastructure are providing services to the farmers.
Youth are attracted to and engaged in fish pond business but lack incentives and services from the government.	No collective aggregation and marketing activities in pocket areas, creating dependency on urban traders.	Demand for live fish prompts use of aquariums at outlets, but at limited scale due to weak infrastructure and transport facilities.	Government hatchery farms provide fish seed but service is under-utilized. Technical services (testing water quality, diseases, etc.) not available to entrepreneurs.
Lands are converted into fish ponds but competing with land price rise from urbanization.	Limited number of traders involved in Nepalese fish pond marketing.	Poor hygiene and sanitation practices in processing at the fish outlets.	Limited number of entrepreneurs can access bank loans and so depend on MFI and local lenders with high interest.
Integrate fish pond with fruits & vegetables in the dike and utilize wastages as pond input.			Electricity for deep boring is irregular and unreliable.

4.5.3 Livelihoods & production

Subsistence and micro-scale commercial pond fish farming has existed since the early '90s in Nepal, with lower cast marginalized communities (Malaha, Jalhari, Majhi, Tharu) in the Terai belt utilizing ponds as small as 4 Kattha (0.14 hect) for their livelihoods. Although commercial-scale ponds exists, the majority are still run by individuals / self-employed and are mostly maintained by women, who spend about 3-4 hours a day managing them.

However, with the increased demand for fresh fish and a government subsidy program to encourage pond development, the sector has rapidly expanded and now also includes small and medium-scale entrepreneurs. Many of those with smaller plots have expanded up to 1 Bigha (0.68 hect), while commercial-scale entrepreneurs are leasing plots for pond sizes of around 2 Bigha (1.35 hect). A few larger-scale businesses also exist, producing fly and fingerlings for sale to other farmers as well as fish for consumer markets, and also leasing out land to other pond fish farmers.

This variety in scale is reflected in production practices; at smaller scale, farmers lack the investment resources and access to technology and still utilize traditional practices of using cow dung, urea and fertilizer. Fish pond entrepreneurs on the other hand, have started using quality feeds available in the markets which improves the fish size. However, both these traditional fish foods and excessive use of feed supplements have negative environmental impact on the land and groundwater. There are currently only a limited number of input supplies such as improved farming tools and equipment (aeration, feeding sacks, water treatment kit, etc.) reaching farmers.

Farmers are rearing all types of fish in their ponds with the average cost of production at NPR130/kg and selling at around a 60-70% profit (a general average based on FGDs), allowing those with larger ponds to provide for their households.

> "The price of land is rising due to urbanization. In the future, it will be difficult to invest in the land, and thus government should focus not on increasing ponds but on improving productivity by introducing modern pond management practices."
>
> **Mr Ambika Prasad Adhikari, President, FAN**

Those running at commercial scale typically employ a manager, technical workers (full or part time) and production workers, so with an expansion in fish ponds this should also provide more employment opportunities. Currently many of these people receive no formal training, which in turn lowers productivity.

There are both government and private services that provide inputs to farmers; 10 government hatchery farms provide fingerlings as per their set targets (6 to 8 weeks old) to the private nursery ponds for converting into fry (12 weeks). This program provides 30% while private farms contribute 70% in fry production (which are of course paid for). Fingerling suppliers also provide embedded (counseling and marketing) services to fish entrepreneurs. Fishermen in the more concentrated fish-producing pocket areas are employed in harvesting fish from the ponds (which is an additional income to what they earn from fishing from rivers).

There are also a limited number of private feed suppliers that sell to pond fish farmers, though there have been complaints about the quality and costs. Agro-vets exist in various parts of Nepal but only a few are supplying inputs specifically to the pond fish farmers.

While flooding has often taken place in the Terai region, in recent years, greater deforestation in the lower hills along with climate change increasing glacier melt and heavier periods of rainfall, is causing greater risk for the life and livelihoods of people in the Terai. This includes their fish ponds which in the past have overflowed causing a loss of brood stock.

4.5.4 Trading (transport) & processing

Overall the transport logistics for pond fish are quite weak. All the fish produced in Nepal is consumed domestically, with about 90% sold locally within the Haat Bazaar (local markets) and nearby urban market centers (hence the decline in fish sales going through Kalimati market). By contrast, the large urban centers mostly sell fish imported from India (Tamil Nadu) due to regular supply in specially packed (Thermocol) fish sold at competitive prices – though as noted in the introduction, this only makes up a small amount of total consumption in the country. Local traders still struggle to compete with them in price despite the demand for fresh fish; this is due to lack of proper infrastructure, including no ice plant factories, difficulties in road transport and proper packaging facilities.

Picture 10: Live fish transport

There has been an innovation in recent years whereby traders from urban fish markets have started collecting live fish in a special transport vehicle equipped with an oxygen cylinder that aerates the water and hence keeps the fish alive. The concept is new in the market and still being tried out; the intention is to demonstrate to consumers that the live fish is fresh from Nepal and chemical-free.

4.5.5 Wholesale & retail

As mentioned before, the rise in domestic production has been caused by both consumer preferences for fresh (chemical free) fish, as well as greater access to different types. Larger fish (0.5+ kg), common carp, grass carp and bighead carp are highest in demand. Silver and Nahni fish varieties are popular in the highways and other rural markets especially for the hotels and restaurants.

Picture 11: Fish shop with aquarium

The setting of fish sales varies. In rural markets fish are sold in an open space, usually nearby the haat bazaar, whereas in urban markets specialized fish outlets sell a variety of fish, both imported from India and locally produced. In some of the fish outlets in urban markets, fish aquariums display locally produced live fish delivered with the vehicles described above. This new concept of selling live fish has increased their demand and consumers are willing to pay a premium price; imported fish costs about NPR200-300 whereas live fish range from NPR400-600 depending on the types of fish.

There are currently no links between fish pond farmers and larger retail outlets, restaurant or hotel chains that are more price sensitive and therefore tend to purchase Indian imports.

4.5.6 Support services & enabling environment

Under the Ministry of Agriculture & Livestock Development a central fisheries Promotion & Conservation Center oversees nine fishery farms in different agro-ecological zones. The prime minister's modernization project has initiated investments in infrastructure development to modernize the sector, including support in purchasing of machinery, tools to manufacture fish feed and construct fish ponds, providing deep boring facility for water supply to fish ponds and technical inputs to the farmers. To participate in the project, individuals or groups must have at least 6 hectares of land in order to receive NPR100,000 to construct fish ponds on 1 hectare, a 50% subsidy to purchase machinery and a 75% subsidy for deep boring.

Box 8: Service providers in the fish value chain

- Nepal Livestock Sector Innovation Project
- Nepal Agriculture Research Council (NARC), Fisheries Research Division (FRD) for aquaculture and fisheries research
- Fisheries Association of Nepal (FAN)
- Pond Fish Association of Nepal
- Rural Enterprise and Remittance Project (RERP) 'SAMRIDDHI'
- Prime Minister Agriculture Modernisation Project (PMAMP)
- INGOs/NGOs (CEPREAD, HELVETAS, etc.)

There is also the National Inland Fisheries & Aquaculture Development Program and Central Fisheries Lab for technical services. NARC includes a fishery research division responsible for breed improvement and pond management. Fish associations (Fisheries & Fish ponds) provide technical inputs to the farmers and capacity building activities along with the market information. The fisheries Association of Nepal (FAN) located in Chitwan and a separate Pond Fish Association of Nepal both provide technical and marketing support to farmers in addition to advocacy to the government on various issues.

Alongside government-funded programs, aid-funded programs work with government and local actors to support fisheries; there is an ongoing program, Rural Enterprise and Remittances Project (Samriddhi) funded by IFAD and implemented by the government under the Ministry of Industry, which supports fish value chains actors in the provinces 1, 2, and 3. The FAO provides technical assistance to the government and capacity building of institutions working on the fish sector.

In the past, SAMARTH (a DfID-funded market development program) provided technical assistance and training on upgrading infrastructure and management practices. The program introduced quality brood stock to private hatcheries, supported NARC and the Directorate of Fishery Development to make digital monitoring of the broods, and imported pure line Pangasianodon Hypothalamus (a type of fresh fish locally known as "Pangas" from Thailand).

Despite all this support, farmers struggle to get a loan when they need one to fund the construction of fish ponds, which requires high investment and thus financing from banks and financial institutions. Many people are demanding a subsidized loan based on the government subsidy program (see section 3.2) but this is not being easily provided. On the other hand, for those aware of the government-subsidized insurance scheme, they are able to get coverage for their ponds. Based on FGDs this represented approximately 50% offish ponds.

4.6 Goat (meat)

4.6.1 Introduction

Goat rearing is common amongst smallholders across the country for a variety of reasons: like with other livestock it provides manure for agricultural crops, acts as a saving device that can be easily sold and it is a manageable source of meat (unlike a cow's meat which is difficult to store for long periods without refrigeration). Goats are raised mostly in the hills for meat (with dairy being a secondary benefit[58]) and they are an important part of household food and nutrition security, although given the widespread demand across the country, especially during festival season when the price spikes, goat farming is also emerging as an agricultural enterprise for more regular income generation.

Table 14: Employment in the goat value chains

Goat farmers	2.8 million
Goat farmers (> 10 goats)	212,000
Collectors	2000
Traders	133
Meat retail shops	882
Transporters	159
Veterinary	937

Source: MOAD, 2011, NLSS 2011

58. In some areas (Makwanpur, Dolakha districts, etc.) cheese factories produce goat cheese from milk collected from goat farmers and selling the cheese to hotels.

There are currently just under 11.2 million goats in Nepal with an average annual growth rate of about 2%[59]. Estimated annual goat meat production is 52,809 tons from 3.34 million goats[60]. Given the higher cost compared to non-meat alternatives, goat meat is not eaten by most people on a regular basis. Those that can afford it more regularly would buy it on Saturdays, and otherwise it is mostly purchased and consumed during special occasions such as festivals and elections, where almost a million goats and other livestock are slaughtered.

Picture 12: Boer goat breed, Jagatpur goat farm, Chitwan

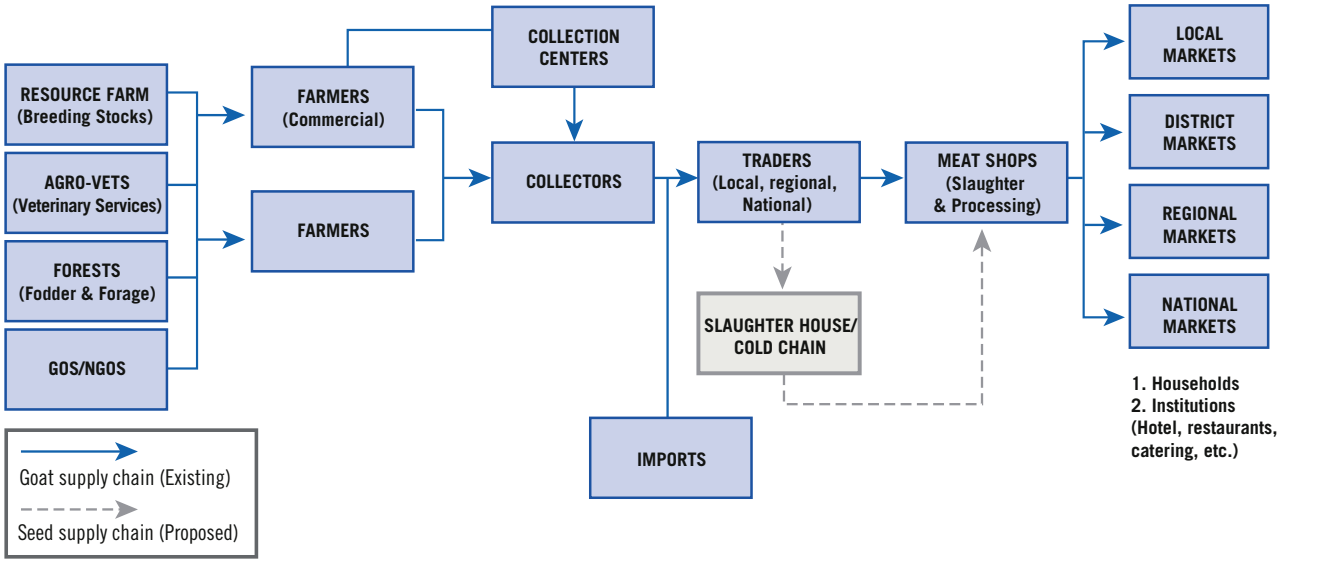
In villages, single-colored smaller goats (black or white) are preferred and are slaughtered as a sacrifice to appease the goddess Duruga. They're otherwise slaughtered within the districts by local butchers and sold as fresh (rather than frozen) meat. Despite the existing domestic supply, there is still room to expand as there is a considerable amount of imports, mostly from India (450,024 in 17/18) as well as improved breeds from Australia[61].

There is also room to improve productivity of existing breeds and quality of feed resources, and to address the prevalence of diseases, parasites and high kid mortality. Improving the productivity of goats via genetic improvement through the genetic improvement program will also massively improve the sector. This would in turn help improve factors that affect the income farmers reap from their livestock, namely scale of operation (number of goats), average goat weight (due to improved breeds), feeding practice, shed management, reduction in mortality rate and reduction in the cost of production and market price.

Nationally, goat contributes 4% to agricultural GDP and about 20% of the total meat production, second to buffalo (54.34%).[62]

4.6.2 Market assessment

Figure 7: Goat (meat) value chain map



59. MOAD 2017.
60. Ibid.
61. Department of Customs.
62. Heifer 2012.

Table 15: Goat (meat) sector comparative evaluation

Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
Valuable source of (emergency) cash for 2.8 million rural people. Limited knowledge of goat rearing, breeding techniques which affects productivity and growth. Some initiation of commercial-scale goat rearing with improved breeds but for those not close to forests there are constraints as goats need regular supply of fodder, forage, grass or cereal. Some have started leasing land. Large out-migration of youth (in part due to lack of employment options) stymies family options to rear goats.	Goat quality is defined by breed, origin and weight (though scales aren't readily available so it is judged visually). Major market is in live goats due to consumer preference, with only small-scale frozen meat market and facilities. Those that have larger goat breeds and/or have 50+ goats earn equivalent to regular employment. Transport facilities not designed for goats, sometimes causing death by suffocation.	Lack of hygiene and safety measures in butcheries (fresh house) in market centers leads to adulteration (sacrificing unhealthy goats, mixing female goats) and quality issues (lack of cold storage; clean water; weighing machine, if available, not calibrated properly). Local butchers prefer Indian goat as there is less wastage. Goats normally traded in open field with no formal and permanent structure in market centers. Limited amount of cold chains supply fresh meat to businesses (hotel, catering, etc).	Several government and aid-funded projects/programs provide support with sheds, improved breeds and forest management for forage/ grass to support commercial-scale rearing (minimum 50 goats). Other services are mixed; veterinary services not easily available in many areas leading to high mortality, but goat insurance, which are required for loans, gradually reaching farmers due to government subsidy (75%) . (Informal) groups and cooperatives provide support in many areas. Smaller-scale loans provided through cooperatives.

4.6.3 Livelihoods & production

While owning and rearing goats is a widespread practice across rural Nepal, it remains predominantly a risk-management strategy (rather than a commercial-scale source of income) being easily sold and therefore acting as a mobile savings device. Households typically have about 6-8 goats, an amount that can generally be maintained and fed through grazing[63] (averaging around 1 goat per ropani of land), in forests (where available) and with cultivated cereals (maize grits, wheat bran). Though costs vary due to geography, size of goat and input costs, generally speaking once a farmer owns more than 10 goats they will need to invest in additional feed – around NPR1,500 annually per goat – while at smaller scale it costs about NPR120-150/year. Field interviews revealed that scaling up this investment can be a challenge for smallholders.

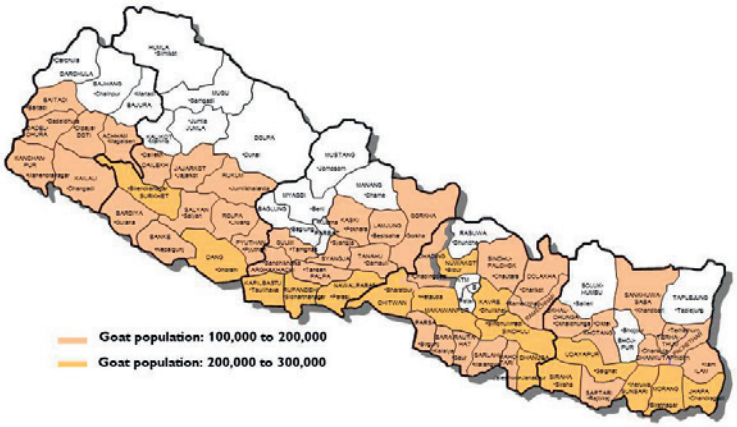
> "We do not have to import goats from other countries if we distribute quality male boer goats to the farmers."
>
> **Mr Narayan Khadka, Proprietor, Jagatpur goat farm**

The major goat producing districts are mainly in the eastern and central region of Nepal, with various kinds being found across the country; the Khari goat is an indigenous breed typical to the Terai and mid-hills, while Chyangra is a mountain goat only found in the

63. Different types of grasses are good for grazing, including bhatmase, mulberry, mulato, teosinte and bakaino.

mountains. Boers were recently introduced from Africa and have distinctive coloring of white hair across the body with a red head (see picture section 4.6.1 above). It has become a popular breed due to its strong resistance to diseases, adaptability to harsh environment, and its ability to grow up to 60 kg within one year – by contrast the Khari can only reach 25kg. Boer goats are being cross-bred with others to increase size, weight and yield. Other varieties are Babari, Sinhal, Sirohi and Jamunapari (of Indian origin).

Map 6: Goat populations by district.



Source: Sichan Shrestha

Farmers lose around 5-15% of their goats to wild animal attacks and lack of proper veterinary services. Government services do not reach farmers and private services are often unaffordable for smallholders.

4.6.4 Trading (transport) & processing

The majority of goats are slaughtered within the villages on different occasions, especially during holidays and festivals (as mentioned in the introduction), with the surplus being sold when the income is required. The goats reach market in a variety of ways; there are just under 2000 local traders in the country that collect goats directly from farmers and sell them in urban markets (10-15 in a week) using local transport facilities. However, in some parts of Nepal, aggregation is done by the cooperatives who purchase from their members and transport to market centers. Traders are most active in purchase and distribution in preparation for festivals such as Dashain (knowing that the price will spike during this period). Finally, some farmers simply take their goats directly to market. An FGD with a number of women goat-sellers indicated that if they didn't receive a price they were comfortable with, they would take their goat(s) to another market the next day. They felt comfortable selling the goats and did not feel there was any gender discrimination in bartering for a price.

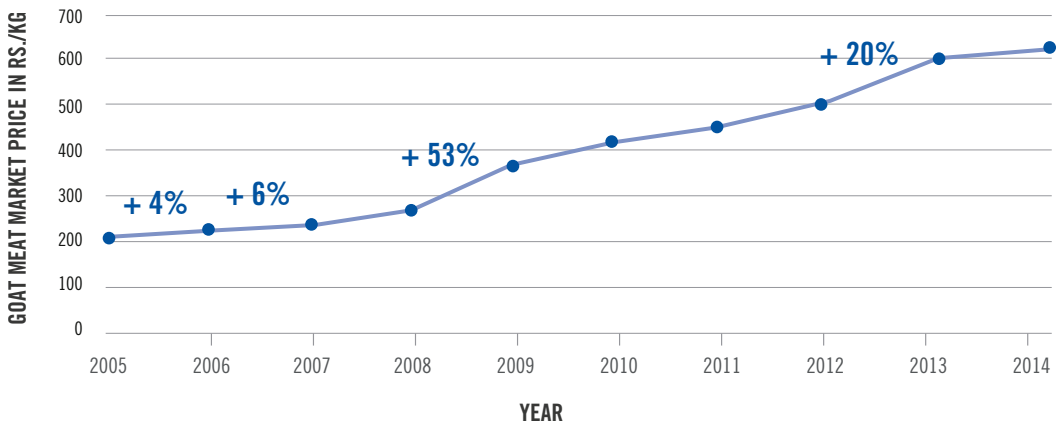
In urban markets, butchers/cold chain suppliers source both local varieties as well as imported goats from India which are regularly supplied by traders.

4.6.5 Wholesale & retail

Goats are typically gathered by traders in particular haat bazaars for selling. The major markets for goats are in Kathmandu (Balkhu, "Khasi Bazaar"), Pokhara and a few other urban centers. There are various meat retail shop formats. In rural areas, goat meats are sold in an open space in the haat

bazaar markets, while in urban areas meat shops sell all types of meat including goat. These shops have regular contacts with collectors in the markets to supply as per their requirements. There are some meat processing companies in the Western part of Nepal (Nepalgunj) who supply frozen goat meat to institutional buyers. The consumers prefer fresh meat rather than meat processed and stored in the freezer.

Graph 7: Goat meat market price trend (2005-2014).



Source: FAOSTAT

Goat meat prices have steadily increased over the years (see graph 7 of average wholesale prices). With the decline in poverty and more money in (urban) households, demand has continued to increase, such that most recent recorded retail prices are as much as NPR 960/kg in the Kathmandu valley.

4.6.6 Support services and enabling environment

While a variety of services exist in the country that are essential for farmers – veterinary medical shops/agro-vet supply tools, instruments, livestock feeds, medicine, vitamins, minerals, food seeds and Artificial Insemination services – access and affordability is often a constraint, especially in more remote areas. Access to vaccination (PPR), control of parasites through deworming and dipping tank services are needed but only of limited availability.

In the past and currently a variety of government and aid-funded programs exist to support the goat market specifically, as well as livestock more generally, and others are in the pipeline. Before the government structure became federalized, the District Livestock Service Offices (DLSO) used to provide extension services to the farmers. Some of the past aid-funded projects/programs include PACT, PAF, HVAP, HEIFER (ongoing project SLVC), NLSIP, HIMALI and CLDP, among others. NARC research stations in province 1, 2, and 3 have resource farms in Chitwan, Kaski, Tanahu, Makwanpur, and Dhankuta districts. Additionally, the central sheep and goat promotion office under the department of livestock services has been promoting goat through the Nepal Trade Integration Strategy (NTIS) fund.

Currently projects supporting goat value chains are being implemented by HEIFER (Strengthening Smallholder Enterprises of Livestock Value Chain for Poverty Reduction and Economic Growth in Nepal), ADRA and Swiss Contact (Sajha). The government is about to start implementing a mega-program "Nepal Livestock Sector Innovation Project" with World Bank funding (80 million USD) in provinces 1, 2, and 3 with an aim to improve productivity and market access for smallholder farmers engaged in selected high value livestock and horticulture commodities.

However, while a number of government and development programs exist, there is widespread criticism of previous interventions, citing inefficiencies in the implementation which in turn did not prompt sufficient growth in the sector to make a real change in income for goat farmers.

Micro-loans to farmers are provided by MFIs and cooperatives which are widely present in Nepal, even in remote areas. On the other hand, there are only limited numbers of farmers who have received loans from commercial banks. Farmers say that they need loans at a subsidized interest rate and for longer durations (at least 10 years) because of the high investment required in the goat business.

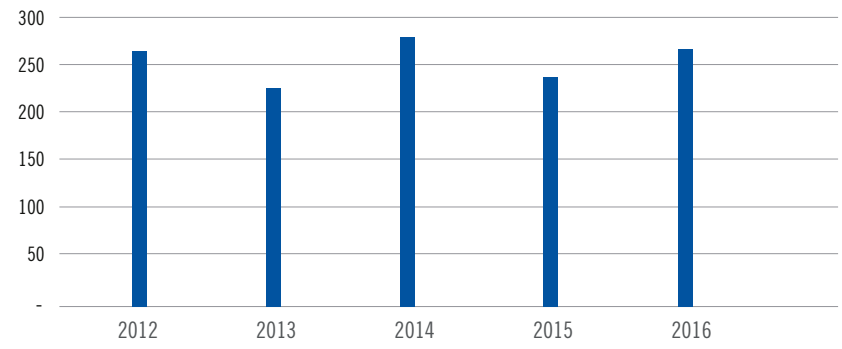
Insurance services in goat are gradually reaching farmers due to the government subsidy program (see section 3.2 for more detail) but there are issues in the claim and valuation of goats; investments in goats vary depending on the selection of breed and ranges from NPR2,000 to 300,000 but banks and insurance companies do not understand this price variation or the goat and agricultural businesses properly to be able to develop products that accommodate this nuance.

4.7 Ginger

4.7.1 Introduction

Ginger remains primarily a product used raw in cooking in both domestic and foreign markets. Nepalese ginger production comes mainly from smallholders in the mid-hills. Around 400,000 farmers are involved in ginger cultivation, of which 40% produce on less than 0.5 hectares. The ginger sector requires an estimated 666,000 people for production for two months per year – equivalent to 11,000 full- time employees.[64] There are 69 ginger producing districts spread across Nepal (of these, Ilam ranks highest with 45,994 tons followed by Palpa, Salyan, Nawalparasi, Morang and Doti).

Graph 8: Ginger production (000 tons).



Source: FAOSTAT

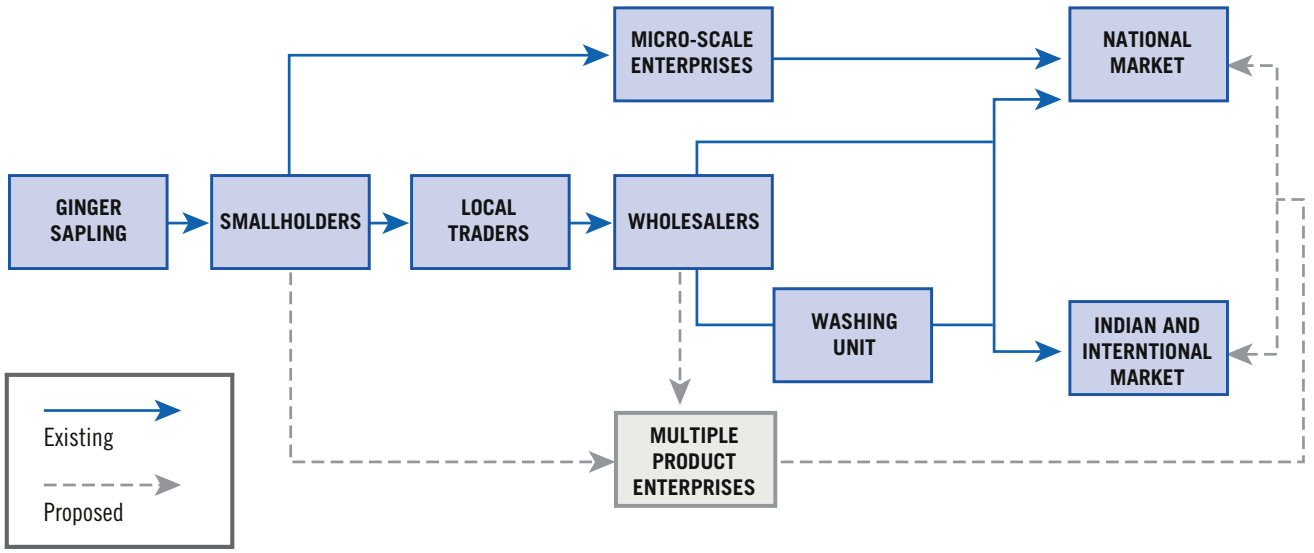
64. ITC, 2017a.

35% of Nepalese ginger remains in the domestic market (20% for seed and 15% for domestic consumption) while 65% is for export,[65] with almost all of it (97%) going to India.[66] The vast majority of this is exported as raw, fresh ginger with only 6% as a dried product (5% called sutho) and ground (just 1%).[67] However, a recent study of the Indian market showed that an increased use in both edible and non-edible products shows a potentially growing and more diversified use for it, including in sauces (+9.7% by 2021), confectionery (+6.6%), hot and cold drinks (+9.1%) and beauty and personal care (+7.0%).[68]

While in absolute terms Nepalese production hasn't changed (see graph 8), it has declined from 3rd to 4th ranking in global production; while in 13/14 it produced 18% of global output, by 2015 this had declined to 9.8%. Other countries have increased production, in particular China since 2013 which drastically increased both production and low-cost exports.[69] In recent years there has also been difficulties with exports to India, which affects pricing. Despite the two countries having bilateral trade agreements, in 2016 and 2017 India threw up various reasons to stop Nepali imports (citing traces of harmful pesticides; being mixed with Chinese imports[70]). Independent studies since proved there did not contain harmful pesticides and in 2018 a "wholly produced" ginger trade treaty was introduced ensuring that, with proof that the entire contents come from Nepal, no additional license or charges are imposed. As of writing this still stands.[71]

4.7.2 Market overview

Figure 8: Ginger value chain map



65. SAMARTH, 2014.
66. TRIDGE.
67. SAMARTH, 2014.
68. GIZ, 2017b.
69. It accounted for 73% of exports in 2014. GIZ, 2017b.
70. Kathmandu Post, Dec 2, 2017.
71. Kathmandu Post, 5 July, 2018.

Table 16: Ginger sector comparative evaluation

Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
If ginger prices are high, farmers report disease if discovered but if prices are low they simply shift to alternative products.	While washing facilities are established in the Terai, most traders wash ginger in Naxalbari, India as the product is closer to market by then and the process shortens shelf-life.	Some value addition, including use in spices industry, and retail started within Nepal	There have been enabling environment initiatives relative to trade with India and Bangladesh, but targeting specific market segments and brand promotion is lacking.
18% of ginger produced is stored as seed for production in the next season.	No practice of drying ginger (e.g. value addition) in Eastern Nepal.	The "wholly produced" trade treaty has opened new avenues to explore different market segment of India.	There is no insurance system in the ginger value chain.
Inadequate knowledge of quality seedlings and how to assess quality.		Market study for alternative markets has been carried out, but apart from trade initiated with Bangladesh, nothing substantial has been carried out.	Lack of market promotion and consumer perception on multiple usage of ginger (medical, cosmetic, etc).

4.7.3 Livelihood & production

Planting is done in April/May during the monsoon rains. Ginger is harvested by digging out the rhizomes, or roots, when the tops have died. Nepal mainly produces two varieties of ginger: Nasse (with fibre) and Bosse (with less fibre). The Bosse variety is preferred as it has a fresher flavor and is thus regarded as higher quality, while the Nasse variety is of industrial quality and preferred for traditional medicines and to produce ginger powder. (GIZ, 2017 b)

> "Farmers inform about diseases only when Ginger prices are high, otherwise they shift to other cash crops. Rural Municipality has program on disease management, yet, due to lack of technical resources we are not able to deal it with explicitly."
>
> **Mr. Sukhbir Nemwang, President, Falgunananda Rural Municipality, Paanchthar, State 1.**

There is essentially no commercial-scale production of ginger in Nepal; instead, smallholders will allocate greater or lesser amounts of land to growing it depending on whether market prices are high or not. As mentioned in the introduction, this is affected by (global) production as well as disruptions with exports to India as it is basically its only buyer. As a result, interventions to try to further improve production get stalled.

Various common grazing animals and diseases (bacterial wilt, rhizome rot/soft rot/pythium rot, dry rot, root-knot nematode, burrowing nematode) that affect ginger are known but not responded to in a coordinated manner: either farmers don't communicate it or the rural municipality doesn't have the resources to respond to the problem.

Once ginger is grown, farmers will again choose whether and how much to sell based on the price – and otherwise store it for the following year.

4.7.4 Trading & processing

Once grown, producers are able to store ginger until the next season using traditional methods (with a few instances of using improved pit storage methods).[72] Around 18% of ginger is kept for the next season harvest six months later, though this depends on the price farmers can get from traders. Most commonly, local collectors visit the farmers to collect the ginger, but farmers may also take their produce up to road head traders, who are mostly located in places where transportation is available and thus act as consolidation points. They supply the goods to district traders who then finally supply to Dhulabari, the main wholesale market in Eastern Nepal. The transportation is carried out by way of sacks (see picture) loaded onto unspecialized vehicles.

Picture 13: Ginger storage in Wholesale Market Dhulabari.

Only in Western Nepal is there a drying facility to produce sucho (dried ginger) but this is the exception to the norm. In Eastern Nepal the demand is currently only for fresh ginger, both for domestic and export markets.

Micro and Small level enterprises within the vicinity of production nodes or in urban areas are making ginger-based products like ginger candy, pickles etc. which are at present very limited. There has been initiation on multiple usage of ginger (essential oil, medicinal purposes, etc.).

4.7.5 Wholesale & retail

Table 17: Average Storage period of ginger and ginger products.

	Store Room	Fridge	Freezer
Fresh Ginger Root	1-2 weeks	1 month	3 months
Peeled/ Chopped Ginger		1 week	
Ginger Paste		1 Month	3 Months
Prepared Jar of Chopped Ginger	2-3 Months	2-3 Months	
Dried Ginger	2-3 Months	2-3 Months	
Ground Ginger (Powder)	1.5 years		
Crystallized Ginger	1.5- 3 years		

Source: GIZ, 2017b

Currently almost all ginger goes to consumers in raw form, whether within Nepal or abroad. While washing facilities are available throughout Nepal (more than 20 facilities), most of them are for trading with India and underutilized. Similarly, organic dried ginger from Western Nepal has been exported for over a decade but this hasn't expanded as the facilities aren't able to yet meet wider export compliance standards. For the domestic market, the wholesale markets (Kathmandu, Biratnagar, etc) source from local districts or the Dhulabari market. It is then purchased by retailers and sold fresh.

72. TECA/FAO.

For the export market, wholesalers bear the cost of both transportation to market centers, as well as various other taxes and loading/unloading fees. Some exporters also have agents that bring goods from farmers, local collectors or road head traders to their places. Importers from India usually receive ginger near the border, where they complete quarantine and custom clearance requirements and then transfer it from Nepali to Indian trucks[73]. A major trade point is Naxalbari, from which the ginger then goes on to New Delhi or Calcutta from which it is in turn distributed across the country. According to exporters, ginger is traded in the vegetable wholesale markets and consumer preferences vary between Calcutta (Nasse variety) and New Delhi (Bosse Variety).

There is some potential to diversify the ginger export market; while almost all exported ginger currently goes to India, bilateral agreements with Bangladesh have recently opened this market and could further be expanded. Recently 35 truckloads were sent to Bangladesh where it fetches NPR2/kg more than in the Indian market[74]. This can help pave the way for more alternative markets; others like Japan and the Middle East[75] have been identified but such options haven't been further explored yet. The same GIZ study showed that a variety of processed goods which already exist in other countries can be developed with ginger, which would also allow longer storage time (see table 17 above). However, because the market is underdeveloped, fresh ginger remains the most commonly traded form for both domestic and foreign markets. Similarly, ginger is commonly used as a component in processed foods, like ginger candy, baked goods and confectionary in other places, but the processing capacity for this in Nepal is very limited.

4.7.6 Supporting Services and Enabling Environment

The Ministry of Industry, Commerce and Supplies, along with the Trade and Export Promotion Center is working on branding and promoting ginger in the global market. These, along with the private sector-led Nepal Ginger Producers and Traders Association (NGPTA) and government representatives have been focused on trade facilitation between Nepal and India. While this is important, it has meant that other services around capacity building, disease management, lack of insurance provision and value addition have received less attention and therefore not been properly addressed.

Box 9: Service providers in the ginger value chains

- Ministry of Agriculture and Livestock Development
- Ministry of Industry, Commerce and Supplies
- Trade and Export Promotion Center (TEPC)
- Nepal Agriculture Research Council (NARC)
- Nepal Ginger Producers and Traders Association (NGPTA)
- Rural Enterprise and Remittance Project (RERP) 'SAMRIDDHI'
- Prime Minister Agriculture Modernization Project (PMAMP)
- INGOs/NGOs (GIZ, etc.)

Development organizations like Mercy Corps and SNV Nepal have previously worked on building capacity of value chain actors which helped improve the adoption of good agriculture practices, local-level processing and policy advocacy which helped improve trade with India.

73. ANSAB.
74. Adikhari, Raju.
75. GIZ, 2017b.

4.8 Lentils

4.8.1 Introduction

80% of lentils grown in Nepal come from the flat, southern districts of the Terai, bordering with India (see map 7). As a nitrogen-fixing crop they are used in rotation with cereals, based on the availability of residual soil moisture after harvesting of rice. And as a protein-rich pulse they are an important part of the Nepalese diet, especially for the majority of poor people in rural areas who cannot afford much meat and therefore depend on lentils for up to a quarter of their protein intake[76]. Accordingly, lentil is the main pulse crop in Nepal (totaling 67% of all pulses produced and occupying 63% of the area, or 206,969 hect, used for growing pulses)[77] and it is grown by around 600,000 farmers[78].

Map 7: Major Lentil production.

Source: Sichan Shrestha

Nevertheless, lentils remain a subsistence crop for most smallholders, selling only their surplus to generate an income. This is in part due to global markets; while in the past Nepal has been a large producer of the pulse, in recent years it has declined. While in 2009 and 2010 it ranked 5th as a country in lentil exports (measured in USD quantity and value), other countries have expanded their production; in 2013 Canada became, and remains, the top lentil producer in the world with approximately 3.25 million tons, followed by India (1.01 million tons), Turkey, Australia, USA, Bangladesh and Pakistan. Nepal, which produced 254,308 tons[79] in 17/18, is not in the major producer's list[80]. During 16/17 there was a global surge in lentil yields which, according to the Nepal Retailers Association, brought down prices around the world. According to the most recent Department of Customs data, Nepal exports 10,450 tons (mostly to Bangladesh and Singapore) and imports 42,505 tons[81] (mostly from Canada, Australia, India and Myanmar)[82]. Apart from Myanmar the countries that Nepal imports from are able to outcompete on economies of scale and marketing infrastructure, including branding, grading and packaging facilities.

76. Ministry of Commerce.
77. MOAD, 2016.
78. USAID, NEAT Activity, 2011.
79. MOAD 2016.
80. www.statistia.com/statistics
81. Nepal Department of Customs.
82. Ibid.

As a result, large-scale traders import the cheaper version wholesale and further refine it by splitting and packaging it with their own brand, which is then sold on to most of the retail shops. Some retail shops also stock small quantities (about 100 kg) of Nepali lentil for the few customers who prefer the taste and are ready to pay a premium price. Hotels, restaurants and other institutions in urban areas such as Kathmandu or Pokhara purchase local varieties, but the majority that is sold within Nepal is through informal, local markets.

Picture 14: Comparison of imported and local lentils.

4.8.2 Market overview

Figure 9: Lentils value chain map

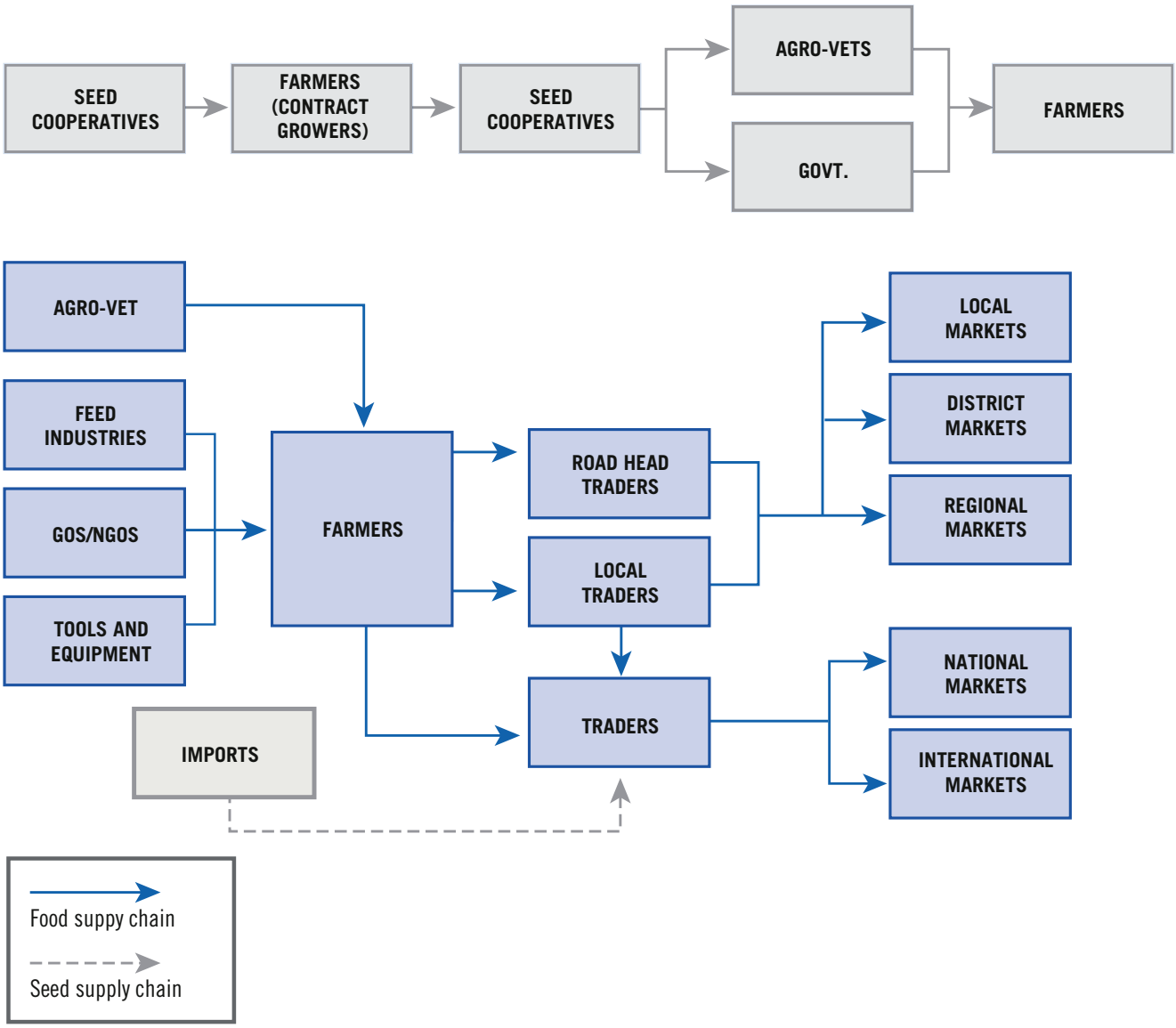


Table 18: Lentils sector comparative evaluation

Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
Mostly grown as subsistence crop, and about 50% sold through informal local market traders ("Galla").	Limited numbers of local traders do aggregation by immediate payment to the farmers on all types of cereal and pulses (whole grain).	Global markets/imports affect price: NPR120/kg in 2015 and February 2019 NPR100/kg.	Limited business/technical services and seed provision through private and public sector. Government research programs not reaching farmers through extension services.
Limited amount of farmer seed production (from development-supported donor programs).	Farmers and local processors lack grading and packing capacity, so pulses and beans remain mixed with stones, dust.	Consumers prefer taste and quality of local lentil but due to huge price gap (about 80% more) many buy imported lentil.	Local agro-vets sell uncertified seeds collected from the farmers, and some coops produce seed with donor support.
Limited knowledge of Lentil cultivation and mostly traditional farming without use of improved variety of seed.		Some segments of consumers prefer a local variety of pulses and beans.	
Awareness of nutritious value and intrinsic appeal of pulses/ beans.			

4.8.3 Livelihoods & production

Lentils are predominantly grown as subsistence by smallholders given the relatively weak supply chain.

As mentioned above, they are grown on small plots of land (4 kattha) after cereal crops, which both replenishes nitrogen and acts as a source of food security. It is usually harvested in March and then dried in sunlight until completely free from moisture and then stored for consumption later or for planting in the next season. When it is sold in local markets or to traders it is generally to supplement household income rather than as a key livelihood component. Prices are often higher for sale of lentil for replanting (going to agro-vets or cooperatives that package and sell to other farmers or government) than for consumption. Farmers that were interviewed noted that household members also work in part-time labor in urban areas.

> "From 5 Kattha land I could harvest only 20 kg of lentil so what is the point in growing. The quality of seed was not appropriate."
>
> **Female farmer, Parsa.**

New and higher quality seed varieties exist in limited access; agro-vets and cooperatives sell improved varieties of foundation seeds to interested farmers for seed production with a buyback guarantee, while government and donor-funded projects provide free seeds. Newer varieties were being used in the observed study districts (Khajura 1,2, Simal and Shkhar). Farmers are also sometimes provided with storage bean bags that protect from insects and pests.

Some farmers observed that they could grow more in the season with improved quality seeds, farm machines, and irrigation facilities. They felt that the productivity has declined because, in the absence of proper irrigation, they depend on rainfall, which has been changing in the last few years.

4.8.4 Trading (transport) & processing

Local and wholesale traders are predominantly responsible for transport and aggregation, with little grading being done. Farmers do not plan sales in advance and they store lentils until they need money, such as during festival periods. In the Terai areas, traders known as 'galla' purchase all types of cereals and pulses from farmers and pay immediately, as opposed to local traders that have to wait until they resell the goods and only then pay the farmers – however they often pay better rates than the galla. Both of these traders stock up the crops and then sell in bulk (100+ kg) to urban wholesalers.

Alongside traders there are about 18 companies registered in Nepal that have lentil processing facilities (grinding, sorting, polishing, grading, packaging, etc.) with an average output of 4-5 tons per hour (per company). However, they rely on imports of whole lentil from other countries and sell it in split form in national markets. During interviews they indicated that they would be willing to process Nepalese lentil but it is difficult to source from farmers and the price of the imported varieties is lower.

4.8.5 Wholesale & retail

As mentioned above, Nepalese lentils is only sold domestically in local markets or to institutional buyers such as hotels and restaurants. In most urban retail shops, imported lentil is sold due to the regular supply and lower price (NPR 80/kg) compared to local produce (NPR 180-200/kg).

4.8.6 Support services & enabling environment

There are limited support services provided in the promotion of lentil value chains. Government support is limited to free or subsidized seed and fertilizer distribution through extension offices – though these are in short supply these days given the transition process. A number of NGO programs such as FORWARD, MADE Nepal and LIBIRD work in seed production through cooperatives and do lentil promotion for nutritional value, especially for women.
Business membership organizations such as FNCCI, CNI and commodity associations have been supporting traders to lobby government on import/export and price related issues. The Crop Development Division (CDD) and Nepal Agriculture research Council (NARC) are continuously engaged in research and releasing new varieties, although until the government's network of federalized services are in place, these will not be able to reach farmers.
Loan services for farmers are limited to informal connections (e.g. from family and friends) and to some degree from cooperatives. In villages, most farmers survive by getting much of the household's daily essential goods from the nearby retail shops on credit and repaying at the time of harvesting. Only larger scale millers and traders with processing facilities have long-term business relationship with commercial banks.

5 Recommendations

The following outline and recommendations have been written to be adapted for program design and as a concept note for reference in further discussion with key government stakeholders, donor agencies and potential partners in the NGO sector.

Box 10: ILO global experience and expertise

As a global UN body the ILO works around the world with governments, labour unions and companies to promote decent work. It has years of experience in market systems and has been working in a number of countries on agricultural supply chains, and has a number of unique attributes that give it a strong value-added as the lead in a markets-based program;

- As a trilateral organization its stakeholders are the government, labour unions and business sectors, all of which, together with cooperatives, play a key role in the agriculture sector of Nepal.
- As a global UN body it draws on technical expertise both from its headquarters as well as other relevant projects and programs around the world that can provide lessons learned and therefore contribute to the program's scale of impact.

Other countries and sectors ILO is, or has been, active in are:

Goat (meat)	Ethiopia
Tea	India
Pond fish	Myanmar, Zambia
Dairy	Afghanistan
Fresh veg	Kyrgyzstan, Egypt, Myanmar

For more information, go to ILO's The Lab website here: **www.ilo.org/empent/projects/the-lab/lang--en/index.htm**

Areas of expertise the ILO can draw on:

- Support to SMEs
- Agricultural cooperative support training tools
- Financial cooperative support training tools
- Social finance
- Women's entrepreneurship development
- Start and Improve Your Business Program (SIYB), tailored to youth.

The ILO as a global UN body is the world's advocate for decent work and improving and sustaining an income that enables people to invest in themselves, their families and, where necessary, their livelihoods. It has unique expertise and experience that can help address the income and quality of work challenges (reliability, health and safety) that are currently prohibiting the growth of the agricultural sector (see box 10 for more details). The outline below frames how the ILO proposes to address this.

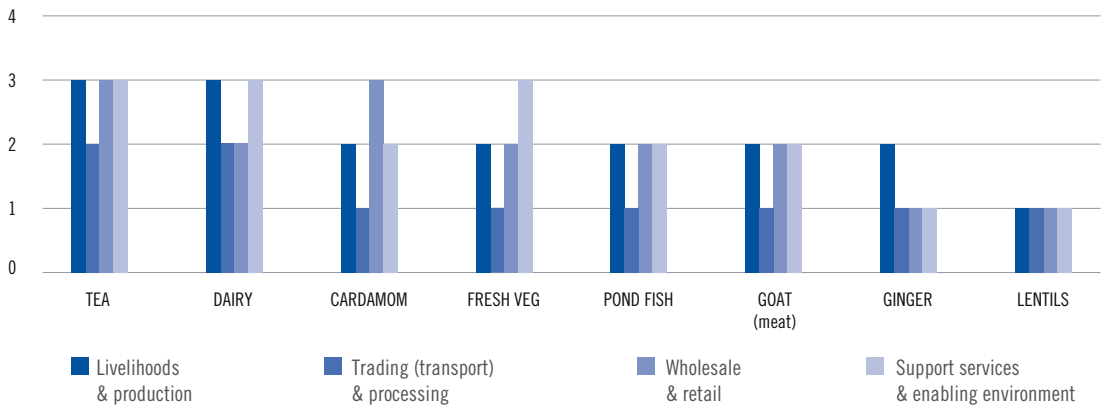
5.1 General and multi-sector recommendations

Given the nature of agriculture in general, the transition to federalization that is affecting so much of the government's services and the employment (potential) and degree of development in each of the sectors, it is recommended that the ILO frame their program as follows:

Prioritize interventions around the leading and growing sectors assessed, including those with a smaller and larger base of current employment. The graph below on the left illustrates the comparative degree of supply chain development of each of the eight sectors assessed (see section 3.3 for more detail), while the table on the right summarizes the amount of those involved in the sector.

With this in mind, it is recommended that an ILO program focus on the top six sectors (not including ginger and lentils). Even though tea, cardamom and pond fish have far lower employment figures, it is important to note that the quality of employment (e.g. amount of income or consistency of work) and growth potential of these sectors was noted to be relatively high, warranting their inclusion.

Graph 1: Ranking by sector (from most to least developed).



83. Employment includes self- and wage-employment, e.g. smallholders at the base of the supply chains and processors, transporters, etc. along the chains.

Table 1: Employment by sector

Sector	Employment[83]
Tea	100,000
Dairy	950,000
Cardamom	67,000
Fresh veg	3.2 million
Pond fish	100,000
Goat	3.02 million
Ginger	400,000
Lentils	600,000

The following provides a general summary of the logic of selecting these sectors given their market demand and growth potential (with more detail in sector-specific assessments in section 4):

- **Tea, cardamom:** both of these sectors have established buyers and are recognized by their quality (e.g. they're de-commodified). Their growth potential lies in reaching international markets and specifically the retail sectors in those markets. Though they employ comparatively low amounts of people, household income deriving from these sectors is relatively high. Tea especially provides good examples of small-scale enterprises at the base of the chain.
- **Dairy:** there is a steady growth in demand for dairy products together with a major potential to shift supply from informal channels into formal supply chains. This can create greater income for farmers as well as jobs processing dairy along the supply chain. The challenge is to improve enforcement of quality standards and build trust in dairy brands.
- **Fresh vegetables:** there is a constant demand for fresh vegetables and yet a total lack of oversight of linking products to markets consistently and distributing them evenly across the country. Stabilizing supply chains, and thus prices, will encourage smallholders to scale up investment in these sectors, ultimately improving income. The establishment of cold storage units or other processing facilities will also create (a small amount of) jobs.
- **Pond fish, goat (meat):** both of these sectors have massive potential through import substitution as both fish and goats are regularly imported from India. Fish requires an investment in both production as well as transport which at sufficient scale, could help develop a sector that supports small-scale businesses at all three stages of the supply chain (production, transport and retail). The goat sector requires investment in breed selection, access to fodder, basic skills development for farmers and some coordination of collection and sales. This may not increase the amount of small-scale enterprises but it will help improve income and translate into a valuable savings mechanism for millions of households.

It should be noted that a purely sector-driven approach runs counter to most rural households' risk mitigation strategies of spreading their income across multiple products to manage crop and/or price failure. On-farm diversification also has positive effects, in that different crops and livestock can complement one another and in turn lower costs of chemical fertilizer use and encourage an ecosystem approach that also smooths labor demand and income across the year.

Pursue a theory of change that explicitly links decent work for smallholders and wage-employed labour in value chains with improving supply chains and the overall agricultural sector. This assessment illustrates that there is a clear link between more developed supply chains and smallholder investment that leads to small-scale enterprises and improved household income. Households make rational choices between low and unstable rural income versus off-farm

alternatives, and also relative to investment decisions in produce to supply (relatively) stable supply chains that they can then benefit from. The overarching ToC should therefore focus on interventions that are explicitly linked to higher and more stable income, improved working conditions, regular work throughout the year, and small-scale commercialization of smallholding. This will not be limited to production and supply into single value chains, but instead address the link between income generated from specific products and overall household income which is spread across multiple income sources (also see box 11 on defining decent work in agricultural value chains).

Box 11: Defining decent work in agricultural supply chains

Of the many millions of people involved in the Nepalese agricultural sector only a small minority benefit sufficiently to generate an adequate and regular income to sustain themselves and their families. The remainder are a mix of wage- and self-employed where the latter make up the vast majority. 'Self-employed' in this context means someone who earns an income from selling their produce which they grow either primarily for subsistence (e.g. only selling the surplus) or as a cash-product (e.g. primarily as a source of income). For almost all smallholders, household income is diversified across multiple sources – meaning across multiple products, and on- and off-farm. Moving from multiple products to depending on just a few is an extremely risky move, and can only be beneficial in the context of very stable supply chains that guarantee purchase, access to loans, insurance and a host of support services. And even considering such favourable conditions, the transition can still be challenging. Therefore, 'decent work' as a smallholder could be defined as a (contribution to) household income spread across a range of on- and off-farm sources which allows for

a. Regular work throughout the year
b. Regular income throughout the year
c. A healthy and safe working environment (e.g. the right tools, skills and equipment to avoid injury)

By this definition, a supply-chain focused program must take into account how improving an income stream derived from one or a few products impacts overall household income as well as quantity, regularity and consistency of labour, in order to understand how it contributes to decent work at the base of the chain.

Propose a 5-7 year program with a 10 year 'vision'. Any market systems program typically requires 1.5 years or so to get started but, given the huge government transition taking place, this will require greater collaboration and coordination with private, government and NGO actors to implement successfully. Framing a longer-term 10-year vision or strategy is realistic given the time it takes to make a real impact in the agricultural sector. Within this timeframe, a more detailed minimum 5 year program can be funded – this will allow for changes at local- as well as policy-level to be identified and incorporated during the program life-cycle and to translate into a greater scale of impact.

As part of this timeline, an allocation of 9 months for the planning, analysis and detailed design phase is suggested before implementation. Key outcomes should include:

- By end of program: 'graduation' in at least 4 of the 6 sectors to a higher ranking along the supply chains, which has resulted in higher income at production/household stage for 0.5m smallholders, and decent jobs created further up the supply chain (amount TBD).
- By end of program: a policy adopted nationally by key ministries and being implemented in provinces 1, 2, 3 that recognizes 'decent work' as the pathway to small-scale enterprise development for smallholders. Decent work is defined as a sufficient and sustainable income from regular labor and diversified on- and off-farm products. This should include policies that are specifically tailored to gender and youth as target groups.
- By end of 10 years: agricultural strategy adopted and implemented by (at least) provinces 1, 2 and 3, that incorporates support for decent work

conditions along supply chains, disaggregated by gender and age, as part of standard capacity support provided through ward-level agricultural technical advisors and cooperative training. This includes adoption of the strategy by the Ministry of Agriculture and Livestock, and the National Cooperative Federation.

Outline a proposal for up to USD$20 million but likely lower. Interviews with province representatives suggested that, at the moment, budgets themselves are not the constraint, but the absence of a clear strategy or framework of how to spend them is. Similarly, UNNATI is just one of a number of aid-funded programs that have had a large underspend by end of program that led to donor frustration.[84] With this in mind

- It is not recommended that the ILO pursue an excessively large-scale budget, but instead secure one that can realistically be spent in the time-frame – though it should be explicitly agreed from the start that, while the program is 5 years, a 2-year extension should be available if required. This can help avoid end-of-year and end-of-program scrambles to spend budget, which runs counter to a market-systems approach.
- It is recommended that any funding of physical infrastructure be co-funded by either government, private sector or both, to ensure buy-in of key actors.

The program should have both action and learning components, including research. Around 16% of budget should be allocated to learning; 8% for program-cycle MEL purposes and 8% for research, developing learning and guidance materials tailored to different audiences. This can be justified because of a) the huge number of programs that government and aid-funded bodies are already implementing that therefore need to be coordinated with, and b) how program activities can be translated into functional policy for government. Research should cover three areas;

- It should build on this report's assessment of what key changes support transitioning underdeveloped supply chains wherein farmers focus on subsistence, into stable and progressive supply chains that sufficiently benefit smallholders to invest in increased quality and yield. Based on the assessments in this report, key interventions will likely focus on public policy, cooperative support, private investment and access to finance. Such foci will then need to be concretely translated into activities in the program.
- Research and policy that complements supply chain interventions with rural livelihoods interventions should be developed and adopted by government stakeholders; finding a balance between greater investment of land, money and time into specific 'high-value' products versus maintaining diversified on-farm income sources to manage (climate) risk and smooth income will be key to support rural households towards becoming small-scale enterprises. It is recommended that ICIMOD lead this research given their experience in this area.
- Gender and youth groups must be a focus. Though there is some overlap, these are otherwise quite different target groups, but both are important for the growth of the agricultural sector; because of so many (young) men working abroad, agriculture is feminizing in Nepal, but this isn't properly being reflected in policy change. Any interventions in the six supply chains, and research in the others, should include aspects around gender – including the balance between agricultural and household responsibilities as well as policy and cultural constraints that prohibit women from becoming economic leaders in their communities.
  Youth on the other hand are generally under-represented, especially young men. Interventions should collaborate with government initiatives to bring overseas returnees back into the agricultural sector. Research should

84. The ILO-allocated portion of the budget was spent – underspend related to other parts of the program.

include incentives that motivate young people to move back into, and invest in, specific agricultural products and stages along the supply chain (production, processing or retail). This can then feed into both program activities and policy recommendations.

Work with and through key government actors at all levels, and partner with key NGOs and programs. The transition phase is a real opportunity to incorporate decent labor standards into national, provincial and local-levels of government. The ILO has already built up experience with UNNATI relative to facilitating multi-stakeholder platforms (MSPs) and it should continue pursuing such MSP facilitation efforts to influence agricultural policy/strategy and services. The rationale for coordinating with actors at all levels is as follows:

- *Central government and national-level actors.* National strategies and coordination of learning is best facilitated at national level. Provinces are currently very much focused on their own planning, but most supply chains being addressed trade across multiple provinces as well as national boundaries. This requires a coordination platform at national level (or at least multi-provincial level) for it to be properly beneficial.
  - Key suggested partners are the Ministry of Agriculture & Livestock, the Ministry of Forests & Environment, the Agricultural Development Bank (as well as other appropriate government entities), the NCF, the FNCCI.

- *Provincial/state.* Practical implementation will have to be done in coordination with provincial actors, who can lead on how to prioritize sectors and specific ministerial budget lines within their purview. Interviews with civil servants in provinces 1 and 2 suggested many agricultural programs and infrastructure plans are already in the pipeline, and so these need to be collaborated with to achieve sustainable change in the sector supply chains. The three different provinces are also very distinct from one another in terms of geography and degree of poverty, which will in turn shape the interventions.
  - Key suggested partners are provincial-level government representatives, and ICIMOD in order to incorporate a better understanding of environmental risk management.

- *Municipality and ward.* Program planning and design at local-level should be determined based on municipal and ward-level feedback to ensure truly inclusive change. Activities should be led by actors coordinated through local-level multi-stakeholder processes that include representation from cooperatives, CCIs and municipal and/or ward-level representatives. This should include agricultural technical leads where available, and should be limited to around five people to make the process manageable.
  - Key suggested partners are listed above.

Make access to finance, insurance and technology a component of decent work framework. Similarly to the previous recommendation, it is not recommended that the ILO lead in these areas, but rather that it draw on knowledge and experience from existing government and aid-funded programs to improve opportunities for smallholders. The SAKCHYAM and SAMRIDDHI programs for instance are both leading innovative methods supporting access to finance in the agricultural sector (though for SAKCHYAM it is not a focus area). It is recommended that the leads of these programs be invited to input on framing the research around decent work standards for smallholders, disaggregated by gender and youth.
Access to insurance is improving, especially for livestock (FGDs indicated that insurance companies are better able to provide insurance packages for goat, cow and buffalo than crops).[85] Nevertheless, access to livestock insurance is still not as widespread as it should be, and for crops it is extremely limited.

85. For the simple reason that it's easier to measure them as a unit and whether they're alive or dead.

Insurance is often also a prerequisite for a bank loan, and thus its absence limits smallholder access to finance. While no aid-funded programs that focus on insurance are known to exist, it must be included as a component of decent work conditions for smallholders.
Access to finance and insurance is naturally linked to access to technology, the lack of which also inhibits smallholders from scaling up. However, being able to purchase technologies is not valuable in-and-of-itself, as it must be linked to improved supply chains as well as the skills of how to use that technology; improving irrigation practices for example, requires the materials to store and deliver water to crops, which must go hand-in-hand with good agricultural practices (as noted below). More specific technology and skills development is mentioned in the sector-specific assessments in section 4.

Environmental management and Good Agricultural Practices (GAP). Climate impact scenarios indicate that all of the sectors will be affected either directly or indirectly by climate change; while livestock and fish will obviously be affected less than plants, they depend on fodder which, if also impacted, will yield less developed animals (or costs will increase). Diseases are already noted to affect almost all sectors, particularly in cardamom, tea and lentils, and their prevalence is forecast to increase with temperature rise. There is more than enough knowledge within Nepal in government institutions such as NARC and NGOs such as ICIMOD and CEAPRED that incorporate environmental change into their good agricultural practice (GAP) guidance. However, with the absence of government agricultural support services due to the transition process, there is a real risk that this knowledge is not properly disseminated to farmers. While the ILO does not have the technical capacity to lead in this respect, GAP and disease management that mitigate the impact of climate change should be part of any interventions, especially through cooperatives, by improving their ability to deliver technical support and training to members.
An ecosystems approach (see case study box 1 section 3.1) that complements crop and livestock farming with one another can also help mitigate impact on the local environment, by using less fertilizer and other chemicals.

5.2 Sector-specific recommendations

Though each of the sectors have their own constraints and opportunities, the ranking and comparative assessment (see section 3.3 on learning across sectors) highlights where certain sectors can be 'clustered' given the similar level of development of their supply chains. This clustering can help outline budget allocation:

- The leading sectors (tea, dairy, cardamom) require greater support in marketing and quality control but which should be comparatively less costly.
- The mid-range sectors (fresh vegetables, pond fish, goat (meat)) require more support in supply chain stabilization, which will cover investment into both coordination and subsidization of infrastructure development. It is expected that this will take up a larger portion of budget.
- Given the low level of development of the ginger and lentil supply chains, it is not recommended to exclusively focus the interventions on these sectors. Instead, they should be used as reference for action-research on how the public and private sector can improve those supply chains. This requires a relatively low allocation of budget.

Note that where the same recommendations are made for different sectors (such as on GAP and environmental management) they are listed in the previous section (5.1).

5.2.1 Tea, dairy, cardamom

Though there are still issues and constraints in the supply chains of tea, dairy and cardamom, they are all relatively developed and stand out as leaders within the Nepalese agricultural sector – dairy in particular, which contributes 9% to GDP. Overall, their constraints are around quality control and linking this to consumer branding for domestic and foreign audiences.

Tea

Promotion of tea brand. UNNATI successfully supported the development of an orthodox tea brand and this needs to continue to be facilitated to reach global markets, and especially retailers. While the Indian market provides a steady demand, it is clear that for the Nepalese tea sector to continue to grow, they need to more regularly brand and export their tea directly to retailers. This requires collaboration with the CTCF, the Himalayan Orthodox Tea Producer's Organization (HOTPA), Specialty Tea Association of Nepal (STAN) and the Nepal Tea and Coffee Development Board (NTCDB).

Certifying organic (orthodox) tea. The cost of organic certification is prohibitively high for most smallholders and yet many processors are looking to source this from them (and themselves become certified). A specialized revolving loan fund for organic certification could be developed and governed by the Tea & Coffee Development Board, and channeled through either Savings & Credit Cooperatives or an appropriate bank. Potential partners for this can be CTCF and NEFSCUN with learning drawn from the DfID-funded Sakchyam program.

Greater collaboration between cooperative and private sectors. FGDs suggested a degree of rivalry between the cooperative and private sectors but, as identified in this report (see section 3.2.), it is in fact the presence of both cooperatives, that build smallholder capacity through aggregation, quality checks and (limited) training, and the private sector, that is stronger in processing, transport and marketing, that helps the industry as a whole grow. The combination of the two helps maintain prices so that smallholders can shop around for the best rate processors are prepared to pay. It is recommended to work with the NTCDB to help identify where a more collaborative relationship can help strengthen components of the orthodox tea supply chain, including contract farming, quality awareness, certification requirements and coordinating supply to processors.

Patenting Nepalese tea seedlings. Though the ILO should not lead in this, this could become a concern for the sector and so further research needs to be done into patenting and promoting tea seedlings that are unique to Nepal.

Dairy

Improve quality checks at all stages of the supply chain. The vast majority of dairy still reaches consumers through informal chains. There needs to be a large shift to push consumer preferences towards purchasing of pasteurized goods through formal channels, which requires greater awareness of quality requirements, more rigorous enforcement and technical capacity of Good Agriculture Practices, Good Manufacturing Practices and Nepal Standards (NS). This should be done working with both the private sector and cooperatives.

Support National Cooperative Federation with certification label for products. Related to the previous recommendation, the NCF is looking to support the cooperatives involved in dairy with a certification label to promote quality dairy. This will be required to change consumer attitudes, though this of course means stopping adulteration of milk all along the supply chain.

Scale up innovations to remove milk 'holidays'. Farmers should not have to bear the brunt of an excess of supply at high season in a country where consumer demand for the product continues to rise and people consume below the WHO-recommended amount. The program should identify locations where long milk holidays take place and focus attention there to promote access to multiple buyers, including traders and larger private-sector actors. Alternatively, those farmers should be supported to invest in their own processing unit so they can add value to their own dairy rather than having to throw it away. This can also promote local markets in particularly remote areas.

Promote greater diversification of dairy products. While there is currently some variety of products (yoghurt, ghee, butter) and some innovations at local and regional level (dog chew, paneer), limited technology is prohibiting dairy processors from considering options like a greater variety of cheeses or different flavored yoghurts that can appeal to consumers looking for new products.

Cardamom

Value-addition and producer awareness of grading. While the market for heat-dried cardamom absent of a smoky odor remains uncertain, producers can be supported in other value-addition activities that would directly help increase their income; introduce grading to farmers through the development of a standardized training and guidance manual for trainers, so that they are aware of how the three grade types are distinguished, how to grow the highest quality grade, and what the (general) prices of those grades are. The training can also cover things like trimming and, where feasible, weighing and packaging. This can build on the work already conducted by the Cardamom Development Center.

Branding and marketing of high-quality cardamom to international buyers. The industry as a whole can massively benefit from developing a brand and reaching out to buyers beyond India to establish a more diverse international market, especially in Pakistan as well as Bangladesh and Middle Eastern countries. This should be done with the Federation of Large Cardamom Entrepreneurs Association of Nepal.

5.2.2 Fresh vegetables, pond fish, goat (meat)

These three products supply domestic markets and to varying degrees are insulated from global competition due to their perishability. They all have semi-stable supply chains that, with improvement, could encourage higher investment into production, and more formalized wholesale and retail sectors.

Fresh vegetables

The sector suffers from extremely poor coordination between supply and demand, which destabilizes prices and discourages further investment by most supply chain actors. The following recommendations aim to address this.

Extend seasons with technology. Currently all producers tend to deliver the same products during the same harvest seasons. Introducing simple technologies such as small-scale irrigation and greenhouses can allow farmers to spread production to earlier and later periods throughout the year. This can be done by government subsidy, but also private entrepreneurs and companies who are willing to provide services to the farmers to grow vegetables using modern technologies (organic, GAP, IPM, PRA, etc.,) in tunnel, and in return buy back vegetables at the prevailing market price with an added premium.

Coordinate supply along the chain. New collection centers should be established in new areas and existing ones improved through investment in value-addition facilities such as weighing, sorting, grading, packaging, pesticides monitoring devices and potentially labelling. Some collection centers can also be supported to establish cold storage units that can preserve multiple products (so not just fresh vegetables, but dairy, ginger, as well as input supplies like fodder).

Improve transport quality and coordination. Lots of produce is lost in post-harvest transport, which is a risk traders calculate into their buying and selling rather than investing into better storage. Similarly, while some market centers are inundated with produce at certain times, others may still be looking for more due to consumer demand. Establishing and coordinating a quality supply of goods in a pre-arranged, rather than ad-hoc, manner can in turn smooth out the flow.

Access to information. There is a need to bring uniformity in the data collection (price and quantity of various types based on its size, origin, and types of farm) at all major market centers and dissemination of such information to the public through the media. This would ensure accuracy of data for appropriate allocation at market centers (see previous recommendation) and policy decisions. For example, price of tomatoes should include small size, big size, tunnel tomatoes, and tomatoes from hills or Terai.

Pond fish

Support inactive groups and cooperatives in core areas to build technical capacity of smallholder pond fish owners. Given the demand of fresh fish in the country, there is a real need to build up the capacity of producers. This includes areas of quality feed supply, proper feeding practices, use of feeding sacks to monitor feed consumption and correlating with health conditions, (greater) access to quality fingerlings, improving quality of water, deep boring facilities, subsidy in electricity, upgrading and maintenance of old fish ponds, use of modern tools and equipment (aeration) and regular technical services. Cooperatives and groups should be supported by the Pond Fish Association and the Fishery Association of Nepal to build the capacity of those groups to supply these types of services to farmers, and improve access to loans under the government directive (integrated subsidy loan guidelines, 2075 by the Ministry of Finance) to provide subsidy loan services from all banks and MFIs with a special provision to the agriculture sector.

Support traders to professionalize aggregation and transport. Currently transport is done with an innovative invention to keep fish alive and hence sold fresh at market – but this model is expensive and may be challenging to scale. These transport corridors should be supported with R&D to find cheaper alternatives to transporting fresh fish.

Formalize points of sale with access to loans. Currently a lot of fish is sold on the ground which degrades the quality and is a consumer health issue. Consumers are prepared to pay a premium on the other hand for local-sourced and/or live fish, which requires investment in improved infrastructure. Provincial government funding can be allocated to establish more formal market stands for fish sellers that allow them to keep their fish alive or preserve them for longer.

Goat (meat)

Establish resource centers and farms to improve access to improved goat breed varieties. There are a number of varieties, such as the Boer goat, that have real market benefit but are not widely bred due to a lack of breeding centers or agro-vets. Resource centers at key locations and close to smallholder

households can help improve access to quality breeds and provide partial veterinary services in emergencies. Similarly, resource farms can provide training on proper management and care, e.g. feeding, shed, breeding, medicines, etc. and sell these resources as well. For regular specialized veterinary and other services for the farmers, there should be on-call services from the government and private providers at nominal rates. This can link to a livestock innovation program on goat feed for which the government recently issued a call for tenders

Standardized training for farmers. In addition to services to goat farmers, basic training that covers essentials such as land allocation and vegetation types that provide nutritious fodder for goats (such as Neapier, ipil-lpil, stylo, Bakaino trees), prevention of inbreeding and advice on which breeds are most appropriate for them should be provided by trained technical service providers.

Formalize the supply chain. At the moment goat supply is somewhat ad-hoc. For a more regular supply there should be a collection mechanism from the farmers through the collectors and trading should take place in special goat markets that includes proper shed and weighing scales. Slaughter houses and cold storage facilities could also be established to cater to institutional buyers (hotels, catering) which can utilize wastage such as bones, blood, etc. to supply other industries.

Improvement of loan and insurance structure. For investment in the goat value chains for farmers, banks should provide loans that are appropriately structured to the sector; goats are a relatively high risk investment, given the difficulty of going from subsistence to small-scale commercial (e.g. 10+ herd size) farming because of the additional resources required. Loans should be provided at a subsidized interest rate for at least 10 years in order to allow farmers to capitalize on returns from business. Similarly, while the insurance sector is taking off for livestock, wider coverage across the country needs to be encouraged.

Ginger, lentils

The supply chains of these two products are relatively underdeveloped (as illustrated in the sector ranking, section 3.3), which discourages smallholders at the base of these chains to invest more in their production, which is grown mainly for subsistence purposes. While it is not recommended that the ILO implement direct interventions on these two supply chains, they can serve as action-research to develop policy recommendations of how government and private sector should work to further develop these and others similar to them. Some lessons learned can be derived from the current assessments:

Livelihoods & production. Both lentils and ginger have the benefit of not being highly perishable, allowing farmers to select whether to sell or save for planting until next season. Lentils have the added benefit of being able to be sold to agro-vets as seeds as well. Introducing storage bags and low-cost, possibly collective, storage facilities can help provide farmers with more flexibility.

Disease management will remain key for a range of products given rising temperatures and insect prevalence. Therefore, farmers will need to be trained on managing these for a whole range of crops and livestock.

Farmers will likely maintain crop diversification and therefore educating them on nitrogen-fixing plants such as lentils is helpful in maintaining a sustainable smallholder farm.

Trading (transport) & processing. Both products have existing groups and cooperatives that are currently under-utilized. Looking at more developed sectors,

we see that activating these groups through proper governance systems and service-provision to its members helps tremendously in getting farmers more enthused about the products.

Traders' strengths are in linking supply to demand, but not necessarily in sharing information back to producers. Regular engagement with traders on what the market is looking for, and when, can help cooperative, government and private sector services providers calibrate their services, information and inputs to farmers.

Wholesale & retail. Despite both products having a significantly higher value when grown chemical-free and, in the case of lentils, having a distinctive flavor preferred by Bengalis, and in the case of ginger, having secured a bi-lateral trade agreement with India, without coordinating bodies (like in other sectors) to monitor and oversee these trends, these opportunities cannot be leveraged; simple processes of quality control, marketing and branding can help target niche markets, but this requires investment.

Support services & enabling environment. Almost all actors *in* a supply chain have a granular knowledge of their own constraints and opportunities, but few have a view *over* the whole supply chain, which is where sector-specific coordinating bodies are key. While the ginger sector has the Nepal Ginger Traders Association, this most likely doesn't serve the interests of the small-holders, cooperatives or other actors involved. The lesson learned from the other, more developed, supply chains is that these oversight bodies are key to improving the sector.

6 Annex

6.1 Selection criteria

The following selection criteria were agreed upon with the ILO at the start of the assessment, and were used as reference during the literature review, selection of organizations and interviewees, and in the design of the FGDs.

Economic & enterprise:

- Current and future market demand (local informal & formal markets and/or export)
- Comparative advantage (macro): natural resource base, labor base (skilled, unskilled), business and support services provision (inputs, processing), ag-tailored financial products.
- Level of competitiveness (micro): agricultural innovation, post-harvest loss, quality control, supply chain stability
- Potential of market actors to scale up (in informal/formal sectors)

Institutional:

- Sector (promotion) policies and regulations are in place and effective
- Government / donors / support organizations' readiness to change, to collaborate and to align with interventions

Social:

- Prospects for poverty reduction and inclusion of disadvantaged groups (women, youth)
- Opportunities for (self-)employment creation & improved working conditions
- Impact of the value chain on surrounding communities (including scale-up potential)

Environment:

- Impact of climate (and climate change) on value chain functions
- Impact of the value chain functions on the environment (e.g. environmental sustainability)

6.2 Interview guidance

Questions for 1-1 interviews with key actors were designed on an individual basis, while the following guidelines were used for field-based FGDs, mostly with smallholders. 1-1 and FGD interviews were both semi-structured and allowed for an open dialogue alongside collecting specific information.

Key guidance:
There are 3 main expected insights from these FGDs

1. How much income do they gain from these products currently (and thus how much would it affect their income if they could produce more of it).
2. How much time and money do they currently invest in this product, and can they afford to invest more time/money given their current means.
3. How interested are they in this product(s) versus other sources of income.

Group composition:

- gender-balanced (e.g. 50/50)
- include disadvantaged groups, e.g. young women & men, single-headed households

General information:

- Age
- Household composition (# of kids and dependents)
- Caste
- Land size
- Livestock population (cow, buffalo, ox, goat, hen, etc..) in numbers

Note – for dairy, this includes addressing cows and fertilizer use.

QUESTIONS

Livelihood & labour

- What are your key sources of household income?
- Which is most important (include farm / off-farm)? If appropriate, ask for each person to make an estimate by % over one year of how much they earn from each source of income.
- Have the sources of your income changed over the last 5 years or remained the same? If they've changed, in what way? Has their relative value changed?

We would like to learn more about product(s) XXX

- How much quantity was produced (daily/monthly/seasonally)? Out of that what percentage was consumed and sold? Please be as specific as possible
- What are you responsible for (production, processing, selling)? How many hours in a day/week do you spend on this?
- What are others in your household responsible for (production, processing, selling)? How many hours in a day/week do they spend on it?
- Are you interested in increasing production of this? Why/why not?
- If you were to increase the amount of time working on this product, how would it impact on your other responsibilities? This can include looking after children, cooking, cleaning, etc.

Investment & finance

- How much money do you already invest in this product? (purchase of seeds, fodder, tools, machinery, etc).
- Are you prepared to invest more in this product if you feel you could earn more income? Or from any other product? Why/why not?
- Do you have a loan or have you had one before? If so, from who?
- If you thought there was an opportunity to earn more from any of the things you produce, would you be prepared to take out a loan for it?
- Did you have insurance policy for crops and livestock? If yes, have you had any claim in the past and/or any settlement issues?

Market

- Who do you sell to? Other consumers at market / individual buyers / business rep buyers / cooperatives (could be all). If more than one, how much do you sell to each?
- Do you feel you get a fair price? Why / why not?
- Are you able to negotiate on price?
- Do you agree on price before the season?
- Do you have access to market price information?
- If you are asked about product quality, what are key indicators for you? (this is to test their understanding of the product quality the market demands)
- Do farmers and groups/cooperatives link to a stable market along with supporting services?
- When and how are prices set?
- Do farmers know where to (market, trader) sell their produce?

Environment

- Do you feel the climate has a strong impact on the quality / quantity of your product? If so, how?
- Do you feel that impact has gotten greater over the last 5 years? How?

Technical and business services

- Do you receive these services from other people? If so, who? This could be from the government, the private sector or cooperatives, or otherwise just from neighbours.
- Do you pay for these services?
- If not, are you willing to pay for such services?
- Have you registered your farm? Why or why not?
- If you have registered, do you see a benefit from this?
- Do farmers adopt improved technologies or management practices?
- Are you aware of the services that local government should be providing?
- Have you been asked by any service providers what type of services you would like to receive?
- What type of services would you be interested in receiving? Would you prefer to get this from the local government, cooperatives or the private sector (traders, JTA, etc)?

Groups and cooperatives

- Are you a member of a group and/or cooperative?
  - If not, have you ever applied?
  - If yes, please name which one and explain its structure and the services it provides; is it paid membership; how many members are there; do they support one or multiple sectors.

6.3 Ranking tool guidance

This ranking tool was developed specifically for this assessment and isn't derived from other possibly similar tools. It is not intended as a scientifically rigorous means of categorising supply chains, but rather a means of simplifying them to a degree that it enables comparability across each of the key stages of markets. It also presumes a degree of development dependency, e.g. that supply chains must go through a pre-defined growth process to improve, which in reality may not be the case.

The following are summaries of each of the stages, followed by a more detailed definition in the table on the following pages.

Emerging. It is risky for any actors at each stage of the supply chain to make longer term investments as the unit price is unregulated and unstable. Farmers at the production stage have little awareness of market requirements, processors provide limited value-addition and produce is sold relatively unprocessed or, if there is an export market, as wholesale. Support services and the enabling environment are limited, and they don't properly sync with actor's needs along the chain.

Establishing. While price still fluctuates it is stable enough for actors to make investments along the chain; improving yield quality and quantity, some grading and processing, product differentiation and sales to different consumers (local, urban, export). Farmers recognise it as a (limited) opportunity and employees along the chain benefit from seasonal labour opportunities. Access and quality of services are improved (BDS, loans, insurance), as is awareness of rights (government subsidy programmes).

Expanding. Producers 'crowd in', some invest in technology and officially register as businesses. Services are readily available through coops, the private sector and the government for majority. Traders, SMEs and larger scale businesses provide multiple channels for grading, processing and packaging. Quality is benchmarked at least against national standards, and regional/national coordinating platforms are established. Loans and insurance are also generally available to those with credit history. More employees along the chain are able to secure decent work.

Leading. Majority of farmers are able to mitigate all but most extreme risks based on knowledge, technology, insurance or services. There is transparency in pricing and market information is widely accessible for all actors along the chain, overseen by a coordinating platform that includes market, labour and environmental representation. Quality standards are monitored by third parties and sector products are diversified and sold widely across the country as well as exported. People (self or wage) employed along the chain receive fair compensation, where possible have a contract and aren't discriminated against based on gender or age.

Table 19: Sector ranking tool (complete version)

	Livelihoods & production	Trading (transport) & processing	Wholesale & retail	Support services & enabling environment
1. Emerging	a. Primarily subsistence farming and livestock, weak understanding of market requirements, income from multiple products to manage risk. b. Young men migrate to urban/abroad for work. Women carry 'double burden' of farm and HH work. c. Limited understanding of livestock rearing, crop management or use of ag technology.	a. Loose network of traders determines collection and transport. Little grading or value-addition, and loss of produce in-transit. b. Feedback to farmers on quantity/quality needs absent or ad-hoc. c. Almost all self-employment or day-labour, with strong bias towards men.	a. Price unstable and determined only by seasonality and shelf-life, with absence of supply-and-demand management. b. Little distinction between wholesale/ retail goods and foreign access limited to wholesale. c. Consumers prefer to source from local or even own supply due to lack of trust in overall market quality.	a. Access to support services, business development services, input suppliers, employment rights almost absent. b. Coops absent or ineffective, no sector-specific oversight body or farmer representation. c. Farmers, traders, workers have limited or no access to loans, insurance, distrust in existing providers, MFIs not focused on agriculture.
2. Establishing	a. Some grading, weighing. Price sufficiently stable to save and invest income and land for higher yield. Leading farmers see sector as business. b. Young men migrate for 'prestige' though farm income is higher. c. Some application of good management and technology (limiting pesticides, crop rotation, irrigation, etc.), livestock management.	a. Aggregation points established by farmer groups, coops that complement traders. Limited value-addition and decline of in-transit loss. b. Quantity/quality requirements understood and agreed upon, but limited support to meet standards. c. Seasonal labour available in small factories, coops, SMEs with reduced gender bias.	a. Quality differentiation, value-addition and improved transport corridors stabilize prices. b. Product differentiation separates wholesale (export) markets and retail. c. Outlets respond to varying consumer preferences with packaging and limited branding.	a. Limited support and BDS provided (paid/unpaid) through coop, government, private sector, including (basic) worker rights. b. Farmer groups, tier one coops established that respond to farmer needs and help negotiate price, employment conditions. c. Some farmers able to access loans, default rates manageable for creditors. Some insurance available, though banks and insurance still limit exposure.
3. Expanding	a. Farmers understand market requirements, able to mitigate some risks including climate (change) impact. b. Coop membership and/or small-scale business led by both young men and women. c. Pesticide use managed or removed (organic), many GAP and ESH practices applied. Livestock management integrated with farming.	a. Farmers sell to multiple buyers (coops, traders, factories) based on contractual agreements. b. Quality, processing, storage, packaging at multiple stages that adds value and diversifies product. c. Seasonal and permanent employment available for (semi) skilled workers with contracts. Gender bias reflected in job hierarchy and income.	a. Formal quality standards adopted and pricing partially or wholly regulated at various stages of supply chain. b. Diversified retail goods sold across multiple provinces and multiple export markets sought for refined/ retail goods. c. Consumer trust based on food regulation, consumption trends based on quality and lifestyle preferences.	a. Easy access to (paid) support services and inputs through coop, gov't, private sector. b. Product-specific coordinating platforms exist at district, provincial or national level and dialogue is facilitated between key actors (business, coops, gov't, unions, etc). c. Banking and insurance sectors have established products for farmer as well as traders, processors.
4. Leading	a. Farmers able to maintain (or increase) income despite market, climate, disease risks through insurance and technology. b. Ag entrepreneurship attracts (young) men and women. Women can own and control production, sales and income allocation. c. All GAP practices plus ecosystem and biodiversity applied in farming. Quality work standards enforced for employees. Livestock breeding at commercial scale.	a. Leading small-scale farms compete with larger businesses through value-addition, specialisation. b. Production and post-harvest increasingly integrated and formalised. c. Agricultural production and post-harvest employment regulated and presence of life-long career opportunities.	a. Economies of scale push down consumer prices while maintaining quality. b. Product supply chain integrated into global trade, making diversified consumer goods accessible country-wide and internationally with marginal price distinction. c. Consumer awareness and preferences also determined by sustainability and social impact standards.	a. Decline in subsidised government support services as farmers are able to invest and pay. b. Coordinating platforms establish and enforce quality standards, provide access to global market information. Linked to labour unions and government ministries to support business and employee rights. c. Actors in agriculture market are supported by investor, banking and insurance sectors.

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ISBN 9789221337225