CHARACTERISATION OF FARMING SYSTEM DIVERSITY IN MID-HILLS OF NEPAL

PARTICIPATORY VALIDATION OF STATISTICAL FARM TYPOLOGIES

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The Mixed Farming Systems Initiative aims to provide equitable, transformative pathways for improved livelihoods of actors in mixed farming systems through sustainable intensification within target agro-ecologies and socio-economic settings.

Through action research and development partnerships, the Initiative will improve smallholder farmers' resilience to weather-induced shocks, provide a more stable income and significant benefits in welfare, and enhance social justice and inclusion for 13 million people by 2030.

Activities will be implemented in six focus countries globally representing diverse mixed farming systems as follows: Ghana (cereal–root crop mixed), Ethiopia (highland mixed), Malawi: (maize mixed), Bangladesh (rice mixed), Nepal (highland mixed), and Lao People's Democratic Republic (upland intensive mixed/ highland extensive mixed).

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1 Abbreviations and acronyms

ABC	Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT)
CIMMYT	International Maize and Wheat Improvement Center
GM	Gurbhakot Municipality
HCA	Hierarchical Cluster Analysis
HTM	Halesi Tuwachung Municipality
ICARDA	International Center for Agricultural Research in the Dry Areas
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IRRI	International Rice Research Institute
IWMI	International Water Management Institute
MFS	Mixed Farming Systems
PCA	Principle Component Analysis
SDG	Sustainable Development Goals

2 Background

In the recent decades, stratifying agricultural holdings into mutually exclusive and relatively homogeneous groups has gained momentum to tailor products, services and supporting arrangements to the structure and function of farms, farm typology, (Kaur et al., 2021). The farm types are constructed based on farm features, components, production orientation as well as farmer's socio-economic profiles (Hoppe & MacDonald, 2013; USDA, 2021). Despite accelerated farm type development, their applicability in project targeting is challenging as robust validation is required especially when they are developed from use of unsupervised algorithms. Studies have found high variability in the number of clusters formed resulting from slight change in either number or type of variables used (Alvarez et al., 2018; Kuivanen, Michalscheck, et al., 2016).

As a result, stakeholders use a few farming system attributes and engage domain experts to formulate and validate farm types (Dossa et al., 2011; van de Steeg et al., 2010). In expert-based validations, two approaches have been used: confirmatory in which the resulting typology is presented to the validation panel who compare it with their own knowledge on the local farming systems diversity (Alvarez et al., 2018) and subjective in which expert-based classification/participatory characterization is compared with statistical typology using confusion matrix (van de Steeg et al., 2010). Involving both farmers and experts in a participatory process enhance the description, categorization and interpretation (Kuivanen, Alvarez, et al., 2016) although in mid-hills of Nepal, the loci of farmer knowledge is limited due to geographical barriers which limits generalization to wider landscapes. However, multi-stakeholder approach compliments farmers experiential views with wider municipal and ward planning domains (Nyambo et al., 2019).

Access to innovations, strategies, and support for improving productivity, income and resilience to shocks vary across space and social-economic profiles. Understanding these differentiations could help decision makers and service providers to tailor the development interventions and advisory. Untargeted support potentially widens skewed distribution of resources, inequality, and degradation hotspots within adjacent landscapes. Multistakeholder platforms are being established to support co-creation and enhance system synergies. According to the typology by Zepeda et al (2023a, 2023b) and earlier consultations (Jibesh Kumar et al., 2023; Neupane et al., 2024), farming systems can be grouped into four distinct types in mid-higher altitude of Khotang and into 5 farm types in Surkhet. The farm-types depict the varying levels of resource endowments from farms that depend on remittances to those with strong agricultural income stream, located in varied agro-ecologies with different production systems that include millets in high-altitude, in remote areas with maize and livestock, marginal maize landscapes, to small intensive rice-wheat systems, supported by innovations for system reconfiguration such as emergence of home gardens, irrigation, forage, feminization of labour, mechanization and markets.

Against this backdrop, this study was conducted as a confirmatory evaluation of the typologies proposed by Zepeda et al (2023a, 2023b) to explore which farm and household attributes farmers use to differentiate themselves. The additional objectives of the study were to assess if the current strategies used in targeting by stakeholders correspond to the typology and to explore potential entry points

for innovation setting the ex-ante probability of adoption given related risks and resource envelop.

3 Methodology

3.1.1 Study area and design

The main purpose of the study was to engage stakeholders in describing and explaining diversity in farming systems and explore approaches for targeting innovations (Figure 1). A qualitative approach was used to gather perspectives on differentiation and insights on innovation targeting. The stakeholder workshops were conducted in Halesi Tuwachung municipality in Khotang district and Gurbhakot Municipality in Surkhet in 2024. These districts and municipalities were purposively selected as case studies to compare and validate farm typology results from a household survey conducted in 2023 (Zepeda et al., 2023a, 2023b).

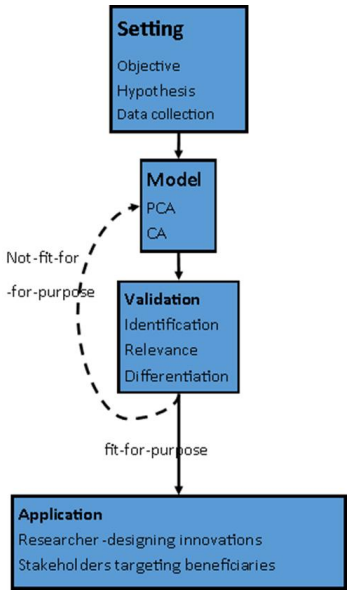

Figure 1: Farm typology development, validation and application workflow.

3.1.2 Participant selection

To capture key enablers necessary for scaling the innovations, a range of stakeholders participated including government, private sector, and NGOs organizations with core mandates from *awareness, implementation to policy plus enabling conditions such as gender*. Farmers from two research sites in each municipality of Khotang and Surkhet were also consulted in group settings. Stakeholders represented irrigation/crop and fodder/livestock sub-sector for assessing the current practices considering their core mandate(s) to support farmers and users on:

I. Awareness, confidence and trust, capacity through information service or extension.
II. Availability, access to finance/affordability
III. Compatibility with existing farming, market and business systems or business models
IV. Capacity and know-how including training and extension.
V. Gender equality and social inclusion, legal conditions and governance including partnership building.

3.1.3 FGD and KII: design, setting and implementation

Information was gathered through focus group discussions (FGDs) and key informant interviews (KIIs). Three FGDs were conducted in each municipality: two with farmers drawn from wards number 6 and 7 of Halesi Tuwachung and wards number 12 and 14 in Gurbhakot Municipality. The third FGD was conducted with major stakeholders working in one or more of the core mandates. The FGDs were intended to collect generalized/broader information on typology alignments and intervention targeting based on consensus among participants from different stakeholder groups.

Key informant interviews (KIIs) were conducted with the same participants in selected study areas consisting of informants from a range of stakeholder groups such as government technicians, value chain actors and farmers representing different farm-types across gender, age and socioeconomic background. The KIIs were primarily done to solicit stakeholders' perceptions on potential contribution of major indicators including share of maize, manure, fruit trees/fodder and homestead on indicators like diversification, income, nutrition, yield, soil quality, food security and equity under different typologies.

1) **Government actors-** Municipal, ward and Palika (village) leaders provided the differentiation within the administrative jurisdictions and highlighted the approaches government programs follow to target farmers with support services and subsidies.
2) **Value chain actors-** The input/ output retail agrovets and cooperative members within the wards highlighted perceived market orientated differentiation of the MFS in the wards.
3) **Practitioners –** MFS farmers and/or representatives of farmer groups (men and women) gave differentiation in terms of both consumption and market orientation as well as inference of perceived social cohesion.

4 Results and discussions

4.1 Farm typologies of study areas and their alignment

In 2023, distinctive farm types for Nepal's eastern and western mid-hills were generated through a household survey and statistical analyses (Zepeda et al., 2023a, 2023b). During 2024 participatory discussions, the types were described to the stakeholders who reflected on the definitions and their use for innovation targeting. In Khotang, the major factors considered for the discussion were market distance, maize and millet grown area, livestock weight, income source (on- and off-farm) and remittance. On the other hand, in Surkhet, the major sources of differentiation were input use, type of cropping pattern, land type (high and low) and resource availability. For the sake of easy understanding by the participating stakeholders at local level, only those major differentiating factors were presented in detail.

Table 1: Farm typologies of Khotang and Surkhet derived from 2023 survey.

Farm Type	Halesi, Khotang	Gurbhakot, Surkhet
Farm Type 1	Marginal maize-based farm households with remittance-dependent income	Smallholder Intensive Rice-Wheat Farm households
Farm Type 2	Farm households who have strong agricultural income streams	Small-Scale intensive mixed crop-livestock farm households
Farm Type 3	High altitude millet-based subsistence farm households	Diversified farm households with off-farm and livestock driven income
Farm Type 4	Remote and extensive maize-livestock farms with remittance-driven income	Marginal micro-farms reliant on non-farm income
Farm Type 5	-	High-Altitude and remote livestock and off-farm income-based households

During the focus group discussions, stakeholders estimated the proportion of households in the municipality jurisdiction that falls under the different farm typologies delineated by the statistical procedures. Only 3 to 4 principal factors were considered while describing the typologies to the respondents, which allowed them to give a rough estimate of household proportions under different farm typologies.

In the two wards of Khotang, farmers identified themselves and/or other farmers in the four farm types, among them farm type 3 was found in very less proportion (<5%). This can be attributed to the fact that millet is being grown by majority farmers for home consumption in cultural festivals, so the millet farmers spread in all farm types as well. While farm type 4 proportion was estimated much higher by the stakeholders, the reason behind this could be misinterpretation of market distance in the statistical typologies. In the rural hill context, roads often damaged by rainfall and landslides thereby blocking the road completely or partially for some time. This indicated that households near to the market by the kilometre distance might be less accessible due to road conditions. This implied that quantitative results from statistical analyses misaligned with the understanding of local stakeholders on ground reality.

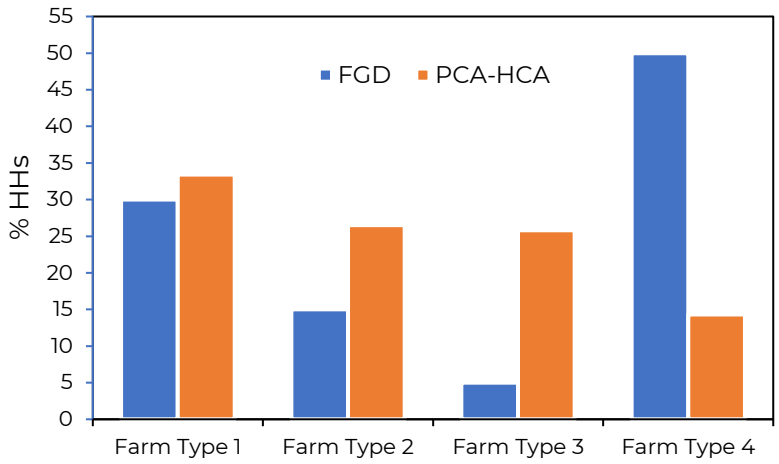

Figure 2: Proportion of statistical typologies and comparison with responses from FGD participants in Halesi, Khotang.

In Surkhet, participants identified themselves and/or other farmers with the 5 typologies. However, they find difficulty in differentiating farm type 2 and 3 as they look similar when only considered the few major factors like market distance, input use, off-farm income, livestock income, etc. Farm type 1 is also in many cases resembled with farm type 2 and 3. Although altitude is a distinctive feature in mid-hills, farmers diversify cropping through plot fragmentation. They own plots located both at higher altitude and lowlands. Most farmers tend to grow rice in lowlands during the monsoon season. This creates complexity in differentiating farms based on altitude as identified in farm type 5. Although, the participatory estimates of household proportion under 5 typologies of Surkhet were in congruent with the statistical typologies, possibility of uniting different typologies does exist to have clear distinction among the typologies.

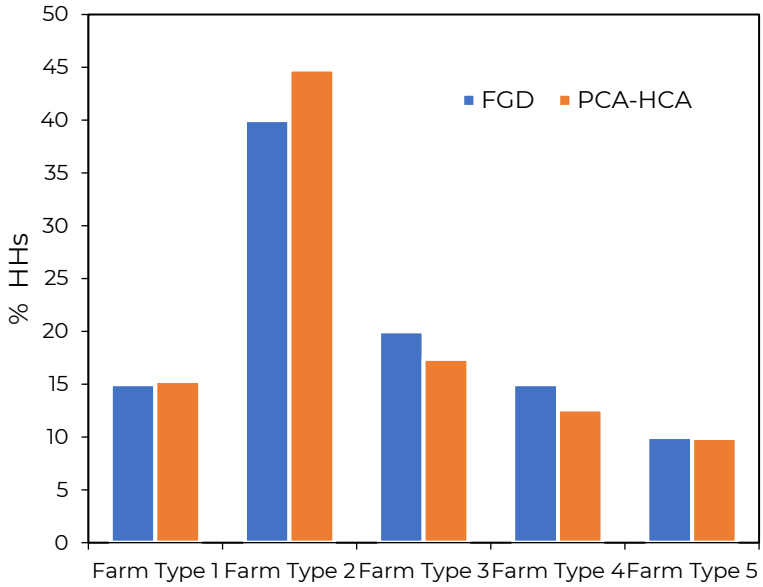

Figure 3: Proportion of statistical typologies and comparison with responses from FGD participants in Gurbhakot, Surkhet

Participants in FGDs generally identified themselves or others in one of the typologies based on the differentiated structural and functional resources, such

as remittances, agricultural income, share of maize or millet and altitudes. On the flip side, they also found it difficult to differentiate in terms of some crops or resources indicated by statistical analyses. For instance, in Khotang, irrespective of variations in remittance or agricultural income, almost all the HHs reported that they grow millet and raise livestock. This overlap of resources fails to distinguish between typologies identified through quantitative analysis in the existing scenarios where there is not any available/accessible tool to support prepare actionable plans by measuring the thresholds.

4.2 Farmer differentiation

Farmers across gender and sites shared differential perceptions on the factors used in typology development through statistical procedures. The main plot and surface declared further illustrate why the typologies derived from statistical analyses might misalign with farmers' perceptions.

The results clearly demonstrate the response distributions of main plot surface (in ropani) and surface declared (in ropani) in Gurbhakot and Halesi Tuwachung by gender (Figure 4). These graphs indicate that both males and females in Gurbhakot and Halesi Tuwachung show very small or no difference with respect to area for main plot surface in their respective municipalities. However, the graph (Figure 4, right) clearly shows substantial difference in surface declared (in ropani) between males and females in Gurbhakot, while such difference is nominal in Halesi Tuwachung although wider distribution is reported by males. Both males and females from Halesi Tuwachung generally tend to have higher and varied surface declared in comparison to those in Gurbhakot. This may be attributed to the difference in land tenure among farming households in the municipalities. Overall, these results demonstrate differentiated HHs' responses for main plot surface and surface declared (land holding) by gender, geography and their interplays.

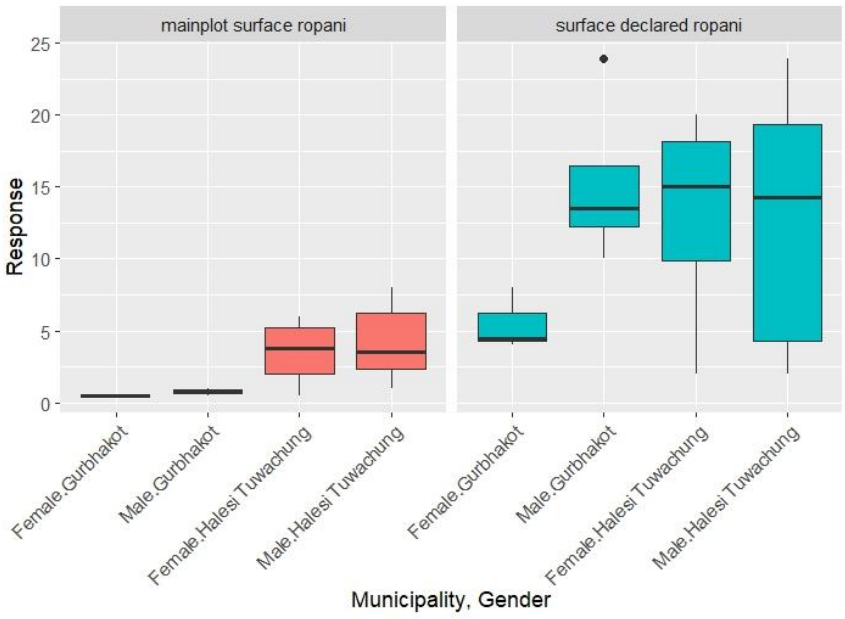

Figure 4: Boxplots showing different responses from participants for main plot surface and surface declared.

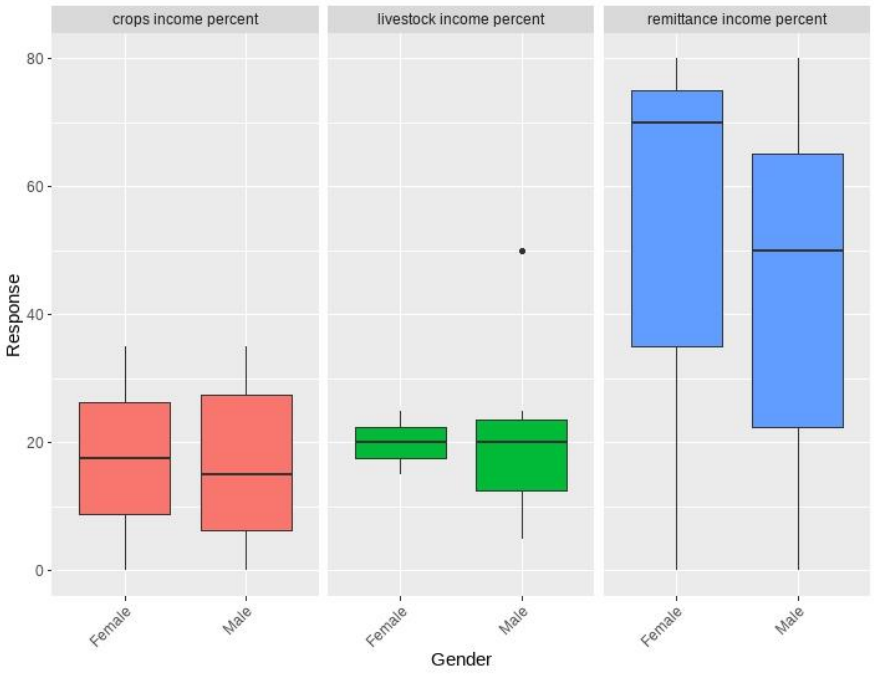

Figure 5: Percentage contribution of crops, livestock and remittance to household in Halesi Tuwachung

Figure 5 indicates distributions of males and females' responses for various incomes in percentage. The box plots (left and middle) show that there is no substantial difference in the distribution of crop and livestock incomes in percentage by gender. However, the box plot (right) clearly demonstrates the females tend to report higher percentage of income from remittance compared to the males.

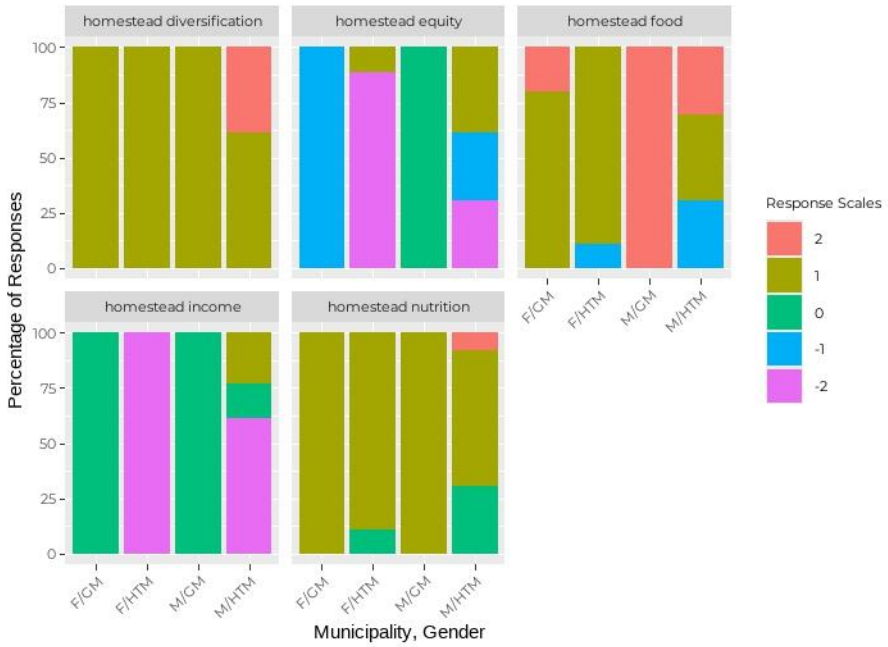

Figure 6: Contribution of homestead on different indicators as identified by the stakeholders, differentiated by gender across municipalities.

Figure 6 depicts how stakeholders, mainly practitioners perceive the contribution of homestead in the households differently. Majority respondents agreed on positive role of homestead on diversification, food security and nutrition at household level but with additional room for improvement fulfilling the gap in homestead production practices. Contribution of homestead on equity and income is debatable with more inclination towards neutral to negative scales. Equity contribution was also differed by gender - male having neutral to positive and female having negative responses – indicating that gender dimension also plays crucial role in defining typologies.

4.3 Relevance of factors used for statistical typology development: Expert subjective assessment

Following the guiding protocol developed for the participatory validation exercises, in both municipalities, we attempted to get quantitative information on the factors/variables utilized/selected for delineating typologies through PCA and HCA. However, stakeholders and farmers find difficulty in providing figures for most of the factors/variables comparing typologies. Based on subjective responses received from the respondents on the questions related to the factors/variables, the research team categorically discussed all the factors and mapped them into binary outcomes, whether each of them fit for distinguishing households (Table 2 and Table 3). Stakeholders identified some structural and functional variables that could really be helpful in differentiating households. While many of other variables were disregarded by the stakeholders either due to difficult estimation/measurement procedures or unavailability of required data, indicating that factors selected for typology categorization should be realistic, practical and context-specific for devising actionable plan by the stakeholders.

Table 2: Stakeholders' perception on relevance of factors/variables used in statistical farm typologies for Halesi Tuwachung, Khotang

Variable/factor used in typology	Factor taken for clustering (Yes/No)	Distinguishing factor (Yes/No)	Possible reason(s) identified
Altitude (m)	Yes	Yes	Altitude is determining farming practices.
Distance from market (km)	Yes	Yes	It affects what to grow or rear depending on market reach. Road condition is a missing variable, which largely influence transport of farm products and linked with distance from market.
Surface declared (ha)	Yes	No	It changes time to time in different seasons and years.
Share of land in winter (%)	Yes	No	Winter planting is subject to late season rainfall so the cropped area changes.
Total fallow land (ha)	Yes	No	Fallow land area changes
Main plot surface (ha)	Yes	No	No clear distinction of main plot in terraced lands.
Diversity of fruit trees	Yes	Yes	Linked with altitude, fruit species differ among households. Not the number of species but the types differ.

Diversity of animals	Yes	No	As a subsistence practice, most farmers rear similar livestock. Usually, livestock rearing is determined by caste and cultural differences.
Seed input usage	Yes	Yes	High land tenure, higher use of seed inputs.
Manure input usage	Yes	Yes	Higher the land tenure and livestock numbers, higher use of manure
Chemical fertilizer usage	Yes	No	Chemical fertilizer application is negligible in the areas and subject to availability.
TLU for sheep and goats	Yes	Yes	Market-oriented thus medium and small farms can be differentiated. Very few large commercial farms
TLU for pigs	Yes	No	Usually for home consumption in Rai community.
TLU for hen	Yes	No	Usually for home consumption in Rai community. Very few medium-sized poultry farms
TLU all animals	Yes	No	Difficult to predict and estimate for all animals and likely to be similar as farmers often prioritize one or two livestock types. Buffalo farmers less prioritize goat/pig farming.
Homestead diversity all crops	Yes	No	Few options of homestead crops that are cultivated by each household
Total homestead production (matter)	Yes	No	Few households near to market tend to produce more vegetables. But very difficult to estimate the production in homestead.
Self-consumption of homestead production	Yes	No	Market is uncertain and the price fluctuates time to time. Self-consumption is determined by market.
Income from livestock	Yes	Yes	Livestock income can be easily calculated and more stable
Income from crops	Yes	No	Very inconsistent crop production so difficult to distinguish. Further, mostly used for HH consumption rather than to sell.
Remittances	Yes	Yes	Household which gets remittance and not – can be distinguished
Farm products into off farm activities	Yes	No	Very difficult to measure/estimate as it depends on quantity of production and types.
Share of land dedicated to banana (%)	Yes	No	Banana is not cultivated with plan in fixed land, self-emerges in some spots.
Share of land dedicated to maize (%)	Yes	Yes	Maize is a primary crop, so can be distinguished based on land tenure. Can be difficult again as maize is cultivated almost in every farm.
Share of land dedicated to masyang (%)	Yes	No	Mixed with maize and other intercrops and area changes year to year.
Share of land dedicated to millet (%)	Yes	No	Mixed with the maize but usually cultivated by majority farmers. Differentiation is difficult.

Table 3: Stakeholders' perception on relevance of factors/variables used in statistical farm typologies for Gurbhakot, Surkhet.

Variable/factor used in typology	Factor taken for clustering (Yes/No)	Distinguishing factor (Yes/No)	Possible reason(s) identified
Altitude (m)	Yes	Yes	Farming practices differing in different altitudes.
No. of HH plots	Yes	No	Plots differ in size depending on elevation and slope.
Surface declared (ha)	Yes	No	Changes across season and year.
Land occupancy (ha)	Yes	Yes	Available land tenure information can be utilized to distinguish HHs.
Land availability by HH habitants (ha/hab)	Yes	No	Different land types within household makes it difficult to equally distribute to HH habitants (Not a practical measurement).
Land availability by TLU score (ha/tlu)	Yes	No	Farmers rely on external resources (forests, feed from market) as well.
Main plot surface (ha)	Yes	No	No clear distinction of main plot in hill regions.
Times grass planted for cattle (n)	Yes	No	Usually same across HHs (often determined by water availability), difference is how much the HHs are dependent on forests and feed from market.
Diversity of animals (n)	Yes	No	Very difficult to differentiate as similar types of livestock reared across landscape.
Seed input usage (kg)	Yes	Yes	This is correlated with land occupancy and surface declared. Remain tentatively constant across seasons and years per household.
Manure input usage (kg)	Yes	Yes	Correlated with TLU and farm size (land occupancy).
Chemical fertilizer usage (kg)	Yes	No	Correlated with farm size (land occupancy) and surface declared but subject to availability
TLU for sheet and goats	Yes	Yes	Sheep/goat farms can be differentiated based on the farm size (livestock number) and often linked with the market.
TLU for all animals	Yes	No	Difficult to predict and estimate for all animals and likely to be similar as farmers often prioritize one or two livestock types. Buffalo farmers less prioritize goat/pig farming.
Homestead diversity all crops	Yes	No	Similar crops grown during season; difference is on time of planting.
Total homestead production (matter)	Yes	No	Difficult to report the homestead production by the farmers as the vegetables is produced over a season and there is no formal data recording system.
Self-consumption of homestead production (%)	Yes	No	This is also dependent on total production and market dynamics for the HHs near to the market. Fluctuates so frequently.
Income from livestock (%)	Yes	Yes	More stable source of income and differed by farm/herd size.

Income from crops (%)	Yes	No	Subject to annual production. Income from crops in hills is much negligible and often used for home consumption.
Other services or sources – commerce (%)	Yes	No	Difficult to estimate as HH members not necessarily collect/give income from services/commerce to HH head. Thus, this may not be counted while calculating income of the HH.
Farm products into off-farm activities (%)	Yes	No	Very difficult to measure at household level as production depends on various factors thus variable across seasons and years.
Share of land dedicated to lentil (%)	Yes	No	Lentil is a neglected crop for the region and area fluctuates year to year.
Share of land dedicated to rice (%)	Yes	Yes	Rice is priority crop, so farmers allocate lowlands for rice cultivation.
Share of land dedicated to wheat (%)	Yes	No	Wheat, lentil and mustard are the competing crops for winter depending on climate situation and water availability. Area differs year to year.
Share of land dedicated to other crops (%)	Yes	No	Other crops are not consistently grown.
Irrigated crops selected average (%)	Yes	Yes	Can be identified which HH has irrigation facility and for which crops.
Maize surface in monsoon (ha)	Yes	Yes	Maize is cultivated widely during monsoon across the landscapes, so difficult to differentiate.
Rice surface in monsoon (ha)	Yes	Yes	HHs who have cultivable lands in lowlands allocate for rice can be distinguished.
Wheat surface in winter (ha)	Yes	No	Subject to climate situation and often competes with other winter crops.

4.4 Significance of major variables on different indicators

Respondents of key informant interviews also provided their inclination towards some important factors/variables in terms of their contribution in achieving goals including nutrition diversification, increasing income, ensuring food security, equity, and enhancing diversification. Respondents' perspectives on a 5-point scale from the respondents from Khotang are depicted in 7 taking 'share of maize' as a variable/factor. The farmers and stakeholders who identified a particular farm type were asked to provide answers in the scales for the respective farm types. Since no respondent identified themselves into the farm type 3 (FT3), it was omitted while analysing and visualizing the Likert scale responses for Khotang.

Contribution of maize share in most indicators was influenced by farm types. Though maize was the major component in FT 1 and FT 4, respondents' inclination towards more negative responses (neutral, disagree and strongly disagree) indicated that the subsistence maize farming in hill landscapes has not been perceived affirmatively in terms of achieving the goals set by a farm family or by the farming community.

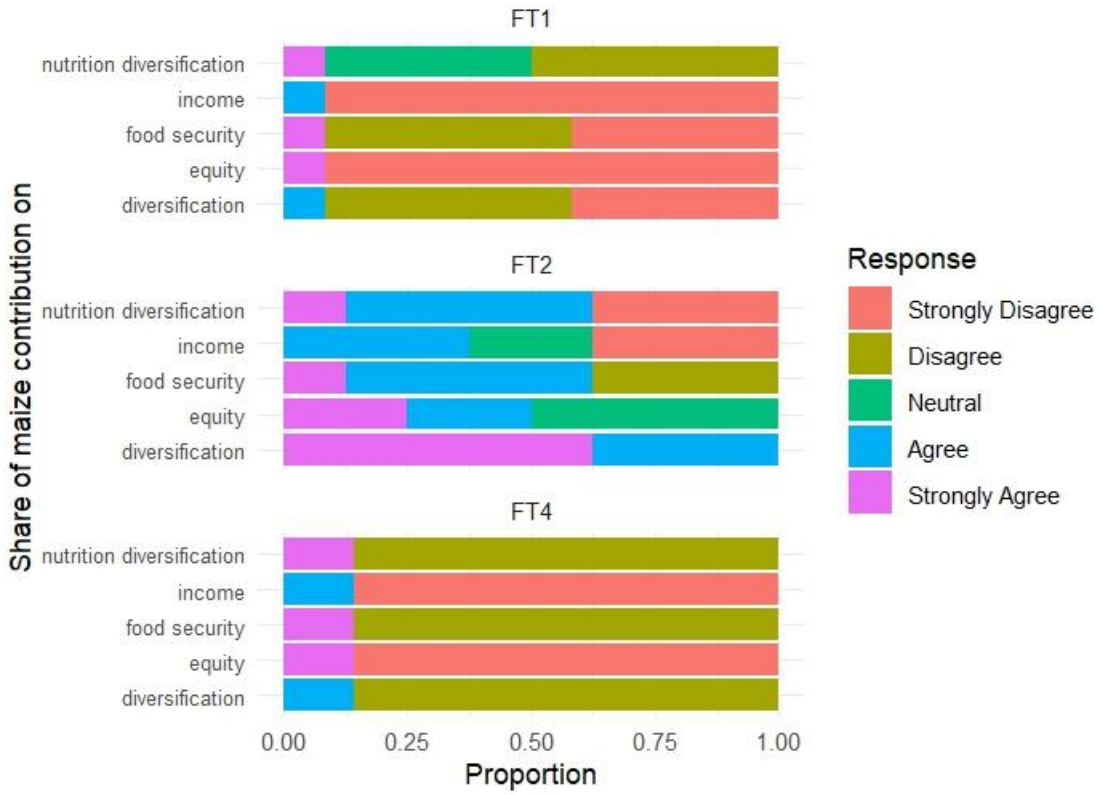

Figure 7: Responses in 5-point scale by the Khotang respondents in terms of contribution of 'maize share' on given indicators under 3 farm types.

On the flip side, FT 2 tended to be more benefitted by maize share, which could be attributed to the strong agricultural income from intensive cultivation. FT 1 and FT 2 seemed to be more subsistence in nature and have low income from agricultural activities.

4.5 Existing practices: support programs and targeting

4.5.1 Support programs

Focus group discussions with stakeholders in two municipalities also intended to gather information on the currently prioritized interventions in their regular support programs. The prioritized interventions under 4 different sub-sectors such as cereal cropping, vegetable farming, fodder and fruit cultivation and livestock rearing were discussed, compiled and documented (Figure 8). Interventions are prioritized based on demand from farmers and stakeholders' side. The funds are allocated considering availability of budget in agriculture segment in every fiscal year in the municipality and funds received from provincial and federal governments targeted to specialized programs. Prioritization also rooted in regular activities coming from previous years influenced by political and economic aspirations of the stakeholders meaning that design and implementation of support programs are ingrained as a culture of the extension offices and non-governmental organizations working in agriculture research and development sectors.

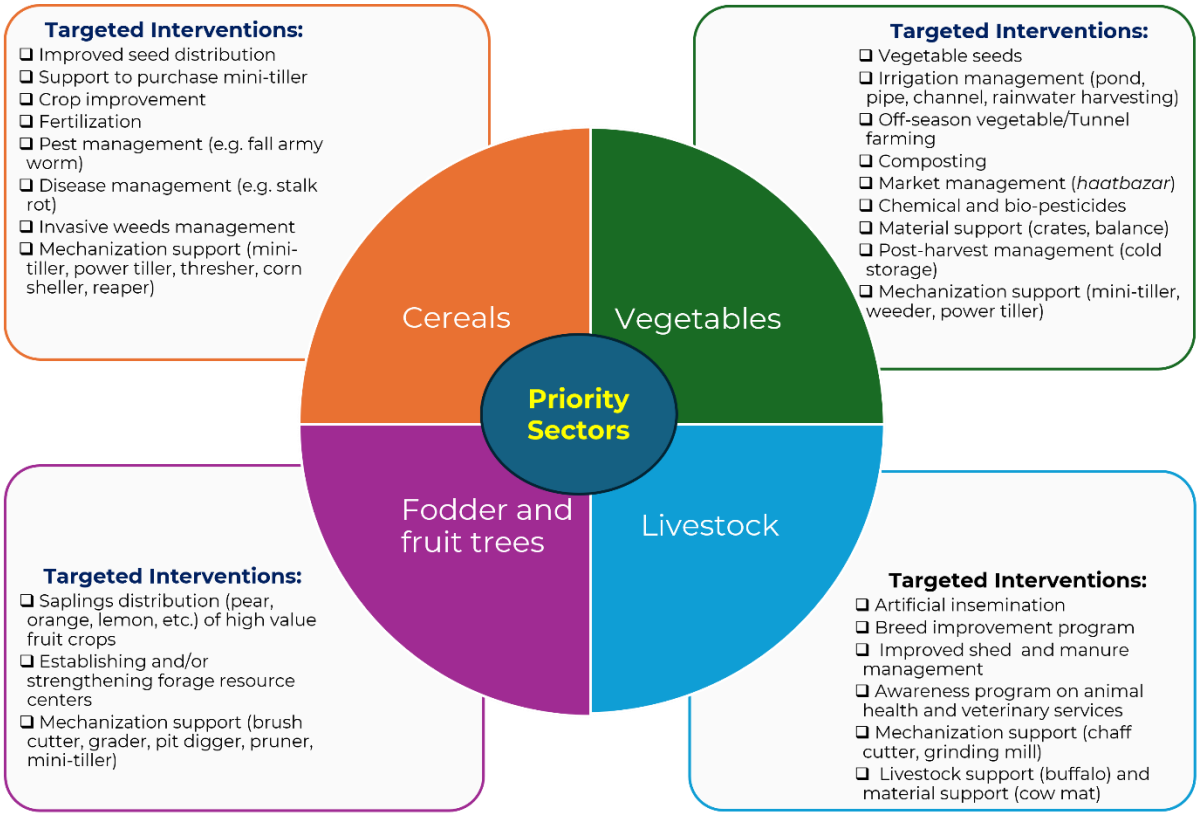

Figure 8: The interventions identified by the stakeholders based on current practice of intervention prioritization under four different sectors (compilation of both municipalities from Khotang and Surkhet).

4.5.2 Identification and targeting of households

FGDs with stakeholders identified that the government service agencies and market actors have been using ad hoc or traditional mechanisms to identify households or farmers to provide their services. No formal typology categorization exists at municipal level to target the households to implement interventions. These mechanisms are undermined by their disadvantages with limited, ineffective and inefficient service provisions to target farmers. For instance, the agriculture extension office supported an additional buffalo to the HHs/farmers with already owned at least one buffalo in their shed. This example illustrates how stakeholders have been identifying households/farmers to target their support. One approach of targeting is by considering existing farming which might help to increase production volume thus increasing market linkages and tending towards commercial farming. However, the practice of supporting the households who already have the resources (e.g. buffalo) may again be problematic in terms of probabilistic shift in agriculture business and encouraging the start-ups (new entrepreneurs). Additionally, this may irrigate the large section of the farming community as resources and budget are limited and thus only few are benefitted. So, an initiative to promote such intervention at the end can be a double-edged sword.

5 Future line of work

Although statistical farm typologies represented the scenarios of the mid-hill's farming households, differentiating the households taking several factors/variables into account may be practically difficult for devising actionable plans. Further research is needed to identify key variables to be used to differentiate farms based on their relevance in the local contexts. While, some missing variables should be included that have large influence in shaping the farming practices and behaviour of farming communities and the households. For instance, variables like topography, aspect, slope, soil stoniness, etc. might play significant role in decision making at the household, village, and landscape level.

This means that while the statistical approaches effectively capture and differentiate variations in resources, such as altitudes, income and remittance, the typologies further require additional refinement to incorporate critical local variables, contexts and farmers' experiential insights. In doing so, approaches, such as mixed methods, that integrate both quantitative clustering and qualitative validation could improve the alignment of typologies with farmers' contexts and thereby provide more actionable insights for future interventions and effective targeting. An example of market distance as a major variable truly indicated that the variables/factors should be defined according to the local contexts.

In applying mixed methods, an exploratory sequential design could be adopted to address knowledge gaps. This involves qualitative assessments initially, followed by the design of a refined quantitative analytical tool. The proposed sequence is outlined in the figure below:

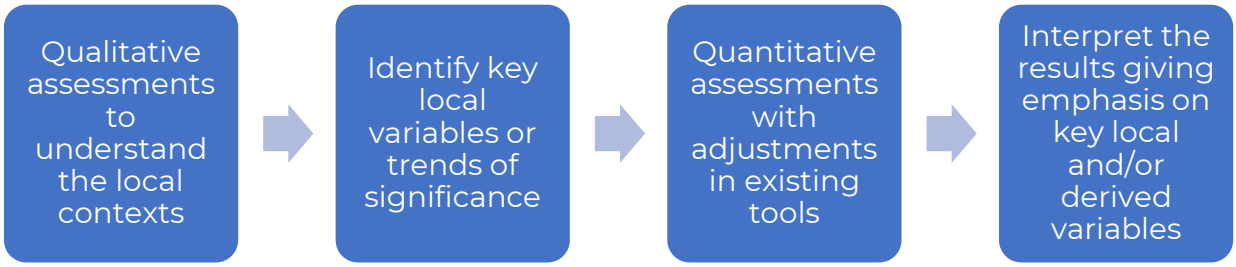

Figure 9: Proposed flow of mixed methods to characterize farm types and generate actionable strategies based on them

Megatrends like out-migration in mid-hills and the remittance coming from abroad may have implications that are highly unlikely and unpredictable. For instance, remittance receiving households may either increase their capacity to invest in agriculture sector or switch off farming occupation and shift to other off-farm activities, or just migrate to the cities for better education and life leaving the farming occupation. This implies that considering only the remittance income may not be sufficient to characterize and differentiate the households. The 'prospective orientation' of the households may be explored to understand whether they intend to continue farming occupation or how they allocate their income and resources.

Farm types underscore the importance of cautiously choosing and interpreting factors based on their significance in multiple scenarios. Two examples, such as the maize share contribution and the role of homestead on indicators like household income, diversification, nutrition, and equity, emphasize this point.

Perceptions of local stakeholders are key to designing realistic farm typologies. Differential responses towards the relevance of factors in farm categorization in both municipalities highlight that gender, social, and regional dimensions should also be considered while deploying both qualitative and quantitative assessments. The adoption of this comprehensive approach will allow for the generation of more refined and actionable farm typologies.

6 Conclusion

Appropriate farm typology delineation can significantly support agencies in targeting interventions to the right stakeholders or farmers in genuine need, thereby generating meaningful impacts. The integration of qualitative and quantitative approaches in a mixed-methods framework allows for a nuanced understanding of local contexts and enhances the applicability of farm typologies. Ultimately, refining farm typologies in alignment with local contexts and stakeholder insights ensures that interventions are realistic, impactful, and sustainable. Typologies designed to fulfil the political and economic ambitions of the respective sites/regions are required. This technical report attempted to highlight the significance of context-specific farm typologies in place of generalized ones to help address the challenges of smallholder mixed farming systems of Global South taking example from mid-hills of Nepal.

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