Takeaways on Agriculture and Livestock Productivity: A Study of Rural Farmers

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Abstract

The purpose of this study was to analyze the takeaways on agricultural and livestock productivity in Khotang. The majority of households are principally engaged in agricultural and livestock activities but major cereal crops, groceries, fruits, vegetables, seeds, seedlings, meats, fertilizers, pesticides is massively imported from beyond the district. About 30-40 percent of cultivated lands remained as fallow because of population deficit, shortage of labor, migration, and wild animal encroachments. The study is focused in the Diktel Rupakot Majhuwagadhi Municipality, Khotang. The mixed methods were used to gather the primary and secondary nature of data. Systematic random sampling method were used to select the sample size and accomplishing the structure survey questionnaire in this research work. Existing agricultural and livestock policies and its' execution is helpless to motivate rural farmers who spent their lives in the field and cattle-sheds for several decades. Nearly 24 percent of population are out of home and only senior adults, woman and kids can be found in majority of households. Women spent their significant time in the field since the absence of men at home but the available equipment used for agriculture work seems more incompatible for them. Workloads has been increased for no guaranteed possibilities are observed that the absent population will resume their farm activities upon their arrival to the village. Local Government has the full of authority to research, plan and execute the realistic agricultural and livestock policy. An identification of need-based skills, training, and compatible equipment and its' wisefull uses for the advancement of production, processing and commercialization of agriculture is the collective voice of rural farmers.

Key Words: Agriculture, livestock, alternative approaches, intercropping, agricultural research.

Introduction

During twelve thousand years ago, Asia made a tremendous contribution in introducing agriculture in the World history. About 28 percent of total population globally and 70 percent of Nepalese population are engaged in agricultural work (Roka, 2024). Majority of farmers are residing in the third world but not in the industrialized countries.

As estimated by FAO, approximately 4.8 billion hectares (37 percent) of land are classified as agricultural land in the World. The largest share (67 percent) of the agricultural land occupied for pastures and only 33 percent for cropland. Nearly, 28 percent of land in Nepal

is considered as agricultural land however, 7 percent is uncultivated (Ritchie & Roser, 2013, Timilsina et al., 2019).

Agriculture and livestock is underrated profession in Nepal. Since 1940s, agricultural activities were taken as the most prestigious job. A mostly popular proverb "excellent agriculture, moderate business and worst employment" were commonly used by people (Roka et al., 2021). But the perspective has been significantly changed and labelled it as the neglected profession that carried out either by senior and illiterate citizens, women or poor. Youths are being disconnected with agriculture activities. Since the very beginning, agricultural activities is treated as a passive contributor in Nepal who only supplies food but not seen as contributors for economic growth (Gautam, 2023, Bhandari, 2024). There are no consistencies in between state's policy and practice. Ideally, state could have recognized farmers' economy as moral economy' but, villages are continuously neglected and harnessed as suppliers of foodstuffs and vote bank (Sharma, 2024).

States' investments in uplifting agriculture and agricultural research seems disappointing. The state's investment in agriculture over past eight years has barely reached 4.13 percent of the total budget (Roka, 2024, p-116) and not even invested $50 million in agricultural research (Upreti, 2018, Baral et al., 2020). Existing research works in agriculture have not been focused in identifying the structural and institutional weaknesses and response accordingly. Developed countries convinced with the modern school of thought treated agriculture as the great contributors for economic development and invested notable amounts in agriculture and agricultural research.

The state has the crucial role to systematize agriculture and backstops farmers for surviving in the dignified way. The country has not paid adequate attention for the advancement and shifting of agricultural and livestock activities. Nepal is struggling with irrigation insufficiencies, labor deficit, poor technological knowledge, encroachments of wild animals, weather uncertainties, inaccessible insurance, land fragmentation, poor market linkages, and other disease and pandemics relating with agriculture and livestock development.

Livestock comprise as an essential component of agriculture in Nepal which contributes in supplying rich nutrition to human kind, soil, plant. Since two decades, the significant changes in family structure has contribution in deteriorating the livestock numbers. Shortage of labor, declination of grazing lands, inaccessible livestock insurance, poor technological knowledge contributed in shrinking number of cattle (Baral, et al., 2020). Anyone barely observe a buffalo or cow with a baby in their cattle-sheds in villages. Since hundreds of years, oxen are mostly considered as the mandatory means of tilling the agricultural fields but families with the pair of oxen are very rare because of the absence of youths at home. Trends of keeping agricultural land as fallow is automatically expect in escalating the size of grazing lands and the number of livestock. Surprisingly, large size-cattle are significantly replaced by the small ones as well as reduced its' numbers.

Several superficial assumptions and statements are made as declining agricultural and livestock productivity in the district. But, consolidated academic research and writings on these issues are barely done. Scholars and researchers have paid less attention in undertaking research in geographically remote areas at a ground. This research is carried out to answer research questions as-

1. What are the status of agriculture and livestock productivity in the study area?

2. What are the issues and challenges in agricultural and livestock productivity and key takeaways for commercialization and marketing of it?

Methodology

The field research work was accomplished in fifteen wards located within the Diktel Rupakot Majhuwagadhi Municipality, Khotang. Mixed methods were used to gather primary and secondary data. Total 1807 (20 percent) sample household were selected using a stratified random sampling techniques. Approximately, the lists of 9,500 households were received from the secondary sources in the first phase. Initial lists were updated and finalized through the field visit before selecting samples. Sampling intervals were insured in selecting 1807 households as sample and each listed households had similar chances to be selected as sample. Structured questionnaires were administered to each sample households of the selected residents. Pilot tests were done in advance at household-level to testify validity, coherence, and sequences of questionnaires. Nominal, ordinal and ratio measurement scale were used in questionnaires to categorize and analyze data. Collected primary and secondary data were listed, coded and classified referring research objectives. An exploratory and descriptive data analysis process was applied and findings are presented in tables, graphs, charts, and narratives.

Results

Over the generations, farmers adopted diverse cropping patterns according to their food habits and day to day needs take into account climates and geography. Besides consuming at home, a farmer reside in the village is the lifeline for urban people, local elites, and landholders who continuously supplies foodstuffs to make them alive. Farmers spent their lives treating agriculture and livestock as a survival strategy but not as a profession that calculates profit and loss. Financial illiteracy is the major obstacle of a farmer to shift agricultural and livestock activities from subsistence to commercial (Paudyal and Nehamfuki, 2024). Subsistence farming always makes a farmer unable to overcome from the scarcity, hard time and uncertainty. In the study area, 71 percent of respondents portrayed agriculture and livestock as a means of their subsistence who encountered with such scarcity, hard time and uncertainty each year since hundreds of years.

In the study area, a farmer mainly cultivates major cereal crops and cash crops in nominal scales. Maize, rice, millet, wheat, buckwheat, barley is mostly seen in the field as major cereal crops. The production of major cereal crops has been significantly declined from 23 to 98 percent for several reasons during the past-five years. The principal causes of declining major food grains are the shortage of workers in the field, irrigation insufficiencies, wildlife encroachments, cost deficit, reduction of livestock and compost manure, long drought/inconsistent weather, shortage of seeds/seedlings, and crop loss by infectious diseases.

During the past five-years, cultivation of cash crops is found in the increasing trend in the study area. The production of cash crops is increased by 7 to 20 percent. The logics behind its' increment and shifting patterns are the low investment, nominal labor cost, average income and profit, constant market, and instant return. More than 90 percent of respondents have answered they have grown garlic, onion, ginger, potato, cauliflower, cabbage, chili, carrot, radish, turmeric, tomato, oranges, lime, kiwi, litchi, mango, banana, avocado, cardamom, and

coffee etc. in their field. Recently, most of these produces are consumed at home and a very nominal portion are sold to neighbors and market nearby. Plantations of fruit-bearing trees have been significantly increased beyond surface-level financial incentives for several reasons. It requires less-labor comparing cereal crops, consider as the best way to tackle with the fear of uncultivated land in future having labor shortage issues, and increases market access along with opening up road networks to urban cities.

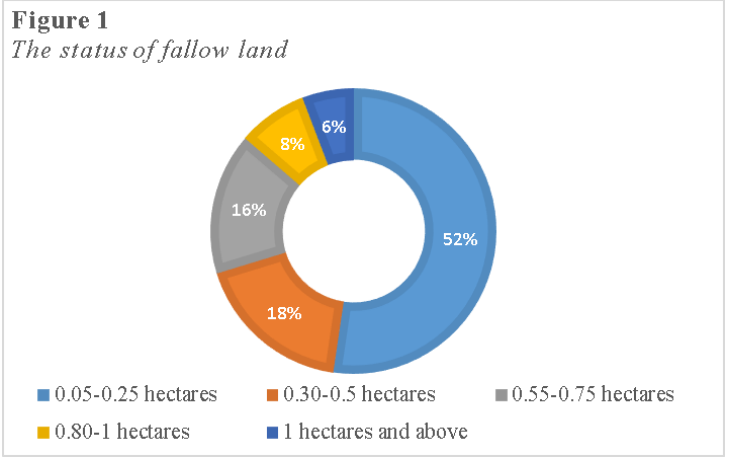
The pastoral activities have been significantly lowered over the past five years in the study area. Nealry, 53.50 percent respondents have observed the number of livestock is declined. 22.46 percent of households do not have the bigger-size livestock in particular buffalo, he-buffalo, oxen, cow since the last five-years. The study shows, the number of buffalo and he-buffalo were decreased by 41-45 percent whereas, oxen, cow, pigs were decreased by 31-47 percent because of the absenteeism of youth herders, lack of grazing lands, inaccessible and unaffordable livestock insurance, frequently infected disease and pandemics.

Transaction records of foodstuffs and cattle indicates in degrading trends. Inconsistencies in buying and selling records are measured among farmers and herders who do not have a significant track records in selling throughout the year. Only 10.23 percent respondents sold maize, millet, rice, wheat/barley, vegetables, mustard, buckwheat and soybeans in surrounding markets except the consumption at home. Nearly 73.76 percent respondents sold at least one livestock products over the year however, the amount they have received is nominal. Besides selling major cereal crops, no significant amount data were obtained by selling cash crop products and not even cash crops or multi-year crops were rotten during the last year by not having market or market access.

Unsurprisingly, people are out of covered with the health insurance in Nepal. Discussing about the coverage of crop and livestock insurance is itself a strange. Crop and livestock insurance contributes in providing safety-nets to farmers. Each year, crops are lost from several natural calamities specifically droughts, floods, landslides, hailstorms etc. Most recently, the encroachment from wild animals are very common throughout the study area and farmers have faced significant amount of crops loss in each year. In the last two years, farmers have faced losses of oxen, cows, pigs, goats, sheep, and chicken by Lumpy skin, Khoret, Bird Flue, and several other diseases and pandemics. Governments' veterinary services were ineffective during the pandemic and respondents have their serious concern about having quality services. Insurance companies are rarely available in the district. More than 90 percent respondents have never heard about crop insurance and almost none of respondents have heard about livestock insurance. But they have the less attraction with them because of inaccessible and unaffordable services, their tedious terms and conditions and

Figure 1

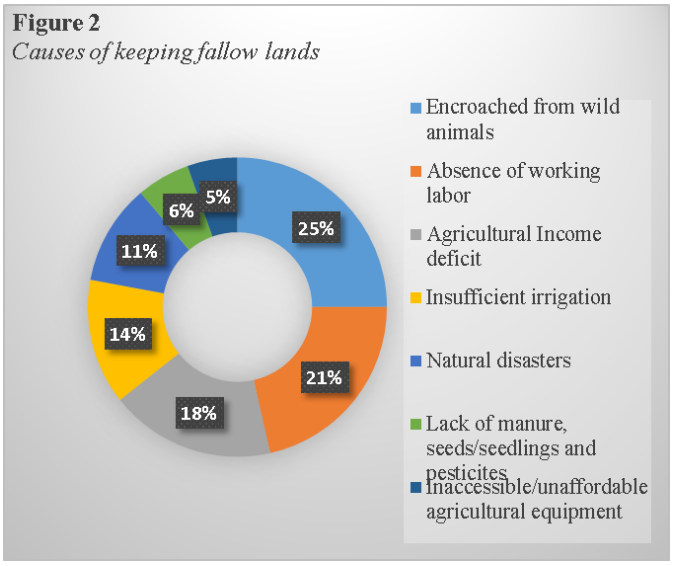
The status of fallow land



repayment process. In the study area, only 4.37 percent of respondents get connected with insurance companies having insurance of the selected cattle.

Technical services and support from the state contributes to enrich agriculture and livestock productivity and sustainable income. In each wards, government has envisioned to deploy a Veterinary technician but more than 75 percent respondents don't even know about they have a veterinary staff nearby who barely gets required technical supports as needed. Over the past five years, 67.01 percent respondents never received veterinary services from the government.

Figure 2
Causes of keeping fallow lands

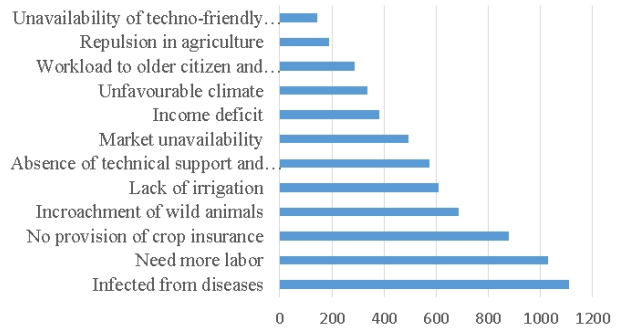


Migration and population deficit caused an establishment of the culture of remaining land as fallow. In the study area, farmers keep their arable land as fallow without cultivating even a single crop for a decade or more. Each year, the volume of uncultivated land has been significantly increased. 36.63 percent of respondents have responded their certain portion of land is left without sowing. 52 percent respondents have 1-5 ropani (0.05-0.25 hectares) of land is uncultivated and more than six percent respondents have at least one hectare or more.

Causes of land left without sowing have found various reason. Encroached from wild animals, absence of working labor, income deficit, application of classical farming techniques, insufficient irrigation, natural disasters and inaccessible and unaffordable agricultural equipment are the root causes.

Several issue and challenges are observed in agriculture in the study area. Nepalese federalism system envisioned local government has the role to localize and respond farmers' issue and challenges. Agriculture and livestock based indicators were designed to identify and prioritize its' issues and challenges. Farmers have frequently lost their crops and cattle by several disease and pandemic, encroachment of wild animals,

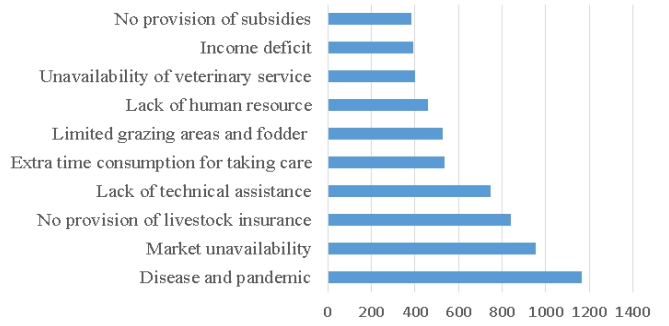
Figure 3
Issue and challenges in agriculture



inaccessible crop and livestock insurance, inadequate technical supports, and no provision of subsidies. Theses causes are most responsible for making farmers demotivated in each year. The absence of these safety-nets labelled agriculture and livestock as repulsive profession. Farmers are engaged throughout the year but they barely get an attractive income from it. An absenteeism of youths at home not only contributed in decreasing agricultural and livestock productivity but also increasing workloads to senior citizen and women. As mentioned by Maharjan et al., (2013), households usually seek additional human resource for agricultural work not only hired women labor but also a women spent their significant time in fields since the absence of men at home and available agricultural equipment is not compatible for them.

Agriculture and livestock is complementary to each other. Lower the number of livestock has negative impacts in lowering the agricultural productivity (Baral, et al., 2020). The use of chemical fertilizers, pesticides and imported seeds and seedlings not only financially burdened to farmers but also faded crop diversities and organic farming techniques.

Figure 4
Issue and challenges in livestock



Farmers aged 60 years and above have found worried about the continuation of their agricultural and livestock activities in near future. Lack of successors in agriculture and livestock activities is a potential expected risks in near future. The migration of youths in the increasing trend is the most significant variable that contributes in gradually declining agriculture and livestock productivity (Sharma, 2024). The classical way in agriculture and livestock would not have retained youths leaving their villages. Eventually, mechanized system in agriculture and livestock has the potentiality contribute in saving the cost, resources and increases agricultural production, productivity, production quality, and profits (Gauchan, 2023, Shrestha, 2017, Upreti, 2018, & Baral, et al., 2020).

Table 1
Intervention strategies in reforming agriculture and livestock

	Justification (*i. fits into hills, ii. farmers' need, iii. low cost, iv. low risk*)			
Intervention Strategies	**i**	**ii**	**iii**	**iv**
Trainings (production/marketing)	√	√	√	√
Promoting fruit-bearing trees	√	√	√	√
Subsidies & compensate in major crops/cattle	√	√	√	√

Grain/seed and land banking	√	√	√	√
Promoting intercropping system	√	√	√	√
Rainwater harvesting &water catchments	√	√		√
Use of compost manure/ pesticides	√	√	√	√
Resuming fallow lands	√	√	√	√
Organic certification	√	√	√	√
Branding/marketing local/organic products	√	√		√
Cooperatives farming &marketing	√	√	√	√
Compatible tools & equipment support	√	√		√

Migration leads to decline of population in villages even there has been reached the basic infrastructural development. Sharma (2024) used a term to indicate these development model as 'creative destruction' whereas our society is heading to the cycle of consumerist marsh. Irrigation canals, jungles, rice fields/terraces, foot trails, rest stops, cemeteries, water resources and other rural lifelines are damaged by undesirably and arbitrarily constructed rural roads tracks (Ninglekhu, 2024, Tharu, 2023).

The recent, indicators allied in agriculture and livestock are unpleasant but, there is the necessity to reveal new possibilities to overcome. Roka (2024) emphasize socialist way the most suitable and easiest way for agricultural transformation. Constitution of Nepal has envisioned in framing the socialist economy. Authorities are delegated to local governments who can play a significant role in identifying bottlenecks, priorities and further takeaways to reform agricultural and livestock as dignified profession.

Livestock and agricultural activities wouldn't be a dignified profession until and unless a farmer is able to analyze the profit and loss as mentioned by Paudyal and Nehamfuki (2024). In the study area, no periodic production targets are observed among subsistence farmers and herders. A shift from subsistence to commercial stage is conceivable whether a farmer is able to come across the agriculture and livestock trajectories. Farmers have no opportunities to interface with the analysis of commercial and marketing possibilities, opportunities and challenges. During the study, respondents were asked about exploring possible skills, technologies and training for enhancing production, processing and marketing of agriculture and livestock products. Production-based skills, training and technology were mostly chosen in lieu of the processing and marketing.

Conclusion and Discussion

Existing agriculture and livestock policies and its' ritualistic execution has no way to morally uplift the majority of farmers. Farmers spending their significant time in producing food grains and rearing cattle have losing their faith. The out-migrants of one-fourth population caused shifting the family structure from joint to nuclear one and in each fallow lands have significantly expanded. Agricultural and livestock activities are sustained unless the joint-family system were exists in villages (Gautam, 2023). Senior citizens, women and kids are available in most of the households as permanent members. Less possibilities are seen that migrant youths will resume their predecessors' profession upon returning back home.

A proverb as "excellent agriculture, moderate business and worst employment" is old-fashioned over the years for several reasons. Self-reliant households are now mostly depending on imported foods and grocery items and spent the significant amount to procure. More than 30 percent agricultural land is uncultivated since a decade or more. Youths have no encouragement to be engaged in their predecessors' profession and leaving home to look for non-agricultural jobs. Presence the majority of senior citizens, women and their kids at home indicates an adoption of agriculture or livestock work has no future. Rural farmers are barely covered with agricultural and livestock subsidies and they have no safety-nets when they have lost their crops and cattle. The reason why, people are now shifted into business and employment and shutting the door in villages.

Policies gaps are hindered to flourish organic agriculture in Nepal that can be expected to explore by research work (Baral et al., 2020, Upreti, 2018). It is expected a significant role from the government of Nepal in providing safety-nets to farmers and herders. An execution of ongoing subsidies and insurance policies are incompatible to address hurdles facing with by a farmer. Subsidies to farmers in organically produced major crops may have a significant motivation for resuming predecessors' profession and lowering dependencies with outside markets (Deshar, 2013). A systematized subsidy and insurance in agriculture and livestock may contribute to retain youth in the village and recommence agricultural and livestock activities. Further research is a precondition to explore actionable takeaways from the ground and no doubt local governments are the potential entities who deserves to institutionalize research-based planning.

Farmers have nominal chances to compete with competitive markets unless they have safety-nets and safeguarding by governments. The promotion of organic farming techniques contributes to open up new opportunities to rural farmers. It contributes for efficient soil fertility management, promotes sustainable cropping methods, discourage chemical fertilizers, pesticides, and make possible in producing high-quality foodstuffs (Nwosisi, 2016). Alternatives approaches "sustainable livelihood approach" (Rajbhandari, 2015), "spatial variability" (Shrestha at el, 2020), and "sustainable intensification" (Shrestha at el, 2021) aims to maintain humans and nature balance.

Alternative approaches emphasize in adoption of socially acceptable, ecologically non-degrading, economically viable, politically non-discriminatory, and technologically appropriate to improve production sustainability in crops and livestock (Rajbhandari, 2015, Shrestha at el, 2020, Deshar, 2013). Shrestha at el. (2021) suggests 'persistence', 'resilience', 'autarchy', and 'benevolence' as four principles and ten approaches to contribute for sustainable agriculture intensification.

Till the 1990s, existence of joint family structure and the limited non-agricultural opportunities were pressurized in splitting land in small pieces. Farmers had to do not only produces foodstuffs for their own consumption but also had to sustain state, landholders and wealthy people (Caplan, 1070, Regmi, 1977, Regmi, 1978). Nevertheless, landholdings sizes were significantly low (0.2 hectare) because of population pressure and the unequal distribution of cultivated land. The rapid transformation of Nepalese society into urbanization created difficulties in forecasting how much cultivated lands will requires for the next generation. It is assumed, there would not have been adequate cultivated land for farming jobs in future (Waili at el. (2011). Small pieces (0.05-0.25 hectares) of uncultivated land behind it various reason in the the study area has to be reinstated. It required schemes that make possible to integrate

fragmented lands, introduce advance agricultural tools to cultivate the uncultivated lands. Local government has possibilities to maintain digital records, formulate and execute policies to maximize utilization of unused land and resolve the wildlife encroachment issue by referring given constitutional rights and responsibilities (Ghimire, 2023).

Over the generations, farmers had used diverse cropping patterns according to their food habits and day to day needs take into account climates and geography. But, things have been notably changed since three decades. A farmer is not only gets major food grains from the market but also depended with each imported seeds, seedlings, fertilizers, pesticides from the countless number of agro-vets for agriculture and livestock activities (Tamang, 2024). Neoliberal economic system, climate uncertainties, changes in food culture, youth migration has the great role in massive extinction of traditional and indigenous crop and livestock varieties and its nurturing techniques (Roka, 2024, Gauchan, 2019). Our collectiveness, communitarianism, and socio-cultural diversity is overlooked by commodification of goods (Dhakal, 2024, Roka, 2024).

Now, the acceptance of reviving and reforming the traditional and indigenous farming/ herding system has been increased. Nature-based solutions may have potentialities to tackle with existing challenges. Identification of skills, training, and compatible equipment and its' wisefull uses for the advancement of production, processing and commercialization of agriculture is the collective voice of rural farmers which is never been heard and explored.

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