Volume 3, Issue 1, 2023
Nepal Public Policy Review

Research Article

DOI: https://doi.org/10.59552/nppr.v3i1.60

Agribusiness and Supply Chain Development Policies in Nepal: A Review from Temporal Dynamics

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Manuscript Received: 16 February, 2023 Final Revision: 19 April, 2023 Accepted: 13 May, 2023

Abstract

A critical review of agriculture policies during different plan periods, aligned with political changes, has been conducted out to understand the shift in priorities, technology transfer ,support products, and private sector engagement. Firstly, in the 1950s, the policies were influenced by the first five-year plan and focused on the import and dissemination of technology. During the three decades of the Panchayat era, there was an emphasis on state mechanisms for technology transfer, agribusiness, and research, with limited incentives for the private sector. After 1990, agricultural policy products followed a path of liberalization and focused on defining the state's role and promoting pluralism. This period witnessed the establishment of a wide range of private and cooperative-led agribusinesses, although their growth was hindered by political conflict. Subsequently, policies began to incorporate priorities such as nutrition security, comparative advantage, competitiveness, climate change adaptation, agrobiodiversity conservation, and sustainability. However, with the federalization of the state and establishment of a three-tier governance system in 2015, agriculture policies, priorities and strategies a became fragmented, diversified, and localized, and lack harmonization. This review demonstrates that agriculture policies were largely influenced by domestic political developments and structural changes at the international level. Nonetheless, a consistent focus on increasing production and productivity, as well as achieving food security and self-sufficiency, can be observed.. Throughout all policy periods, supply chain development, a crucial component of agribusiness, received limited prioritization, which remains a major impediment to agricultural transformation. Despite seven decades of policy evolution, Nepal has been unable to create an enabling policy environment to attract significant private and cooperative sector investments that could drive substantial growth in agribusiness. This situation calls for further research in the field of policy formulation capacity among the three tiers of government to foster agribusiness and promote supply chain development for agricultural transformation.

Keywords: Agriculture, Policy, Food Security, Productivity, Commercialization, Development

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1. Introduction

The agricultural sector engages around 50.1 % of the total population (CBS, 2023), and contributes approximately one-quarter (23.9%) of the nation's GDP (MoF, 2022). The total cultivated area is 3,0,91,000 ha out of which 48.93 % (15,12432 ha) is irrigated (MoALD, 2022). Among the total agricultural production, the contribution of agriculture subsectors is as following for the Fiscal Year 2021/22: Food Crops 44.3 %, Vegetables 17.1%, Cash Crops 15.3%, Industrial Crops 13.2%, Fruit Crops 5.8 %, and others 4.3% (MoALD, 2022). In 2018, Nepal imported 1.2 million tons of cereals , which indicates that domestic food production is not sufficient to feed its population (FAO, 2019). Similarly, during FY 2020/21, selected agricultural commodities worth NRs 7,901.04 million were exported from Nepal (DoC, 2022). However, the productivity and competitiveness of the sector are low, the adoption of improved technology is limited, and a significant cultivated area is dedicated to cereals. Since the beginning of the APP (1995/96), the growth of agricultural GDP has been slow (about 3%) and highly variable over the years (MoALD, 2015) indicating a low level of agribusiness development. The average annual Agriculture Gross Domestic Product (AGDP) growth rate for the last eleven years (2011/12 to 2021/22) was only 2.99 %, which is far lower than the Medium Term (10 years) Target (i.e. 5%) of ADS (MoALD, 2022). Several factors such as the decade-long conflict (1996-2006), natural disasters, CoVID-19, poor governance, weak linkages between research, extension, and education agencies; and poor extension service etc. have affected agricultural growth. In addition, some of the gaps and constraints limiting agricultural growth include inappropriate approaches in designing agricultural policies, plans, and programs; inadequate, and in some cases, contradictory legislative provisions; low institutional capacity; and weak coordination between key stakeholders in formulating and implementing the sectoral policies (Khanal et al, 2020).

As about 18.7 % of the population is still living below the absolute poverty line, the agriculture sector is crucial to increase income, alleviating poverty and uplifting the living standard of the people (MoF, 2022).

Agricultural growth is the most powerful mechanism for poverty reduction when an economy is at a low development stage. Realizing this fact, the Ministry of Agriculture and Livestock Development (MOALD) envisaged accelerated growth of agriculture through improved governance, increased productivity, profitable commercialization, and enhanced competitiveness as guided by ADS (MoALD, 2015). The transformation towards a more commercialized agriculture requires a set of measures that focus not only on farmers but, fundamentally on agro enterprises and supply chains for products and services. An agribusiness supply chain includes a number of processes such as

supply management, production management and demand management to ultimate customers through a competitive distribution channel (Chandrasekaran & Raghuram, 2014). Agribusiness and supply chains in Nepal are widely criticized for inefficiency, governance, quality, and sustainability. The complexity of agribusiness supply chains is due to the bulkiness of produce, perishability, and seasonality (Chandrasekaran & Raghuram, 2014), which demand specific policies, programs, and infrastructures. Further, agribusiness and supply chain development are significantly dependent upon enabling a policy environment in the field of infrastructures, land use, information technology, finance, and subsequent efficient policy-implementing institutions. Although the country witnessed five major socio-political changes followed by subsequent agricultural development policies during the last seven decades, the performance of this sector has been inadequate to meet the increasing food demand and livelihood needs of the country's growing population. The Agriculture Perspective Plan-APP (1995/96-2014/15), National Agriculture Policy 2004, Agribusiness Promotion Policy 2006 and Agriculture Development Strategy-ADS (2015-35) are the major guiding policy initiatives of the Government of Nepal for agriculture development. There are over 25 active sectoral and commodity promotion policies, including ADS that have been shaping agribusiness, supply chain development and transforming the agriculture sector from subsistence to commercialization (MoALD, 2020).

The sector is still in a low development stage as highlighted by a number of indicators including labour productivity, productivity gaps, trade and competitiveness, poverty and malnutrition, and infrastructure (MoALD, 2015). In this context, it is important to critically examine government policies, including legislative and institutional provisions, for agricultural development and identify associated gaps and constraints. This paper attempts to critically review the dynamics of agriculture development policies in terms of priorities, technology transfer, support measures, allocation of resources, research-extension-education linkage, and incentives for private sector engagement over the periods. Further, the analysis of this paper aligned with political changes and the evolution of agriculture policies referring to different time horizons since 1950. Therefore, the main objective of this study is to review and analyze the major agriculture policies with respect to their contributions to promoting agribusiness and supply chain development in Nepal.

2. Methodology

This paper is primarily relies on the review of literatures and agriculture policies in different time periods. Specifically, the study covers agriculture policies, programs

and agriculture extension approaches adopted by the Government in various national periodic plans, starting from the first five year plan (1956-61) to the current fifteenth five-year plan (2019-2024). Similarly, the study also includes a critical review and analysis of major agriculture policies and plans implemented by the Government in the past decades, such as Agriculture Perspective Plan-APP (1995/96-2014/15), National Agriculture Policy 2004, Agribusiness Promotion Policy 2006, Agriculture Development Strategy-ADS (2015-35), and other commodity specific agriculture policies. The review focusses on assessing dynamics of policy priorities concerning agriculture commercialization and agribusiness development over the periods. Additionally, specific policies for seeds, land use, irrigation, trade, and other key areas have been reviewed and analyzed. The source of data/information were Ministry of Finanace/ Economic Survey, Central Bureau of Statistics (CBS), FAOSTAT Statistical Information on Nepalese Agriculture, Compilation of Agriculture Policies, and other publications. The statistical tools such as growth rates, trend analysis, percentage analysis, and average have been employed for quantitative analysis. Furthermore, the qualitative information related to the objective has been organized in tabular and descriptive forms and analyzed critically. The study has also adopted qualitative approach to data analysis including a framework for private sector incentives. Focus group discussions (FGD) and key informant consultations were utilized to understand policy dynamics and their impact on agribusiness and supply chain development. The FDG's involved agriculture experts who have served in public ,private, and development practitioners in Nepal. Additionally, individuals currently working in the public,private,development sectors were consulted during the study. The purposive sampling technique (non- probability sampling) was employed for consultations with the respondents.

3. Results and Discussions

3.1 Historical perspectives in agriculture development

3.1.1 Agriculture extension service perspective

The history of agriculture extension in Nepal goes back to Rana regime when they introduced new breeds from outside as part of technology transfer. Since then, the extension service system has undergone a wide range of transformations in institutional mechanism, investment, structure, objectives, and approaches. Initially, the agricultural extension system was a monolithic government-funded technology dissemination service with limited representation and contribution from the private and agribusiness sectors. The source of technology was primarily the public research system, focusing on the uniform needs of farming communities while neglecting

the requirements of agribusiness and supply chain development.Similar to trends in extension system worldwide, the early approaches in Nepal were more top-down, led by technicians or experts. However, in recent decades, efforts have been made to make extension services more participatory, inclusive, democratic, and beneficiary-led (Ghimire et al., 2021). The recent extension approaches in nepal are pluralistic, participatory, market oriented, and commercially focused. The advancement in Information Communication Technology (ICT) have significantly increased access to the modern agriculture technology among the youth agri-entrepreneurs. Nepal has implemented various extension approaches in the past (Table-1) but with little success (Ghimire *et al.*, 2021). The suboptimal success of these approaches can be attributed to weak implementation mechanism, which are directly linked to the competency of employees (Ghimire, 2017). When the Agriculture Perspective Plan (APP) was launched in FY 1995/96, Nepal's agricultural sector was much less developed compared to the present. Since then, there has been relative improvement in living standards of farming communities, and that the overall performance of the agricultural sector has improved. Productivity, infrastructure, food security have improved, and poverty has decreased. However, indicators such as food and agricultural trade deficit have been increasing and per capita agricultural land holdings have been decreasing. With the establishment of federal governance system, the responsibility for agricultural extension functions has been transferred to provincial and local governments. This has created significant challenges in terms of horizontal and vertical coordination for technology transfer. Consequently, the primary role of technicians has shifted from technical support to becoming grant-distributing agents.

Table-1: Agriculture Extension Approaches Adopted in Different Time Periods

SN	Agriculture Policies and Programs	Time Period	Key Features	Contribution to agribusiness and supply chain development
1	Tribhuvan Gram Bikas Yojana	1952	Rural development	Agriculture development considered a major pathway for rural development, wider integrated approach adopted, agribusiness and supply chain thinly focused

SN	Agriculture Policies and Programs	Time Period	Key Features	Contribution to agribusiness and supply chain development
2	4-H (Charpate) Club	1953	Rural youth mobilization for development	Technology dissemination focus
3	First Five-Year Development Plan	1956–61	Human resource development Increasing agriculture production and productivity Zonal and district offices established	Priority was given to transportation, communication and construction, followed by technology transfer focu
4	Integrated Rural Development Project (IRDP)	1970	Rural development by making a simultaneous effort to develop all sectors such as education, health, agriculture, drinking water, etc	The IRDP approach followed in all the 75 districts to provide holistic support from service to production and marketing.
5	Training and Visit (T&V) Program	1975	Transfer of Technology (ToT)	Focused on technology dissemination
6	Tuki extension approach	1977	Assigning extension functions to locally rooted volunteer farmers	Focused on technology dissemination, agribusiness and supply chain development for agriculture inputs
7	Farming System Research and Extension (FSRE)	1989	This concept was initiated to integrate research and extension by generating technology in the	Focused on participatory technology generation and dissemination following system perspective with less focused on agribusiness and supply

SN	Agriculture Policies and Programs	Time Period	Key Features	Contribution to agribusiness and supply chain development
			research outreach sites with the participation of the farmers.	chain development
8	Block Production Program	1982	Intensive use of resources in consolidated way to increase farm productivity. Main focus on Block Production Program was intensive farming.	Focused on increasing cereal productivity with modern technologywith almost no focus on agribusiness supply chain development
9	Farmer Group Approach	1987/88	Put farmers of similar interests together and carry out agricultural development and associated activities on group basis. The group approach has been effective to bring innovation to groups and expand to other farmers in their command area	Successful in technology transfer, agribusiness, and supply chain development. Groups and cooperatives-based supply chains and agribusiness developed in different subsector
10	Pocket Package Program	1982	Production focusing on a particular area (or pocket). This approach is effective to introduce new demand-driven technologies.	Instrumental in commercializing crops, dairy, vegetables, and other crops. Contributed to input output supply chain development in agriculture

SN	Agriculture Policies and Programs	Time Period	Key Features	Contribution to agribusiness and supply chain development
11	Projectization Approach	2000	Commodity-based production programs implemented following project design framework (timeframe, financial planning with expected outputs)	Contributed to promote agribusiness and supply chain development including all required set of interventions on project framework
12	Farmer Field School (FFS)	1997	Based on adult learning, learning by observing, and learning by doing principles	This opened up new avenues for agribusiness as IPM products and supported to develop market infrastructure
13	Public Private Partnership	2004	Private parties also invest their share in the program (in cash or kind) and provide services to needy farmers or groups in collaboration with government agencies.	This specially focused on agribusiness development through complementary investment schemes

Source: Ghimire et al. (2021)

3.1.2 Policy evolution perspective

The history of agriculture policy evolution goes back to 1956 when the first five-year plan was formulated, and continued till now. Currently there are over 2 dozen of policies, , which are provided in Table-2 The main common strategic components of the plans (1952-1995) and policies have been to establish systems on technology, institutions, support and extension, production management, research, education and extension linkage, agribusiness, and trade and linkages. The dynamics of these systems is the core of the agriculture policy evolution. However, technology development and increasing production and productivity have been prioritized during all the policy periods. Commercialization, comparative advantage, competitiveness, private sector engagement, export promotion and trade balance,

regulatory mechanisms and supply chain development are the new axillary branches emerged during the later stage of agriculture policy evolution. Since the APP started in FY1994/95, the agricultural sector in Nepal has made progress in several indicators of well-being and development. For example, income per capita and productivity of agricultural labor have increased, poverty has decreased, and malnutrition has declined (MoALD, 2015). The road network has been considerably expanded and irrigation coverage has increased. Access to infrastructure and services including road, market, banks and agricultural service centers have also improve considerably. In almost all agriculture subsectors (crops, livestock, fishery, and forestry), there has been progress in terms of production or/and productivity. However, there are several indicators where the sector needs to improve that include labor productivity, productivity gaps, trade and competitiveness, poverty and malnutrition, and infrastructure. Some subsectors have progressed, but in overall, the progress are not sufficient to improve conditions of a large number of people engaged in agriculture, reduce malnutrition and assure food security. There are however positive signs and potentials for growth and opportunities.

3.1.3 Policy periods, and agribusiness and supply chain development

Agriculture development policies are largely shaped by changes in international theoretical perspectives on development political economy. These theoretical roots were emerged from one or more of macro-level development theories neoliberalism, modernization, world system, and transformative and micro level elite, group, systems and institutional, incremental, and rational choice. The level of influence of a particular theory or theories in agriculture policy and plan formulation has been different over the periods. In Nepal, agriculture policies and their general outcomes can be broadly categorized into six periods, however there is no distinct boarder line to separate these.

Before 1950 period: The is no evidence of any notable shape for agriculture development until 1950. Around the 1850s, Jung Bahadur Rana imported a Jersey bull, two Jersey cows, and clover grass seeds from the United Kingdom, and initiated a cattle-breeding program. However, some infrastructure such as veterinary hospitals, central research farms, and technical schools (Ghimire et al., 2021) were established before 1950. Eextension services were centralized and top-down, farmers' awareness and ambitions were low, and farming was dominantly subsistence-oriented. There were no sub-sectoral conceptual priority, farmers to farmers technological system and defined state support system, Communities shaped family farming to achieve household food security. However, a few agriculture development programs in small and localized scale assisted rural farmers through educational programs aimed at improving household food security and ood systems.

During 1951 to 1960: The political change in 1951 brought democratic ideological changes in social and political systems and planted the seed for people's participation in development. The theoretical perspective of planned development introduced was through first five-year plan that covered 1956 -1961 (NPC, 2016). This plan put second priority to agriculture development and social services, and agriculture extension workers were considered multi-functional professionals to solve problems of farm families and communities, and lead increased farm production and income. The major focus was to demonstration, distribution of good seeds and improved fertilizers, expand cultivation of vegetables and fruits, raising poultry, and scientifically protecting plant and animals from diseases. In 1957, a school of agriculture was established under the Department of Agriculture (DOA) at Kathmandu, and agriculture extension office were established in 25 districts in 1959 (Ghimire et al., 2021). Development of supply chain and market enterprise were not envisioned during the period. Weak and pro-trader marketing channels were identified as constraint for increasing farmer's income as they were compelled to sell their produce at cheaper price at the time of harvest. However, formation of marketing and purchasing co-operatives, support to farmers to constructstalls, sheds and storage for protection from spoilage, the standardization of weights and measures, and the establishment of standardized grades for agricultural produce were focused in the plan. The state enterprises conceptualized as diary collection centers, central dairy processing units and cheese processing units at different locations. The technological, support and extension system was not clearly conceptualized by the plan.

During 1961 to 1990: This period witnessed political instability, from introduction to abolition of absolute monarchy. Started with the three-year plan (1962-65), this period adopted mixed economy in theoretical perspective and implemented six periodic plans until 1990. The main focus remained on state managed mechanisms for research and technology, education and extension, input supply, regulatory and output marketing systems. Establishment of input supply chains through government farms; research, education training, and financial institutions; state trading enterprises for fertilizer, seed and agricultural machineries. For example: extension offices were established in 50 districts in 1963 (Ghimire et al., 2021). Similarly, to absorb agriculture raw materials, commodity-based state-controlled processing enterprises e.g. jute mill, rice mills, sugar mills, spinning mills, and tobacco factorywere established during 1965 to 1970 through Third to Seventh Plans. (NPC, 2016). For output marketing through forward linkages, state trading enterprises e.g. Food Corporation, Paddy and Rice trading company and Salt Trading Corporation were established. In overall, major commodity value chains were state-led and

controlled. The domestic agriculture research system were linked to international public institutions under CGIAR and other country specific agriculture research system to establish robust agriculture technology dissemination. For example: Nepal Agricultural Research Council (NARC) was established during the seventh five-year plan. The supply chain linkages were largely limited to state trading enterprises in and outside the country. The forward and backward linkages in agribusiness system were largely dominated by state enterprises. The policy and priorities hardly incentivized private sector to investment in agribusiness and supply chain development. There was weak B2B linkages for input supplies, service provision, research, extension, education, value addition, processing, and forward linkages. In summary, during this period, state controlled agribusinesses and supply chains were established, which did not incentivize private sector investment, nurture private innovations and innovate support products to promote private agribusiness and supply chains.

During 1990 to 2008: This period started with restoration of democracy in 1990, globalization, liberalization and structural changes aligning with international development, which shaped domestic economic policies. During the eight plan (1992-97), the government followed liberal economic policies, planned development and wide range of reforms implemented to incentivize private and cooperative sector investment and participation in development. Agriculture policy priorities shifted to promote commercialization, competitiveness, and comparative advantages in the agriculture sector to achieve food security and trade balance. State managed supply chains and agribusiness were dismantled through privatization and subsidy cutoff in agro enterprises to promote private sector. Only research farms and technology centers remained under the government system where there was low incentives for private sector. With structural changes and pro private sector policies, private enterprises were excluded for input supply chains, processing, and value addition, B2B linkages at domestic and international level. Promotion of cooperative movement as a third pillar for economic development cooperative enterprises also flourished during the Ninth (1997-2002) and Tenth (2002-2007) Plans (NPC, 2016). Earlier, public enterprises focused state support system to farming communities and later extended to access private and cooperative sector with introduction of new support products. At later stage of this period, agribusiness policies were largely guided by WTO framework reducing subsidy in several subsectors including credit. Private agribusiness and supply chain enterprises concentrated more on agriculture input supplies; technical services; dairy, poultry, vegetables and seed import and export;, and agro processing. During the same period, private and cooperative sectors emerged as integral and powerful part of technology, research, education,

extension, and service system in agribusiness and supply chain development. However, the pace and coverage of private and cooperative sector investment and participation in agribusiness and supply chain development deeply retarded during ten year armed conflict and remained unable to deliver visible impact of policy reforms (MoALD, 2015). The APP (1995-2014/15), a growth and commercialization focused strategy, was the guiding document for this period. Likewise, other key policy framed to drive agribusiness during the period were National Agriculture Policy, 2004, Agriculture Extension Strategy, 2006, and Agribusiness Promotion Policy 2006 (MoALD, 2021). Fertilizer supplies was opened to private sector and subsidy was removed. Competitive grant system of support was introduced to incentivize private sector investment in agribusiness. Formation of commodity organization and their involvement in agribusiness promotion was also key achievements during the period.

During 2008 to 2015: After initiation of peace process in 2006, the transitional governments continued liberal economic policies to promote agribusiness and supply chain development. Private sand cooperative sectors, supported with enabling policies, matching and startup grants, export incentives, investments in agro products and agribusiness development considerably increased. More than 15 public policies were formed during this period in agriculture sector (MoALD, 2021), which were oriented towards promoting private sector engagement in agribusinesses. National Agriculture Research and Development Fund (NARDF) was established to enhance participation of private sector in research and technology system. National Seed Vision (2013-25), a seed sector development strategy, was formulated in 2013. This is the first official document of its kind, which guides all stakeholders associated with the seed business in Nepal for variety development and maintenance, seed multiplication, seed processing and conditioning, seed marketing, and seed quality control and use (MoAD, 2013). Additionally, there is significant increase in number and volume of private sector and cooperative investments in input supply chains, agro advisory and technical services, research, technology and education system, agro processing, seed business, and export promotion.

2015 onward: Nepal promulgated federal republic constitution (2015) with three tiers of governance system with allocation authorities, resource and accountabilities to subnational level. The Constitution has envisioned building an advanced, self-reliant, and socialism-oriented economy. Subsequent governments followed same kind of liberal economic policies and planned development as theoretical ground for development (Constitution, 2015), with main focus on food and nutrition security, trade balance and agriculture commercialization. The ADS (2015-2035) focuses on

technology innovation, value chain development, food and nutrition security, decentralized education science, and is being implemented accordingly. Additionally, there is a significant increase in the number of educational institutions from public and private sector involved in human resource development required at different level for agriculture development in the country.

The critical analysis of public policies including periodic plans, APP, ADS, National Agriculture Policy 2004, Rural Infrastructure Plan 2004, Agri-Business Promotion Policy 2006, and several others are all emphasizing commercialization, modernization, diversification, and industrialization of agriculture sector to enhance food and nutrition security, import substitution, export promotion, and poverty reduction.. Most policies in Nepal are supportive to agribusiness promotion. Although, the Government has been implementing sound public policies for agriculture development and agri-business promotion over the periods, yet there are some strength and weakness of these policies.

Numerous policies have been left at a draft stage, not implemented, often lack supporting legislation and resources, because of limited implementation capacity, financial resource constraints, poor coordination, lack of supporting legislation, and lack of monitoring and evaluation. For example, the overall performance of APP has been mixed (MoALD, 2015). The APP period saw a dramatic improvement in rural road infrastructure, community forest, and horticulture. Irrigation expanded considerably even though it did not achieve the groundwater targets . Within livestock, subsectors such as dairy processing and poultry performed well. Cereals, in general, did not do well, partly because of deficiency in accessing inputs such as improved seeds, quality, and affordable chemical fertilizer on time, and partly because of higher incentives for farmers to engage in higher value commodity production.

Similarly, the disruptive conflict had negative implications for the implementation of policies, plans, and projects; both local elites and a sizable share of the labor force have abandoned rural areas depriving agriculture from needed capital, resources, and labor; while increasing pressure on infrastructure and peri-urban area of already crowded major cities. Likewise, frequent changes in government have constrained continuity of leadership and senior officer thus making implementation of programs more difficult. Despite existence of numerous policies, often favorable to agriculture, their implementation has been below expectations due to a host of factors such as lack of resources, weak capacity, lack of credibility of policies and absence of supporting legislations. In the present context of federalization, the functional coordination and harmonization of resources for agribusiness promotion among the three tiers of government is a challenging task.

Table 3: Summary of dynamics in agribusiness and supply chain development policies and outcome over last six and half decades

Periods	Strategic focus	REE system	Support system	Output with respect to supply chain and agribusiness development
Before 2051	Technology introduction	Not shaped	Not clearly shaped	
2051 -2061	Production and productivity , subsector defined	State owned system, vocational training, outside technology, -localized focus and deployment of technicians, farmer to farmer technology transfer,	State owned system, Seed distribution, Veterinary services, Small localized markets	Localized supply chains in dairy and vegetables
2061-2090	Diversified strategic focus; state mechanism building to promote subsectors, production, and productivity	State owned REE system: national research network, CGIAR based technology source, government owned resource centers, state owned education and vocational training system, technology as public good, state to state enterprise linkage, state value addition and trading enterprises	State directed support system, service provision to farmers and extension teaching, focused on technology dissemination products, subsidy on seed and fertilizer, dedicated state owned credit institution	State owned agribusiness flourished, state managed supply chains evolved/ established, weak development private agribusinesses, B2B networks

Periods	Strategic focus	REE system	Support system	Output with respect to supply chain and agribusiness development
1990-2008	Strategic focus on commercialization, competitiveness, comparative advantage, privatization, and liberalization to gain efficiency	State owned technology system complemented with market opened for private patented technologies; private educational and training enterprises established; public extension system complemented with pluralistic extension involving private service providers, CBOs and cooperatives, technology source, delivery and demand diversified, private sector involvement opened in research with NARDF establishment	Public sector subsidy and support removed for state enterprises,, subsidy removed for chemical fertilizer; credit and seed, pluralistic support system evolved from NGOs, INGOs, cooperatives; support system guided by WTO rules; private and cooperative sector incentivized	State owned agribusiness and supply chains stunted, private and cooperative agribusiness and supply chains evolved, agro advisory enterprises developed B2B linkages at national and international level established, commodity associations emerged as advocacy group
2008-2015	commercialization, competitiveness, comparative advantage continued, self sufficiency	Weak REE linkage, diversified technology source, pluralism in extension system, diversified precision service demand for technology among farming	Fertilizer subsidy re-introduced and regulated supplies, pluralistic support system evolved from NGOs, INGOs,	Private and cooperative agribusiness and supply chains grown; agro advisory enterprises developed;

Periods	Strategic focus	REE system	Support system	Output with respect to supply chain and agribusiness development
		population, private sector participation in service delivery, competitive grant system wide promoted to promote private investment, cooperatives promoted, private sector involved in research, wider participation of private sector in agri education widely	cooperatives, support system guided by WTO rules, private and cooperative sector incentivized, matching grant support to agro enterprises, crop insurance introduced	B2B linkages at national and international level established; commodity associations emerged as advocacy group
2008 onward	ADS main guiding document, strategic priority value chain development, decentralized education science and technology, food and nutrition security, innovation and agro entrepreneurship, farmers right at federal level	REE linkage fragmented, private evolved in varietal research R and D, diversified educational institutions at provincial and federal level, diverse curricula, no specified public extension system, extension function handed over to local and provincial level, technology source diversified, access to technology increased with digital connection, pluralistic	Fragmented support system, private sector and cooperative support through competitive grant system at all levels, higher investment from private sector agribusiness and supply chain, crop insurance, agriculture credit, electricity tariff for irrigation subsidized, output-based cash	Wider development of private and cooperative sector in agribusiness and supply chain development, regulatory mechanism need to be strengthened to improve the quality of agribusiness and supply chains

Periods	Strategic focus	REE system	Support system	Output with respect to supply chain and agribusiness development
	Fragmented diversified strategic focus among three tiers of government	delivery systems and precision service demand, private sector involvement in technology import	incentive introduced	

Source: Adopted from different periodic development plans of Government of Nepal (NPC, 2016, NPC, 2020)

3.1.4 Public investment perspective

Public investment in agriculture is crucial and have significant effects on public health, nutrition, and poverty reduction in the country. The ADS (2015-35) has mentioned that annual budget for agriculture is expected to be about 10% of total budget expenditure. There has been a gradual increment in budget allocation in agriculture sector (Figure-2) with some ups and downs in some years. However, this is not enough investment in agriculture as it is still less than 2 percent of GDP. Investment in agriculture, agribusiness and rural development by the Government, development partners, and the private sector has increased since 2000, due to global and domestic factors including a more stable business environment. For example, Morang Merchant Association and Chambers of Commerce and Industry reports that NRs 2 billion industrial investment has been made in the Sunsari-Morang corridor between April 2010 and October 2011 (Ghimire, 2011). Investment includes soy processing, rice milling, biscuit manufacture, and plywood, from both domestic and Indian investors. The private sector has investment has been strong in dairy processing and marketing poultry (estimated to be NRs 21 billion). The larger part of the Government's annual budget to agriculture goes for support services, including research and extension; subsidy on fertilizers, seeds and planting materials, insurance, credit; and for infrastructure and information services. Agriculture investments are also aimed at stimulating input market development for commercialization of agriculture by offsetting high initial distribution costs until the market expands, economies of scale are realized, and prices decline (World Bank, 2008). Hence, the overall impact of agricultural investment in its aggregate is at increasing welfare and development in Nepal.

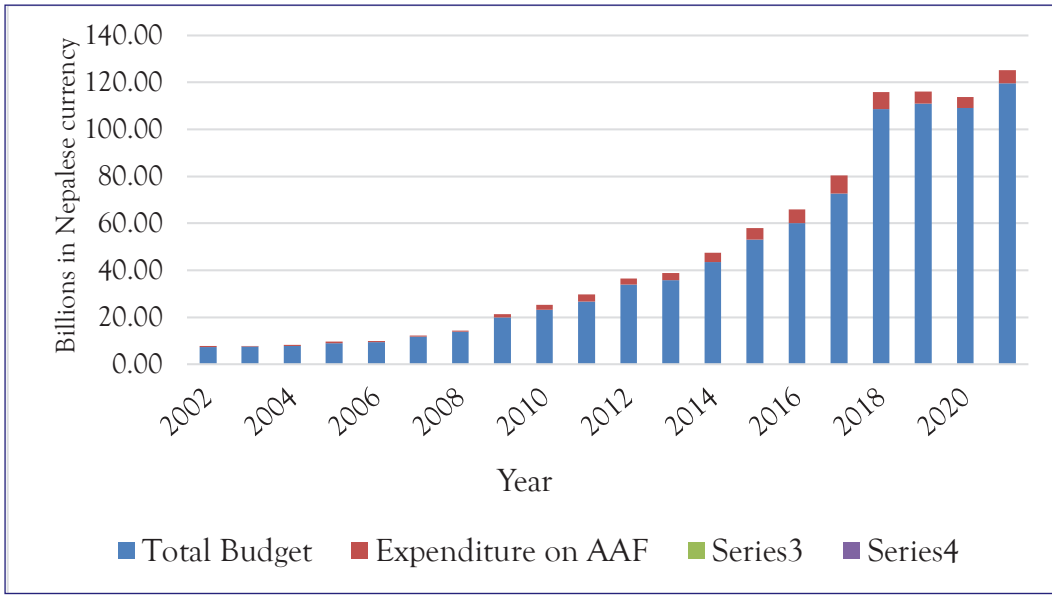

Figure-1: Government Expenditure on agriculture, forestry, and fishing (AFF) in Nepal. *Source: FAOSTAT. https://www.fao.org/faostat/en/#country/149*

3.1.5 Commercialization perspective

Historically, agriculture has been the root of industrial growth worldwide. Nepal, having an agro-based economy, improvement in agricultural productivity will provide an initial spur to industrialization (Gauchan, 2018). Nepal has an estimated 44.7% of agricultural entities commercialized, and 55.3% are subsistence farming entities (MoALD, 2015). Staple commodities such as rice, wheat, potato, and vegetables have higher commercialization rates (30-50%) than maize and fruits (15-25%). Commercialization rates for milk (60%) buffalo meat (80%) and goat meat (85%) are high, reflecting the high value of these products (MOAC and JICA 2010). The low proportion of commercial agriculture in Nepal is highlighted by the low use of mineral/chemical fertilizers, irrigation and mechanization, and limited production of rural surplus for the rest of the economy. Thus, stimulating the process of commercial transformation has been included in past and current policies.

Agriculture and agribusiness investment are constrained by inadequate suitable policies (e.g. contract farming), competition with state enterprises and cooperatives, lack of services and infrastructure to support value chain development (e.g. agribusiness incubators, agro-industrial parks), low coverage of agricultural insurance, and a transparent and stable tax and incentive system to promote innovation and reduce risk. The key issue is how to increase sustainable and profitable investment

in agriculture and agribusiness that could accelerate the growth and modernization of agriculture. Nepal-India Trade Treaty has de facto created free trade between the two countries and resulted in Indian products outcompeting some of the Nepalese agricultural produce in the Nepalese domestic market, particularly in the cereal market. Due to a lack of good farming and manufacturing practices, it has been difficult for Nepalese farm products to comply with international quality standards. As a result, Nepalese products face non-tariff barriers in the form of sanitary and phytosanitary (SPS) and technical standards in the export markets. Pegged exchange regime with India has resulted in the erosion of the competitive edge of Nepalese products in exports to India as well as in domestic markets. One of the issues of agriculture trade is how to use trade policy instruments in securing food security through a self-reliant food economy. Therefore, APP and ADS have viewed agriculture as an engine of growth for triggering commercialization, promoting competitiveness and developing industries in the country.

The transformation towards a more commercialized agriculture requires a set of measures that focus not only on farmers but, fundamentally on agro-enterprises involved in the commercialization of agricultural products and services. These enterprises include input providers, producer companies, marketing cooperatives, storage operators, logistic companies, agro-processors, importers and exporters of agricultural and food products, distributors, traders, and agricultural service providers (including financial service providers, insurance providers, business service providers (Gauchan, 2018). These enterprises may be micro, small, medium, and large. Profitable commercialization requires the combination of several measures such as an enabling investment climate and a number of reforms to strengthen contractual arrangements, taxes, and financial services to promote efficient commercial agriculture.

The registration trend of agro-industries has increased during the past few decades and poultry stands number one among agro-industries (Figures 3 and 4). Similar is the case for agriculture, multipurpose and commodity-specific cooperatives registration. There are altogether 15,217 agriculture-related cooperatives registered in Nepal till FY2016/07 (Figure 5). The reality is different as increased registration of agro-industries and cooperatives does not reflect growth on the ground. The government support policies demand firms or cooperative registration as basic eligibility criteria for this the registration number increased exponentially in recent years. A large number of agro vets established and operate a strong supply chain of seed, breed, agrochemicals and embedded services. In total, 12,066 agro vets have been licensed and they have a strong B2B network at the domestic and international

levels (Figure 6). This is a wide and deep supply chain significantly contributing to agriculture commercialization in the country.

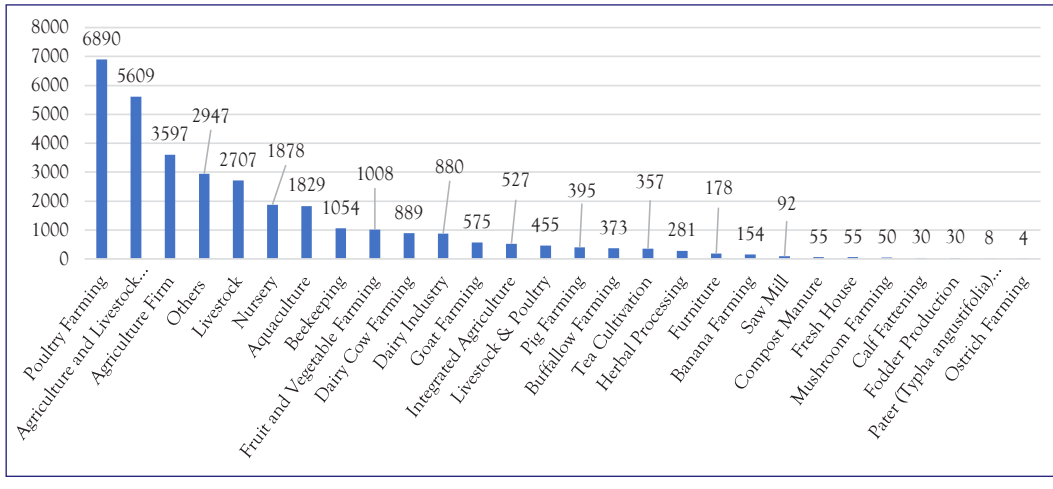

Figure-2: Agribusiness Registered during 1994-2021 in Nepal. *Source: DoI, (2021/022).*

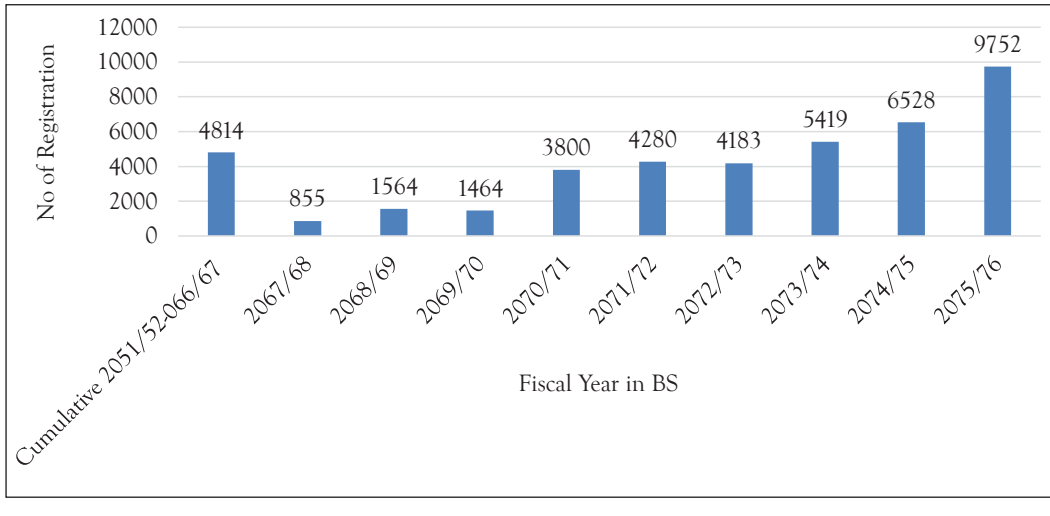

Figure-4: Agro-Enterprise Registration Trend in Nepal. Source: DoI, (2021/022).

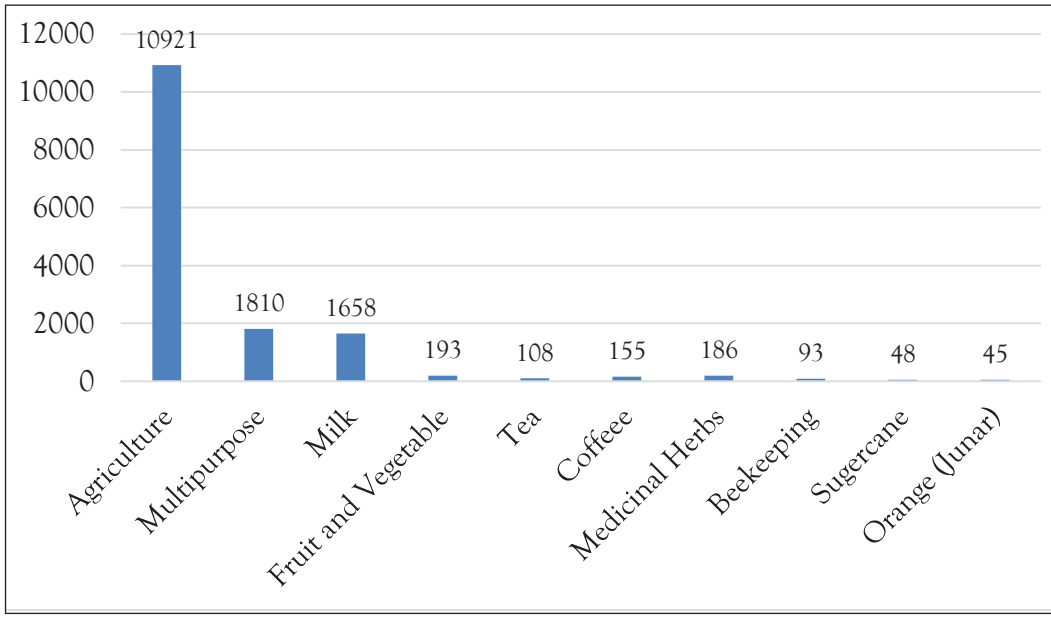

Figure-4: Agricultural Cooperatives Registered till 2016/17 in Nepal. Source: DoC (2017)

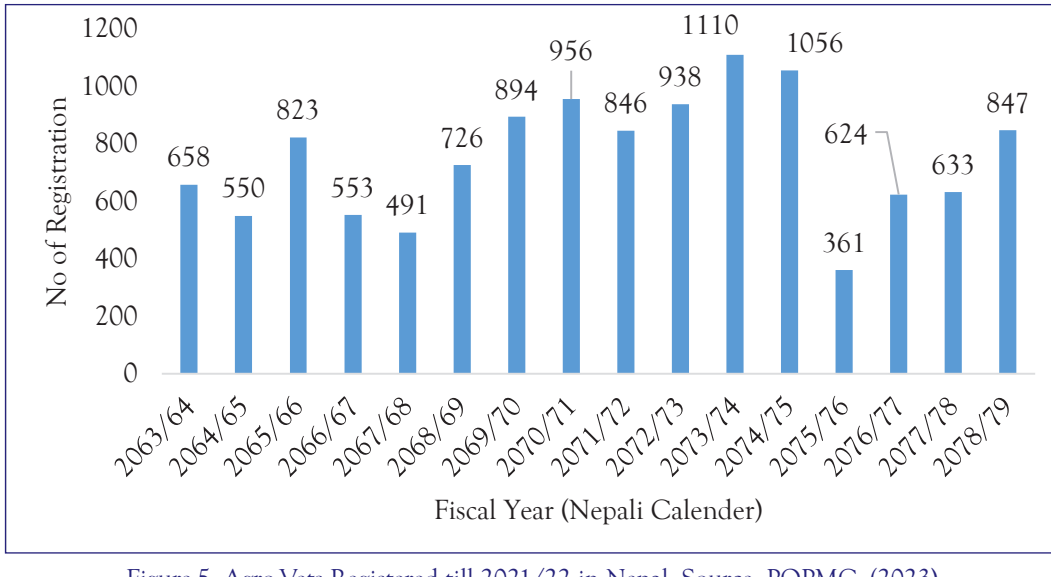

Figure-5: Agro-Vets Registered till 2021/22 in Nepal. Source: PQPMC, (2023).

3.1.6 Production trends perspective

There is considerable potential for the growth of agricultural productivity in Nepal. Since its first five-year plan (1956/57–1960/61), the Nepalese government has

continuously focused on improving food production. However, the agriculture growth rate remains stagnant, with an average rate of less than 3% per annum, which is far below the targeted 5.4 % in the Fifteenth plan (2019/20-2023/24). Currently, the level and the growth of productivity are low due to several factors including an ineffective and underfunded agricultural research and technology transfer system, lack of an effective mechanism for linking research extension and farmers, the low availability of year-round irrigation, the limited availability and affordability of key inputs (fertilizer, seed, breeds, etc.), declining soil fertility, poor integration of research and extension with the agricultural education system, and high incidence of pests and diseases.

Rice, maize, and wheat occupy the maximum share in terms of area and production of Nepalese agriculture and play major roles in the food and nutrition security of the country. Although the Government has been investing in cereal production since the 1960s, there is a slow and steady growth in area, production and yield. Rice, wheat, maize, barley, buckwheat, and millet are the cereal crops that are grown in Nepal, among which the first three occupy 91.31 and 96.67 percent of the total area and production of cereal, respectively (MoALD, 2021). Cereal crop plays a major role in food and nutrition security in Nepal as Nepalese food habits are based on cereal crops. Cereal supplies 65 and 60 percent of the total food energy and proteins to the Nepalese population (Regmi, 2016). Cereal crop shares about 33 and 23 percent of the total food expenditure of rural and urban households, respectively in Nepal.

Despite having importance, Nepal is not able to become self-sufficient in terms of cereal crop production. The cereal import dependency ratio is increasing every year and the food import-to-export ratio is at an all-time high. Import of food has increased fourfold from 2011 to 2018 making the country vulnerable to food insecurity (NPC, 2019). Cereal crop production is heavily input intensive in nature. They require a large amount of investment in terms of fertilizer, irrigation, labor force, and plant protection chemicals. Only 54 percent of the total cultivated land is irrigated, among which only 33 percent of the land has year-round irrigation facilities in Nepal (Dahal et al., 2022). Such a situation makes the Nepalese cereal production system highly monsoon dependent. Paddy production heavily depends upon the timing and amount of the monsoon rainfall, whereas maize and wheat depend on rainfall in other months. Production of these crops varies due to highly variable, unpredictable rainfall as well as lack of other irrigation systems.

The linear regression analysis shows that the production of cereal crops in Nepal has been increasing gradually with yearly rise and fall for the period of 1961 to 2021 (Figure-1). The coefficient of determination ($R^2 = 0.929$) for the cereal crop production

in Nepal shows that there is a strong positive correlation between agriculture policies/programs and the production of cereal crops in Nepal. Similarly, the land area for cereal crops has also been increasing slowly with some ups and down for the same period (Figure-1). Likewise, the productivity of major cereal crops in 2021 is 3.21 Mt/ha which was only 1.85 Mt/ha in 1961(FAOSTAT). Therefore, it can be interpreted that the government policies, programs, and extension approaches that were adopted in the past had significantly contributed to the increase in the area, production, and productivity of cereal crops in Nepal.

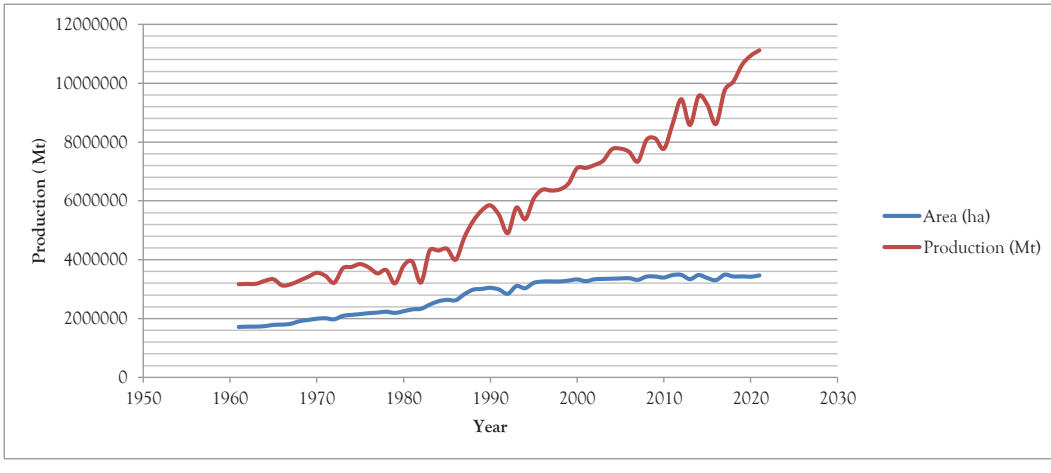

Figure-6: Cereal Crop Area and Production in Nepal. *Source: FAOSTAT. https://www.fao.org/faostat/en/#country/149*

4. Conclusions

The review reveals that there has been an alignment of agriculture and agribusiness policies with the international and domestic political economy during the last seven decades. In the early stage of planned development and throughout the panchayat regime, there was a widespread and deep promotion of state-managed agribusiness and supply chains. These initiatives encompassed various aspects, including technology generation, dissemination, input supplies, finance, collection aggregation and processing. State-managed enterprises were established thrived during this period, while market-based private enterprises remained limited due to the absence of policy and program incentives.

With the restoration of democracy, and adoption of a liberal economy, followed by subsequent structural reforms state managed agribusinesses and supply chains were either privatized or disincentivized, .This led to emergence of private sectors and

other non-state actors such as cooperatives, producer groups, and community-based organizations (CBOs), and non-governmental organizations (NGOs) emerged as key providers of inputs, seeds, exotic varieties, and the technical services. This policy environment was made more friendly to nurture private and community-based actors in agribusiness and supply chains. Currently, the public sector still plays major role in agricultural research (new seed varieties, source seeds, fertilizer), extension service, and provision of support services (subsidies, input supply etc.), while private sectors are emerging in the provision of input supply and agro- advisory services associated with their agricultural inputs, particularly in commercial production systems and market access areas.

Despite the existence of more than 24 agribusiness-enabling policies, there is insufficient investment from the private and cooperative sectors to transform the agriculture sector. An important aspect of agribusiness is the supply chain, which is found to be insufficiently focused on existing policies. Therefore, this review calls for further diagnostic participatory analysis of policy and practice gaps under the current three-tier federal governance system. Such an analysis should encompass overall policy capacity extended from policy formulation, institutions, and resources for implementation.

Acknowledgements

Authors would like to acknowledge the reviewers for constructive comments to improve the manuscript.

Authors Contribution

Rajendra Prasad Mishra: Conceiving ideas; formulation of overarching research goals and aims; Development or design of methodology; Application of statistical, mathematical, computational, or other formal; Conducting a research and investigation process, specifically performing the experiments, or data/ evidence collection; Provision of study materials, reagents, materials, instrumentation, computing resources; Report initial draft/review/ final draft polishing;

Indra Hari Paudel: formulation of overarching research goals and aims; Development or design of methodology; Application of statistical, mathematical, computational, or other formal; Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection; Provision of study materials, reagents, materials, instrumentation, computing resources; Report initial draft/review/ final draft polishing;

Conflict of Interest

The authors decleared no conflict of interest.

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Appendix

Table-A1: Recent Agriculture Development Policies in Nepal

National fisheries policy 2079 (2022)	Climate change policy 2067 (2010)
National animal health policy 2078 (2021)	National land use policy 2069 (2012)
National animal breeding policy 2078 (2021)	Forest policy 2071 (2014)
National dairy development policy 2078 (2021)	Agri mechanization promotion policy 2071 (2014)
National agro forestry policy 2076 (2019)	Floriculture promotion policy 2069 (2012)
National food safety policy 2076 (2019)	Bird farming policy 2068 (2013)
National fertilizer policy 2058 (2001)	Range land policy 2068 (2013)
National tea policy 2057 (2000)	Agribusiness promotion policy 2063 (2006)
National coffee policy 2060 (2003)	Gender mainstreaming policy 2063 (2006)
Agro biodiversity policy 2063 (revised 2071) (2014)	National agriculture policy 2061 (2004)
Irrigation policy 2070 (2013)	National seed vision (2013-2025)
Industrial policy 2067 (2010)	Agriculture Development Strategy (2015-35)
Industrial policy 2067 (2010)	NRB soft loan directive 2074 (2017)
Agriculture Perspective Plan (1994/95-2014/15)	

Source: Agriculture Policy Compilation of MoALD (2021)