



Budget Recommendations for

**AGRICULTURE
SECTOR
GROWTH**

MAY, 2020



SAMRIDDHI
FOUNDATION

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AGRICULTURE SECTOR GROWTH

May, 2020



SAMRIDDHI

FOUNDATION

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Table of Contents

List of Acronyms and Abbreviations.....	i
Summary of Problems and Recommendations.....	iii
Background.....	vii
Introduction.....	viii
Recommendations to Address the Pertaining Issues in Agricultural Sector of Nepal.....	1
1. Infrastructure Development.....	3
1.1 Plans and Policies of FY 2020/21.....	4
1.2 Recommendation.....	4
2. Facilitating Greater Access to Capital.....	7
2.1 Recommendation.....	8
3. Increasing Agricultural Inputs.....	9
3.1 Plans and Policies for FY 2020/21.....	10
3.2 Recommendation.....	10
4. Increase Farm Commercialization.....	13
4.1 Plans and Policies for FY 2020/21.....	13
4.2 Recommendation.....	14
5. Enhancing Market Accessibility.....	17
5.1 Plans and Policies of FY 2020/21.....	17
5.2 Recommendation.....	17
6. Enhancing Value Addition Services.....	19
6.1 Plans and Policies FY 2020/21.....	20
6.2 Recommendations.....	20
7. Increasing Research and Extension Services.....	23
7.1 Plans and Policies for FY 2020/21.....	24
7.2 Recommendations.....	24
8. Mitigating Crop Failure Risk.....	27
8.1 Plans and Policies of FY 2020/21.....	28
8.2 Recommendation.....	28
9. Enhancing Domestic and International Agriculture Trade.....	29
9.1 Plans and Policies of FY 2020/21.....	31
9.2 Recommendation.....	31
References.....	33

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List of Acronyms and Abbreviations

ADS	Agriculture Development Strategy
AFK	Aga Khan Foundation
AICL	Agriculture Inputs Company Ltd.
APP	Agriculture Perspective Plan
ASEAN	Association of South East Asian Nations
BFI	Banks and Financial Institution
CTC	Crush, Tear, Curl
DOA	Department of Agriculture
DOLS	Department of Livestock Services
EU	European Union
FANRPAN	Food Agriculture and Natural Resources Policy Analysis Network
FITTA	Foreign Investment and Technology Transfer Act
GDP	Gross Domestic Product
GoN	Government of Nepal
IA	Indonesia-Australia Comprehensive Economic Partnership Agreement
ICT	Information and Communication Technology
IO	Irrigator Organization
JTAs	Junior Technical Assistants
LGAs	Local Government Authorities
MoAD	Ministry of Agricultural Development
MoFAGA	Ministry of Foreign Affairs and General Administration
MSP	Minimum support price
NARC	National Agriculture Research Council
NCI	Non-Conventional Irrigation
NGOs	Non-Governmental Organizations
NLFS	Nepal Labor Force Survey
NRB	Nepal Rastra Bank
NSAF	Nepal Seed and Fertilizer
NSCL	National Seed Company Limited
PMAMP	Prime Minister's Agriculture Modernization Program
PPP	Public-Private Partnership
PSLP	Priority Sector Lending Program
R&D	Research and Development
SAFTA	South Asian Free Trade Area
SEA	Solvent Extractor's Association of India
STCL	Salt Trading Company Limited
WTO	World Trade Organization

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Summary of Problems and Recommendations

S.N.	Agenda	Problems	Recommendation	Responsible Authority
1.	Infrastructure Development	<ul style="list-style-type: none"> Lack of irrigation services in arable lands of Nepal Insufficient agricultural roads High dependence on traditional methods and technologies in agriculture 	<ul style="list-style-type: none"> Encourage local governments to come up with local irrigation and road projects Promote Public Private Partnership in order to implement local road and irrigation projects Promote joint venture with international and private companies for modern technology transfer 	<ul style="list-style-type: none"> Ministry of Physical Infrastructure and Transport
2.	Facilitating Greater Access to Capital	<ul style="list-style-type: none"> Difficulty in accessing capital from BFIs Reluctance of BFIs to hand out loans to small farmers due to high administrative costs associated with small loans Inclusion of the sector in the negative list of FITTA 	<ul style="list-style-type: none"> Build a clear legal framework for alternative investment mechanisms like venture capital, equity financing, angel investment, etc. to mitigate the gap in investment in agriculture Deregulate the farm insurance sector to attain universal farm insurance and discharge BFIs to regulate a minimum agricultural portfolio Remove the agriculture sector from the negative list of FITTA to increase agro-investment Shift loan requirement provision to agriculture business and industries so that the benefit will trickle down to farmers. 	<ul style="list-style-type: none"> Ministry of Finance Nepal Rastra Bank
3.	Increasing Agricultural Inputs	<ul style="list-style-type: none"> Inadequate supply of seeds and fertilizers Highly subsidized agricultural inputs due to which private industries cannot compete in the sector. High focus and priority to import of chemical fertilizer making it difficult for organic fertilizer industries. Compromised seed quality and informal seed providers. Low agricultural yield 	<ul style="list-style-type: none"> Relax regulations, reduce taxes and provide soft loans to incentivize the private sector to enter the seed and organic fertilizer market Encourage the use of organic fertilizer for sustainable production. Gradual removal of input subsidies on agriculture to enable a level playing field Pilot voucher system schemes to enhance supply of fertilizer through private sector participation. 	<ul style="list-style-type: none"> Ministry of Agriculture and Livestock Development Ministry of Industry, Commerce and Supplies

4.	Increase Farm Commercialization	<ul style="list-style-type: none"> • Large informality and high dependence on subsistence farming • Disintegrated lands as well as scattered crop production • High corporate tax which disincentivizes farmers to come in formal channel 	<ul style="list-style-type: none"> • Divide the country into various agro-ecological zones as per crop specialization of the land • Introduce a clear legal framework for contract farming to transition to commercial agriculture • Create avenues to train farmers by establishing a PPP framework and by outsourcing the training to private companies. • Exempt agricultural businesses with the federal income tax law • Encourage incubation centres to help in capacitate small and medium agriculture business • Incentivize provincial government to bring farmers in formal sector. 	<ul style="list-style-type: none"> • Ministry of Land Management, Co-operatives and Poverty Allevation • Ministry of Agriculture and Livestock Development
5.	Enhancing Market Accessibility	<ul style="list-style-type: none"> • Shortage of roads that connect farmlands to the marketplace • Increased reliance of farmers on intermediaries/middlemen to transport their goods that increases cost 	<ul style="list-style-type: none"> • Invest in the creation of strategic market centers to eliminate intermediaries/middlemen • Establishment of agricultural cooperatives, provision of custom hiring enterprises and leverages on existence ICT penetration 	<ul style="list-style-type: none"> • Ministry of Physical Infrastructure and Transportation • Ministry of Industry, Commerce and Supplies
6.	Enhancing Value Addition Services	<ul style="list-style-type: none"> • Small agricultural production units with poor investment capacities and small production volume • These small processing units cannot comply with food law and regulations because they often do not have proper knowledge regarding the operation of new technologies used in the factory. • Lack of certification and accreditation services in Nepal • Prevalence of uniform minimum wage law set by the government • Lack of mechanisms like quality testing labs, cold storage, road, market, drying facilities and others 	<ul style="list-style-type: none"> • Strengthen quality standardization services like testing and certification of agricultural products • The processing units should be liable to follow good practices while manufacturing the products. • Remove the minimum wage and allow the market forces to operate • Attract investment to enhance value chain development from the private sector and development partners in the form of PPP • Increase research and extension services with involvement of the private sector 	<ul style="list-style-type: none"> • Ministry of Urban Development • Ministry of Physical Infrastructure and Transportation • Ministry of Health and Population

7.	Increasing Research and Extension Services	<ul style="list-style-type: none"> • Data limitations in terms of availability, reliability and data management • Low to no involvement of private sector in research • Lack of demand-driven research • Lack of linkage between research and extension services post-federalism 	<ul style="list-style-type: none"> • Capacitate government run research institutes with adequate funding and training; and incentivize private sector institutes with the introduction of various funding schemes • Implementation of Research Education-Extension Triangle for joint involvement of research, extension and education personnel at different levels of government. • Decentralize NARC to enable specialized research • Inclusion of local farmers in extension services 	<ul style="list-style-type: none"> • Ministry of Agriculture and Livestock Development • Ministry of Education, Science and Technology
8.	Mitigating Crop Failure Risk	<ul style="list-style-type: none"> • Lack of proper storage methods and inefficient handling and packaging mechanisms • Unfavorable weather, lack of quality input seeds and fertilizers and diseases 	<ul style="list-style-type: none"> • Attract private sector investments via PPP to equip farmers with advanced storage facilities, such as chilling centers and silos. • Provide crop and livestock insurance • Establish mini lab to identify tests and disease 	<ul style="list-style-type: none"> • Ministry of Agriculture and Livestock Development • Ministry of Education, Science and Technology
9.	Enhancing Domestic and International Agriculture Trade	<ul style="list-style-type: none"> • High dependence on cereal crop despite low productivity. • Hindrance in domestic trade due to agricultural roads, storage facilities, market information and market intelligence systems • Hindrance in international trade due to suboptimal warehousing facilities and customs infrastructure, certification and lack of formal payments channels • Complex compliance process while exporting products • Lack of packaging and branding of Nepali produce. 	<ul style="list-style-type: none"> • Prioritize the production of high value cash crops and create marketing and branding plans to capitalize on its comparative advantage • Make free trade agreements with various nation • Expedite trade agreements that avoid tariff and non-tariff barriers • Ease the process of export through transit points 	<ul style="list-style-type: none"> • Ministry of Agriculture and Livestock Development • Ministry of Finance • Ministry of Industry, Commerce and Supplies

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The Covid-19 has put the Nepalese farmers under extreme pressure as it has disrupted activities in the agriculture sector and generated challenges in the food supply chain. The shutdown of markets has narrowed down the alternatives for sale of agricultural products for farmers. This failure to access the market as well as the halt in the transportation of vegetables, dairy and poultry has resulted in the spoilage of agro-products that has compelled the farmers to destroy their produce. Moreover, the lockdown has impacted the current peak harvest season that is deemed to threaten the food security in the incoming cycle. Likewise, as Nepal is a net importer of chemical fertilizers, the lack of access to this vital farm input in the time of crisis can exacerbate the food crisis. To make matters worse, India has halted the rice exports and has temporarily suspended export contracts that will have severe consequences in the food trade.

According to a recent study conducted by the Foreign Employment Board, a total of 407,000 Nepalese migrant workers are expected to return home in the long-run as economies of the host countries are projected to contract. Out of those employed in agriculture in the Gulf countries, the majority is engaged and has expertise in modern livestock farming while the minority is engaged in crop-based agricultural farming. Moreover, growing evidence of those migrant returnees from Israel and South Korea indicate that they have applied their skill sets to successfully initiate commercial agriculture in Nepal.

Hence, as these migrant workers return to the country with better skills, Nepal needs to create opportunities and incentivize them to engage in farming. Therefore, this scenario demands the policymakers to better identify the challenges and seize the opportunities in the agricultural sector to look beyond the constraints and craft a robust architecture to better utilize the human resource.

Despite the pandemic and lockdown in the country, the Central Bureau of Statistics expects the agriculture sector to grow by 2.48%. However, to realize growth, reforms conducive to agricultural development is necessary.

BACKGROUND

Agriculture in Nepal remains the mainstay of the national economy, accounting for 26.98 percent of the country's total Gross Domestic Product (GDP) (Ministry of Finance, 2019). While agriculture's share in Nepal has progressively declined over the recent years – in 2011 it remained at 32 percent, the importance of this sector to the country's economic and social fabric goes well beyond this indicator. Agriculture not only dominates the economic output but also deems to be the prime source of food supply, income, and employment for the majority as the sector employs 68 percent of the Nepalese population. Likewise, the country's total commodity export, by and large, feeds on agriculture with a total of 31.1 percent (Ministry of Finance, 2019). In accordance with the sectoral significance, the budget for 2018/19 planned to make Nepal self-sufficient in the following five years.

Although there is significant economic reliance on the agriculture sector, the growth rate has been low because of low productivity, lack of commercialization and less promotion of technical training (Samriddhi Foundation, 2012). The past and ongoing interventions have seen uncoordinated service delivery - often competing and duplicating. Additionally, constraints in the agricultural sector have resulted in the failure to tap into the potential that include but are not limited to lack of access to traditional means of finances -as witnessed through the share of lending of Banks and Financial Institutions (BFIs) in the agricultural sector, restrictions on foreign investment in the sector as a result of negative list in Foreign Investment and Technology Transfer Act (FITTA), inadequacies in the Prime Minister's Agriculture Modernization Program (PMAMP) and issues pertaining to regional connectivity. All of this, therefore, has resulted in an ineffective implementation in terms of transforming the Nepalese agriculture into an economically viable commercial agriculture.

Although the government has launched several periodic plans, programs, and policies to mitigate the problems affecting this sector, results have been below satisfactory. The agro-sector of Nepal is a principal recipient of government subsidies that aims to provide inputs, credit, and interest below the market rate to increase productivity. These subsidies, aiming to benefit the entire agricultural sector, often reach to wealthy farm households, ones already employing high economies of scale, rather than the poor and marginalized farmers, subjecting them to frequent price and product distortions. This has resulted in a question in the efficiency and effectiveness of the subsidy provision arising doubt whether subsidies are benefitting the agro sector in a holistic way and is in fact going parallel to accrue productivity from the sector.

To raise agricultural productivity, a host of other requirements - including better infrastructure, road, irrigation, storage, research and knowledge dissemination, capacity building, and market support provision – are necessary. Hence, there is an ever-widening need to develop instruments that solve the many and varied problems underlying low agricultural productivity in the country.

In this paper, various actions required to curb the persisting issues in the agriculture sector are recommended.

INTRODUCTION



**RECOMMENDATIONS TO
ADDRESS THE PERTAINING
ISSUES IN AGRICULTURAL
SECTOR OF NEPAL**

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1. Infrastructure Development

Agricultural infrastructure is considered to have a positive correlation with increased farm yields. As Nepal does not have a sound infrastructure in place that favors agriculture, there is a need to invest heavily on the same.

Irrigation

The development and maintenance of irrigation systems has been very slow, making the farmers reluctant to depend on natural rainfall for farming. Consequently, the farmers in Nepal still depend on traditional methods like deep tube well and shallow tube well for the purpose of irrigation. Despite Nepal being rich in water resources, the farmers cannot still access groundwater easily as the country also lacks sufficient supply of electricity and fuel. These barriers have made extraction of water from the ground highly expensive. Moreover, since the crop productivity in the sector is determined by the natural rainfall, the farmers operate at high risk.

The Irrigation Policy, 2013 focused on ensuring year-round irrigation through Surface Water Irrigation, Ground Water Irrigation, irrigation based on new technologies, and expansion of lift irrigation while encouraging effective participation of local groups. The policy document also placed focus on implementation through the Irrigation Management Information System, a quality circle of experts in the irrigation department to evaluate the quality of implementation of the policy, strengthening development feedback. The Agriculture Development Strategy (ADS) has targeted to irrigate 77% of land through surface water irrigation, 16% through ground water irrigation and 7% through non-conventional irrigation (NCI). Yet, these have not been materialized.

Similar targets were also set during the Agriculture Perspective Plan (APP), however, the areas irrigated through surface and ground water irrigation were far below the target. The shortfalls were mainly because of the inability to attract sufficient funds from different channels to carry out the ambitious projects. In more recent times, the government has been encouraging micro-irrigation systems to be implemented at small farmers' level for NCI.

Road

As per the data in Strategic Road Network of Nepal 2017/18 a total of 13,447 km of strategic roads has been built; of the total, 6,979 km are blacktopped, 2,276 km gravel and 4,191 km are earthen roads. According to the record, the number of National Highways and Feeder Roads are 21 and 209 respectively (Department of Roads, 2018). However, these roads do not provide adequate coverage to the remote areas of the country. The current rural road network is underdeveloped and there are significant improvements that need to be made to connect the rural parts of Nepal. Alongside, the existence of anti-competitive practices like syndicates and cartels in the transportation system has led to increased rates for road freight and has ultimately increased the cost of agro-producers.

The Agriculture Development Strategy 2015-2035 has devised a policy for rural roads to explicitly target agricultural roads. The policy aims to accelerate the program of development of agricultural roads, while improving their quality and maintenance. The policy focuses on connecting agricultural production centers to market centers; improving coordination with other agro-market infrastructure programs; and clarifying division of responsibilities between center and sub-national levels for implementation of the policy.

Technology and Mechanization

In the agro-sector, animate power – human power and animal power - is the main source of power. While the human power and the animal power is 36.3 percent 40.5 percent respectively, the mechanical power is 23 percent (Jha et al., 2019). Traditional and manual tools such as hoe, sickle, wooden ploughs are still widely used. Likewise, animal drawn traditional power such as wooden plough, iron moldboard plough, disc harrow and wooden planks are available and in operation. This practice has severely hindered the ability to adopt modern technology to increase the output of agriculture.

1.1 Plans and Policies of FY 2020/21

The following are the plans and policies for FY 2020/21 devised by the Government of Nepal (GoN) that are aimed at infrastructure development:

- The government has laid emphasis on increasing productivity and production through further modernization, mechanization and specialization of the agriculture sector for the coming fiscal year.
- Arrange cereal reservation houses, modern technology, storage facilities, preliminary processing and market in all provinces and local levels.
- The government has highly prioritized the development of physical infrastructure like roads, energy, irrigation and urban infrastructures. For developing irrigation services, the government is determined to expand electricity access.

1.2 Recommendation

1. Encourage local governments to come up with local irrigation projects either on its own or in collaboration with surrounding municipalities as per the feasibility. Set-up a fast track fund where local governments can apply and get quick disbursements.
2. Likewise, encourage local governments to map and build agro-road projects either on their own or in collaboration with surrounding municipalities as per the feasibility. Set up a fast track fund here as well.
 - *Irrigation and road projects will also serve as an immediate employment program as Nepal will have to incorporate hundreds of thousands of returning migrant laborers in the economy in the aftermath of the Covid-19.*
3. Enable local (and state) governments to legislate a framework for Public-Private Partnership (PPP) in order to implement the said local road and irrigation projects. Coordinate with the Ministry of Federal Affairs and General Administration (MoFAGA) to offer a practicable model legislation for sub-national governments. At the federal level, identify at least five major road projects (or ideally one per state) and accelerate PPP.

In Tanzania, Aga Khan Foundation (AFK) adopted a Public-Private Partnership (PPP) model to enhance sustainability in irrigation schemes under which the Local Government Authorities (LGAs) invested in major hard infrastructure (main canals and weir) while AKF focused on rehabilitation of existing structures and developing the capacity of

local Irrigator Organizations (IOs). The IOs are responsible for and trained to effectively operate, manage, and sustain irrigation systems. Likewise, as part of the Agriculture Sector Development Program (ASDP), Tanzania adopted a 'decentralized', 'bottom-up' approach where Zonal Irrigation Units (ZIU) with technical capacity, local government authorities with irrigation scheme management skills, and communities through their IOs, would develop and manage the schemes sustainably.

The Olmos Irrigation PPP scheme in Peru implemented a "take-or-pay" policy in irrigation. Under the scheme, the farmers acquire title to the land and the right to the irrigation services. All farmers are obligated to pay the service fee of \$0.07 per m³ for water used to irrigate their farm. It is called a "take-or-pay" policy because if the farmers do not take the water supply from the concessionaire they are still liable to pay.

4. Promote joint ventures with international companies so that it enables technology transfer to domestic companies thereby capacitating them to lead major projects in the future.

A study conducted among 126 organizations scattered across Bangladesh, Kenya, Senegal, Tanzania and Zambia identified that involvement of the private sector in technology transfer helped the agricultural sector realize most new technologies for pesticides, machinery, poultry, fertilizers, and processing (Gisselquist et. al, 2013) . The technology transfer from private and international agencies helped Bangladesh enhance productivity of hybrid rice and new vegetable cultivators. Private technology transfer also led to and supported private research.

5. Enable implementation of the mandamus order issued by the Supreme Court in 2011 to end all forms of syndicate in the transport sector of Nepal.

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2. Facilitating Greater Access to Capital

One of the most prominent issues that hinders the growth of the agricultural sector in Nepal is the difficulty in accessing capital from banks and financial institutions. As a result, the efficiency and productivity of the sector has experienced reduced investment capacity and sluggish growth.

Numerous steps have been undertaken for the purpose of supplying capital to the agricultural sector. The GoN has highly prioritized the agenda of enabling access to finance for small holding farmers. Agriculture Development Strategy (2015 - 2035) prioritized the need for access to credit and introduced measures like providing financial awareness to farmers for increasing credit worthiness, incentivizing banks and financial institutions to open branches in rural areas, and increasing agriculture insurance facilities. In 2017, Nepal Rastra Bank (NRB) adopted the Priority Sector Lending Program (PSLP), which mandated banks and financial institutions to allocate 10% of their loan portfolio to the agricultural sector at a subsidized interest rate of 5%.

However, the access to credit by small and marginal farmers is still below optimal. Out of 27 commercial banks in Nepal, only Agriculture Development Bank has been able to meet and extend its PSLP requirements. Similarly, only three development banks and four finances have been able to meet the NRB directive (NRB, 2020). It implies that banks are more reluctant to hand out loans to small farmers as the cost of loaning to them in relation to the capital loaned is higher than that of large firms. Due to small loan amounts, high administrative costs and high risks, financing small and marginal farmers is unattractive to Commercial Banks (Samriddhi Foundation, 2013). Commercial Banks often tend to prefer paying fines rather than fulfilling PSLP obligations.

Low awareness among farmers; lack of education to develop business plans and comply with complex lending mechanisms; limited eligibility criteria; low demand and supply of farm insurance and inadequate collateral have barred farmers from accessing loans from the formal channels. Additionally, farmers face difficulty during loan repayment due to lack of synchronization between the repayment schedule and crop calendar as well as farm cash flows. These factors have in fact prevented farmers from accessing credit at nominal interest rates and have forced them to depend on informal lending channels with interest rates as high as 24-36% (International Maize and Wheat Improvement Centre, 2019).

The government of Nepal increased the subsidy on insurance premium to 75% that covered damages caused by fire, lightning, earthquake, drought, landslide, tornado, hailstorm and snowfall (Insurance Regulatory Authority of Nepal, 2019). The Insurance Board also introduced district insurance policies for livestock and cash crops. However, currently one insurance company or branch covers three districts, which implies that the insurance sector cannot provide coverage to all farmers.

On the one hand, agriculture sector in Nepal is experiencing a financial shortage, whereas on the other hand, the FITTA, 2019 has kept the sector in its negative list, barring sectors of primary agricultural production, poultry farming, fisheries, bee-keeping, fruits, vegetable, oil seeds, pulse seeds and milk industry from receiving any foreign investments. Additionally, foreign investments are also bad in any trading activities.

2.1 Recommendation

1. Promote alternative investment mechanisms like venture capital, equity financing, angel investment, etc. to mitigate the gap in investment in agriculture.
2. Remove the agriculture sector from the negative list of FITTA. The government should also refrain from incorporating any provision of minimum investment in the agriculture sector in case of foreign investment. In Brazil, the government initiated a liberal policy for agriculture allowing foreign companies to operate wholly owned subsidiaries in the country and acquire domestic companies resulting in Brazil being one of the fastest growing markets for agricultural inputs and an agricultural research hub for several multinational companies.
3. Deregulate the farm insurance sector and foster competition among insurance service providers to come up with affordable insurance programs and also go about enhancing their coverage aggressively. If Nepal can attain universal farm insurance, BFIs will no longer be required to be regulated to maintain a minimum portfolio in agriculture through the NRB. Regulating BFIs through the NRB regulation does not work (in terms of creating access to capital for the neediest) because for banks, the administrative cost of dealing with these borrowers is much higher.

Between 1988 and 1996, the Bank of Thailand eliminated interest rate ceilings on the fixed deposits of commercial banks and eventually liberalized all interest rates. Restrictions were removed on the opening of branches, and commercial banks were allowed to offer a wide range of financial products in rural areas. By 1998, Bank for Agriculture and Agricultural Cooperatives (BAAC) had increased the number of its branches to 535 from 82 (Seibel, 2000).

4. Banks and Financial Institutions can be more attracted towards providing credit to agriculture processing industries, cold storages and other essential businesses in value addition or supply chain. Thus, rather than focusing on making it mandatory for BFIs to provide loan to farm, they should be encouraged to provide credit to these institutions. The benefit will trickle down to farmers.

3. Increasing Agricultural Inputs

One of the key issues in the agricultural sector of Nepal is the lack of adequate access to agricultural inputs. The sufficiency of inputs is a prerequisite for enabling the agricultural sector to be self-sufficient.

Fertilizers

Chemical fertilizers are important inputs of the agricultural sector as they are necessary to increase the output of crops, however, Nepal does not produce any fertilizer. The government has established a publicly owned company, Agriculture Inputs Company Ltd. (AICL), which imports fertilizer products and distributes them to farmers in the different regions of Nepal. Apart from AICL, Salt Trading Company Limited (STCL) also distributes fertilizers in Nepal.

Nepal is not capable of producing its own chemical fertilizers as it has no raw feed stock or materials. Also, it is costly for Nepal to produce and compete against neighbors such as India. On the other hand, organic fertilizer plants in Nepal are increasing. 25 private industries were established by FY 2015/16, with production capacity of over 100,000 MT (Ministry of Agriculture Development, 2015/16).

The chemical fertilizer import surged after 2009 AD, due to the expansion of government subsidy budget in the sector. The Ministry of Agricultural Development (MoAD) simultaneously promoted the use of Organic Fertilizers to meet demand and reduce negative impact of chemical fertilizers. It introduced an organic fertilizer subsidy program with the promulgation of Organic Fertilizer Subsidy Guideline, 2011. However, the subsidy allocated to this program has not been able to take the pace. The Agriculture Development Strategy and Prime Minister Agriculture Modernization Project also prioritizes promotion of organic fertilizer production and distribution as one of its major objectives.

Despite these efforts, the subsidized fertilizer cannot still cater to the widespread demand from farmers throughout Nepal.

In FY 2015/16, the Ministry of Agriculture Development estimated the total fertilizer demand to be approximately 785,000 MT (Ministry of Agriculture Development, 2015/16). The demand has most likely increased by FY 2020. However, total sales of chemical fertilizers in FY 2018 was 364,020 MT. It is also important to comprehend that all farmers in Nepal, due to their subsistence nature, do not demand for fertilizers. On the contrary, the organic fertilizers are underutilized as the industries cannot compete with the surging import of heavily subsidized chemical fertilizers along with the lack of awareness among farmers regarding the benefits of organic fertilizers.

There is a serious lack of supply in the market which implies that the production output is significantly hampered.

Seeds

National Seed Company Limited (NSCL) produces, procures, processes, stores and sells wheat, rice, maize, lentil, jute and vegetable seeds for agriculture production. The company provides seeds to the farmers at a subsidized rate. The problem is that the supply of subsidized seed is inadequate and the farmers depend on the informal seed supply system. The majority of seeds used by the farmers are those saved and stored from the previous harvest or obtained from India. Due to this reason the seeds have adapted to local conditions and are resistant to diseases and insects but have low yield potential. While more than 90% of the cereal seed requirements are met by the informal sector, it is not of very good quality (Samriddhi Foundation, 2012).

For the purpose of addressing the aforementioned issue, Agriculture Development Strategy (2015-2035) and National Seed Vision (2013-2025) was developed. It focused on sufficient investment in resources and capacity building for production and distribution of quality seeds. The Prime Minister Agricultural Modernization Fund focuses on providing capital grants for establishing seed processing and production centers. Apart from these, the Nepal Seed and Fertilizer (NSAF) project was initiated with the motive of increasing access to finance for commercial production of seeds.

Despite the efforts the sector is still plagued by challenges in the form of inadequate human resource to implement and administer seed subsidy, lack of seed inspectors, complicated seed procurement procedure by government agencies, lack of private sector participation, inadequate supply of subsidized seeds and difficulty to supply due to infrastructural challenges.

In the previous year, the lack of proper testing institutions for quality seeds resulted in failure of crop cultivation of farmers who planted Garima hybrid paddy seeds, resulting in decrease of paddy cultivation throughout Nepal (Nepal Economic Forum, 2020).

Lastly, the most distributed seeds in Nepal are cereal seeds, however, the comparative advantage of Nepalese farmers in the sector is very low. Additionally, after 2015, the export restriction imposed by India on paddy seeds has hindered the production, since Nepal cannot compete with the cheaper seeds of India and paddy production and rice milling in Nepal will have high production cost (Nepal Economic Forum, 2016).

3.1 Plans and Policies for FY 2020/21

The following are the plans and policies for FY 2020/21 devised by the GoN that are aimed at increasing agricultural inputs:

- In order to create domestic employment opportunities to mitigate the effect of Covid-19 pandemic on unemployment, the government has set forth plans to mobilize returned migrant workers in the agricultural sector.
- To attract these individuals the government has planned to simplify the process of accessing subsidies by farmers. Plans to provide subsidized seeds, fertilizers and new technology to the farmers in a timely manner have been stated.

3.2 Recommendation

- I. In order to enhance employment as well as supply of agricultural inputs, the government should relax regulations and reduce taxes for incentivizing the private sector to enter the seed and organic fertilizer market either as producing entities or as distributors. The exemptions in tax and other regulatory costs can facilitate the supply of fertilizer and seeds by the private sector at lower cost. The government should also focus on encouraging farmers to use organic fertilizers.
- II. Gradually remove subsidies in the fertilizer and seed industry and enable competition. For as long as government subsidies prevail, the private sector cannot enter and compete. The current absence of sufficient quality fertilizers and seeds to the domestic farmers has resulted in black marketeering, and availability of low-quality inputs; thereby increasing

the cost and reducing the output. Therefore, it is imperative that the government allows complete access to private players or partner with them.

Indonesia, from the period of 2013-2017 implemented a deregulation campaign in its agriculture sector. The policies adopted focused on minimal government intervention and liberalizing the sector by removing regulatory hurdles that hindered growth and competition in agriculture. The policies helped Indonesia experience an increase of 56.7% of investment in agriculture. The Indonesian private seed industry has engaged principally in technology transfer activities such as screening existing varieties and selecting the best ones for production and distribution. More than 20 companies import vegetable seed for direct sale. Private seed companies are also testing varieties and propagating seed for corn, vegetables, fruit crops, and floriculture.

- III. Pilot voucher system schemes to enhance supply of fertilizer through private sector participation. However, it needs to be tested in specific geographic regions.

Food Agriculture and Natural Resources Policy Analysis Network (FANRPAN) conducted a study in Malawi which revealed that direct input distribution in agriculture is costly for the government and is more susceptible to fraud and corruption. On the other hand, the voucher-based system of input distribution was found to be the most economically enhancing tool for smallholder farmers. The program helped improve food security at household level and increased maize surplus at national level from 0.5 million MT surplus in 2005/06 season to 1.3 million MT in 2006/07. The maize yields increased from less than one tone to about 2.04 MT/ha. Other benefits include growth and expansion of private sector business; creation of competition among players; increased use of new technologies and increased per capita use of fertilizer and seed (Mangisoni, Kachule, Kalinda, Chilongo, Simfukwe, & Tostao, 2007).

- IV. Solid chemical fertilizer is heavy to transport with low profitability. The non-availability of fertilizers thus leads to low agricultural yields in such areas despite government subsidies. Therefore, promote use of liquid fertilizers as an alternative.
- V. Soft loans, provided in other agriculture and related services, should also be concentrated towards private seed production and processing industries. In order to incentivize the private sector in production and marketing of high value crop seeds and vegetable seeds, the soft loans can be targeted to such industries.

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4. Increase Farm Commercialization

Nepal is a nation which consists of geographically diverse lands. With 55 percent cropped area and 60 percent crop production, the Terai belt of Nepal entails most suitable land for agriculture. The hilly area consists of 38 percent agricultural land, however, the high ridges and steep slopes around numerous streams have given rise to diverse micro climates. Whereas, the mountainous region has very little prospects of crop-based agriculture and thus is dominated by livestock-based agriculture (Samriddhi Foundation, 2012). The diversity in geographic condition has resulted in a high number of small producers dispersed over the country, leading to fragmentation and quality inconsistency of agricultural productions of the nation.

Currently, 1.3 million hectares of agricultural land in Nepal is barren or uncultivated. Additionally, the average parcel of land per farmer in Nepal is very small. Currently, a farmer only owns about 0.7 ha of land (50 percent of farmers have land possessions below 0.5 ha). As per the Central Bureau of Statistics, this amount has been declining over time. Even though Land Use Act 1964 promotes provisions of land pooling and integrating fragmented land, the space of its implementation is questionable.

The disintegrated lands as well as scattered crop production has led to very little commercialization of the agricultural products. Farming in Nepal has mostly been subsistence, where the products are consumed locally or by the families themselves. Farmers grow crops and raise livestock depending upon the agro-ecology and their household needs and priorities. Additionally, agriculture in Nepal is largely based on low-value cereals which is not highly profitable and provides little to no incentive for farmers to commercially produce the product. Out of total production of cereal crops a mere 13 percent is traded in markets.

It is certain that agriculture in Nepal is largely informal; the Nepal Labor Force Survey (NLFS) reveals that 94.1 percent of those working in the agro-sector are informally employed. Furthermore, the small farmers have little knowledge regarding technical innovations and modernization in agriculture, which has further hindered the productivity of their farmland.

Although both ADS and PMAMP focus on enhancing farm commercialization by improving investment climate, introducing conducive regulations, materializing contract farming, fostering competition and reforming land use policy, its implementation has not been realized till date.

4.1 Plans and Policies for FY 2020/21

The following are the plans and policies for FY 2020/21 devised by the GoN that are aimed at increasing farm commercialization:

- The programs of planting and protecting fruits and other plants at public forest, margins of the roads and highways, river banks and un-utilized public lands will be carried out as a campaign. Ordinary farmers will be encouraged to plant pulses, vegetables, fruits and other plants in private barren lands, terraces and edges of the farms. Kitchen gardens, balcony and vase farms will be promoted in urban areas.

- Investment is being made in agriculture infrastructure along with the plan of modernization and commercialization of agriculture in order to double the agricultural productivity in 10 years.
- Land Bank will be established for the augmentation of commercial agriculture by utilizing agricultural lands with the fusion of land, capital and technology. Contractual and commercial farming, cooperative farming, collective farming or planting a single variety of crop as coordinated by the community will be encouraged through the plotting of land. Contractual farming will be encouraged in the unutilized public land. The Government will increase production and create employment together by promoting such farming systems.
- Micro, small, cottage and medium enterprises will be encouraged for development of agricultural and non-agricultural production, processing, employment generation, and local prosperity in coordination with provinces and local levels

4.2 Recommendation

- I. Nepal can be divided into different agro ecological zones as per the most suitable crop that can be harvested in the land. It will be easier to implement plans like one crop farming, contract farming and cooperative farming.
- II. Introduce a clear legal framework for contract farming. Contract farming can be a significant tool to assist the transition from subsistence to commercial agriculture in Nepal by facilitating land-pooling as well as enhancing productivity. Contract farming is a vertical coordination strategy between farmers and firms; it involves production by farmers under forward contracts with the firms for their agro-outputs. This agreement allows the provision of a particular agricultural commodity at a predetermined price, quantity, quality and time.

Vietnam has one of the most successful models of contract farming in place. It engages in five types of contract farming - sale contract with processing companies, production contract with foreign companies, sale contract with private merchants, sale contract with cooperatives and sale contract with handicraft and industrial village network. After the introduction of a legal framework for contract farming, Vietnamese farmers signed contracts for 1 million hectares of rice, 50% of tea production, 90% of cotton and fresh milk production and 70% of sugarcane output. Over the years it has covered plantations, forestry products, livestock products and fishery. Contract farming enabled horizontal and vertical integration of different actors in the agricultural sector. Vietnam experienced that contract farming increased yield, processing output and income of farmers, attracting smallholder farmers to more commercialized agriculture (Hue, 2004).

- III. The government needs to create avenues to train farmers. For this, the government can establish a public-private partnership framework by outsourcing the training to private

companies. Doing so will also ensure cost efficiency for the government as it will not have to host a training division in the Ministry year-round. Most government-run trainings follow an outdated curriculum and is not in line with the future skill demand. Hence, revise the government-funded capacity-building programs, and enable public-private partnership as the new modality such that programs can be outsourced to sound and economical private trainers on need basis.

- IV. A rational approach to incentivize farmers can be to provide registered agricultural businesses with a complete exemption from the federal income tax law. These enterprises should nevertheless, be liable to follow the state agricultural tax law and should pay tax accordingly. In line with the current plans of the state governments, the tax rate in the agricultural sector is lower than that of the corporate income tax. This will thus act as a stimulus for enterprises to formally register themselves and conduct large scale commercial agriculture. This will also incentivize provincial government to bring maximum farmers in the formal sector.
- V. Encourage incubation center/ training center to facilitate agriculture businesses, especially small and medium ones, in the area of improvement of labelling, packaging, comply with laws and regulations, product development and innovation, linkage development and networking

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5. Enhancing Market Accessibility

One of the problems that farmers face is the lack of access to market and this can be attributed to poor infrastructure development in the country. While road development has been taking place, there still exists a huge shortage of roads that connect farmlands to the marketplace. The average time required for rural households to reach markets is usually long, as, on an average household are required to spend more than 3.5 hours to reach the nearest bus stop and over 2 hours to reach the nearest agricultural center and market center (Asian Development Bank, 2018). When farmers don't have access to the market they either have to transport the products themselves or rely on middlemen. Farmers who can't transport goods on their own usually end up selling their products at very low costs that consumers pay high final food prices for due to unavoidable costs incurred by the presence of the middlemen. In Nepal it is estimated that by the time an agricultural good reaches the market through middlemen, the final price of the product increases by 300% than the initial cost.

The Agro-Business Promotion Policy, 2007 emphasized on the development of growth centers and establishment of agro-product areas and business centers. Likewise, the Agricultural Promotion Act, 2017 classified the agricultural market into wholesale market, retail market, haat bazar (temporary weekly market) and collection center. Similarly, the Prime Minister Agriculture Modernization Project suggests an 85 per cent capital subsidy for the construction of agriculture production collection centers, agriculture haat bazar center, primary processing center, warehouse/go down and business training center. Despite these policies in place, the market accessibility of the farmers has not improved in the recent times. The farmers are still not able to easily access the market for their produce.

5.1 Plans and Policies of FY 2020/21

The following are the plans and policies for FY 2020/21 devised by the GoN that are aimed at enhancing market accessibility:

- To ensure the market for agriculture production, public granaries will be constructed with active participation of the private sector as well and developed as food banks.

5.2 Recommendation

1. Small markets could be turned into larger and more advanced markets by investing in strategic market centers. Inspiration can be found in the so-called Mundi system, an Indian marketplace system introduced in various parts of the country to create more organized marketplaces with easy access to the agro-producers. This system would also provide an environment for the farmers to receive competitive market prices as per the demand and will also eliminate the problem of having to depend upon intermediaries to access the market. The Mundi could at the same time be used as information points for farmers by providing new information, e.g. on productivity- increasing methods, local market conditions, new developments regarding communication technology, etc.

2. New ideas using information and communication technologies to link farmers to markets require further investment. Additionally, ICT technologies can also be used to enhance distribution of agricultural inputs. The Information and Communication Technology (ICT) penetration of Nepal has increased over the years and mobile phones can provide an accessible mechanism for linking farmers to markets. Certain models are in practice in the private sector as well as civil society. There are lessons that GoN can learn from existing practices and scale up successful models of use of ICT to improve market information and strengthen linkages. Agricultural cooperatives are an instrumental mechanism that can facilitate this process. Similarly, creation of provision for custom hiring enterprises with longer operation would benefit agricultural productivity as well as disseminate information regarding mechanization and benefit farmers.
3. The organization of farmers' markets in order to allow consumers to benefit from natural, fresh and local agricultural products. This will not only allow farmers to increase their profits but also aid in rebuilding the local economy. Pokhara Metropolitan City has successfully implemented the strategy by building a farmer's market at NRs. 1.1 million. The farmers have given positive feedback as the initiative has helped them reduce dependency on middlemen and raise their revenue level.

6. Enhancing Value Addition Services

Value addition involves processing, preserving, and packaging of agro products. Value-adding processes help to increase the competitiveness as well as a consumer's confidence in a product. In Nepal, however, the majority of the agriculture production units are very small with poor investment capacities and small production volume. Additionally, the existing production units also suffer from lack of information and knowledge regarding the operation of new technologies, due to which many machines and equipment are found unused. This increases the production costs for these units which makes Nepalese agriculture less attractive for the development of processing industries. Much of the post-harvest losses have been a result of lack of adequate value addition, among other major reasons.

Value addition in agricultural products through the means of processing and packaging can be looked upon in the following categories: processing of cereals like rice and wheat; processing of high value crops like tea and coffee; the processing of animal products (especially dairy and meat); sugar for the production of confectionery items; and, processing of poultry feed.

In the case of cereals, total production is insufficient to meet the domestic demand, and Nepal has been a net importer of cereals for most of the past three decades. A reversal of the scenario is deemed unlikely in the near foreseeable future. Therefore, it might not seem as lucrative as other products where Nepal has a comparative advantage. These include the processing of orthodox tea, dairy products, meat products, sugar, large cardamom, fruits, dry ginger, vegetable seed, and poultry feed to name a major few. Currently, there are more than 774 dairy processing plants established in Nepal besides the government processing plants as per the Department of Livestock Services, private sector investment in the poultry sector is about Rs. 22 billion whereas poultry feed has a turnover value of about Rs. 24.6 billion per year. The orthodox tea sector is now dominated by the private sector, both in primary production and in processing.

While the tea industry in Nepal has experienced a tremendous growth, the farmers have recently been struggling to sustain. The price of both Crush, Tear Curl (CTC) and Orthodox Tea has decreased substantially, not allowing farmers to break even and making them reluctant to hold their stock. The price of orthodox tea alone has fallen by almost 50%. Consequently, in the first four month of the current fiscal year, the export of Nepali tea has decreased by 24%. This decrease is attributed to the lack of institutions that provide organic certification to the tea produced in Nepal. This implies that the farmers should trade in price determined by Indian traders which is significantly lower than the true value of the tea. The lack of proper certification will not just continue to hamper trade with India but also will make Nepalese tea less competitive in the global market. Lack of certification will also have similar effects in agriculture produce of other processing plants including meat and dairy products, making Nepalese products less competitive.

With the changing dynamic of the world, the food industry is also changing. Introduction of new varieties of food and increase in production, import, as well as export has become common. However, in Nepal, regulatory mechanisms to ensure food safety, prevent diseases and quarantine services are inadequate.

Another problem faced by the processing units is the minimum wage set by the government. The government has fixed a minimum daily wage of NRs. 385 for industrial workers, however, not all industries can comply with the requirement. For example, in tea processing industries the workers are seasonal and they cannot afford to pay more than NRs. 278 to the workers. Only five tea industries in 2019 implemented the law, whereas other tea industries said that they would be forced to shut down if they implemented such laws, as they could not compete with the Indian market, the major sector they trade in.

Additionally, lack of scientific mechanisms like quality testing labs to determine the quality and safety of agricultural produce have made both farmers and processing industries vulnerable. Some municipalities have stated minimum price for the produce (in case of tea), which has further hindered tea processing plants as they end up paying the same high price for both high- and low-quality tea which is utterly unreasonable for them.

In more recent days, the Agriculture Development Strategy has been launched which identifies the importance of value addition in a product for increased competitiveness. The Value Chain Development Program is initiated which aims at developing prioritized value chains. The program aims to strengthen value chain linkages and also increase PPP investments. The government has also been actively involved in building infrastructure such as cold storage and processing units to promote value chain and access to markets.

6.1 Plans and Policies FY 2020/21

The following are the plans and policies for FY 2020/21 devised by the GoN that are aimed at enhancing value addition services:

- Quality control and regulation will be done relating to animal products with facilitation for their market management. Quarantine and laboratory facilities will be strengthened and expanded to diagnose, prevent and control communicable animal diseases.
- Use of information technology for the value chain of agro-products will be encouraged.
- Maintenance of quality and regulation of food items will be made more effective. Legal arrangements will be made for the promotion of food hygiene.

6.2 Recommendations

1. Nepal should focus on strengthening its quality standardization services like testing and certification of agricultural products. A successful transition from farm to market requires rigorous quality control measures. Given the limited capacity in Nepal for certification and quality control, increasing investment in this aspect of the value chain is an important agenda. In line with the same, Promulgation and implementation of appropriate food safety guidelines should be introduced.

In Kenya, potato varieties are bred and maintained by the Kenya Agricultural Research Institute in collaboration with International Agriculture Research Centers. The developed potato varieties are then subjected to Distinctness Uniformity and Stability tests and National Performance Trials before they are recommended for release. The seed potato certification is overseen by the Kenya Plant Health Inspectorate Service which ensures that the seed potato is pure, true to type and free of seed borne disease. The certification process includes the registration of seed potato growers, field inspection, lot inspection and sampling, labeling, sealing and finally the establishment of post-control plots.

2. In order to enable processing plants and industries to foster and to compete with the global market, the government should refrain from intervening by fixing minimum wage or prices in any agricultural produce. Wage across different industries vary as per their productivity and a uniform wage rate might make some industries worse off. Thus, the government should let the market forces decide on the best value for their labor and products.
3. Value addition and chain development also require investment in infrastructural facilities such as access to roads, cold storage, customized vehicles for the transportation of livestock, small market places, etc. This is an area that can achieve its potential by attracting the private sector and development partners in the form of public-private partnerships. To enhance competitiveness in specific value chains through development of improved production and post-harvest management skills Indonesia, Colombia, and Kenya had introduced the Public Private Partnership model. The PPPs improved access to specialized infrastructure such as greenhouse and fertigation equipment (Indonesia), collection centers and collective coffee washing stations (Colombia), and a packing house and cottage processing plants (Kenya) (FAO, 2016).
4. Establishment of our own accreditation service, and promotion of good manufacturing practices can substantially help reduce the cost of production.
5. Research and extension are equally essential services associated with value addition and value chain development. Research has been led by the public sector in Nepal and better strategies are required to increase the involvement of the private sector. Since research is a long-term investment, this is an area where a public-private partnership can yield better results. Private sector involvement on a larger scale, therefore, can capitalize on this network while strengthening it with further capacity building activities.

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7. Increasing Research and Extension Services

Considering the emerging need of making Nepalese agriculture self-sufficient, sustainable and economically viable, the need to increase its competitiveness in domestic and international markets is pressing. However, lack of agricultural research and extension services that caters the diverse geographical and climatic conditions within Nepal has hindered the prospect of agriculture industrialization in the country.

Agriculture research and extension in Nepal is dominated by public institutions - Nepal Agriculture Research Council (NARC), Department of Agriculture (DOA), Department of Livestock Services (DOLS) and Department of Food Technology and Quality Control (DFTQC).

NARC is a key player in Nepal's agricultural research system. In 2011 it developed a 20-year vision document which prioritized technology generation, mainly on cereals, legumes, horticulture, livestock and fisheries. Few efforts have also been made in recent years to develop technologies for rain-fed and resource-poor environments.

However, it lacks the capacity and resources to address the diverse demand of farmers, agro-entrepreneurs, and agro-industries. The problem with the current research system is that it is inclined towards cereal crops and therefore is unable to act according to the demand of high value agriculture and come up with ways to avoid risks of crop failure and post-harvest marketing losses. Additionally, NARC has not been able to attract funding for research from non-government and private sectors due to inadequate policies in this area. Thus, its investment in commercial farming technologies is below optimal.

One of the most important issues that hinders agricultural research is data availability. The status of data production that has severely limited the potential for research is mainly due to the fact that Nepal lacks sufficient technology to collect and maintain data and there exists no strong mandate from the leaders at the official level to use, work or learn data skills.

At the private front, agriculture research remains minimal. A number of Non-Governmental Organizations (NGOs) that are active in agricultural research are entirely funded by foreign donors and mainly focus on rural development.

Another important issue is the lack of linkage between research and extension services. After federalism in 2015, the institutions at national, district, and local levels responsible for extension were restructured. A few staff members and extension officers are assigned to deliver agriculture services under local government. However, problems in the form of lack of adequate staff to cater to the needs of a large number of farming households, limited technical expertise and poor linkage mechanisms to state and federal agriculture development as well as research offices have emerged in the sector hindering the delivery of quick, quality and adequate services.

The challenges that has persisted for a long period of time in extension services of Nepal were: Inadequate funds for operational purposes; domination of supply driven approaches rather than

demand driven ones; failing to cater the needs of the specialized client and demand for location specific extension services as required by the commercialization of agriculture; high cost and low impact of extension programs; insufficient face-to-face contact between extension workers and farmers.

Agricultural Development Strategy (2014-2025) tried addressing these issues by laying down plans to restructure NARC with focus on decentralization and responsiveness to research needs of farmers and agro enterprises while fostering linkages within the Research-Education-Extension triangle. Nevertheless, it has not been implemented till date.

7.1 Plans and Policies for FY 2020/21

The following are the plans and policies for FY 2020/21 devised by the GoN that are aimed at increasing research and extension services:

- Nepal Agriculture Research Council will be made result-oriented through its timely reforms. Special attention will be given to develop the hybrid crops. Agriculture and Livestock Centre of Excellence will be developed in all Provinces through upgradation of existing structure of agriculture related research. Arrangement will be made for applied research on agriculture technology and livestock from these Centers with participation of farmers and handover the skill for production and its use.
- Research and promotion will be undertaken on the registration, productivity and multiple use of local foods, fruits, vegetables, livestock and fisheries.
- The knowledge and skills of agriculture education will be encouraged to be utilized in agriculture work and increment of production. In coordination with academic and training institutions, technical manpower will be mobilized as a part of the curriculum or in the form of volunteers.
- Agriculture statistics of the federal, provincial and local levels will be updated through the development of integrated management information systems.

7.2 Recommendations

1. The government run research institutes should be capacitated with adequate funding and skill enhancement training for both research and data usage.
2. In support of commercial agriculture, the role of the private sector is very crucial. Thus, various funding schemes to incentivize the private sector in enhancing their research in the agriculture sector should be introduced. Commercial viability and market are two virgin areas in terms of agriculture research. In Tanzania, the Sugar Research Program was undertaken through a PPP arrangement where the government paid salaries for the researchers and the sugar industry funded the research. The research result is expected to provide solutions to obtain new, high yielding and improved varieties of sugarcane that could thrive in different areas of the country (FAO, 2016).

3. Agriculture research is an area that has potential for private sector investment. The information from these types of research can be purchased by the Government for wider dissemination to farmers and to promote agro-enterprises. In addition, existing agro-enterprises like dairy firms and poultry firms would also be potential customers for this kind of research.
4. Speedy implementation of Research Education-Extension Triangle which suggests joint involvement of research, extension and education personnel at different levels of government.
5. Also, as envisaged by the Agriculture Development Strategy, NARC should be decentralized so that each branch can focus on specialized research that is most suitable for the area they are operating in. The government should fund demand-driven research rather than supply driven. Additionally, the involvement of local farmers in agriculture research can add more value to it. The Agriculture Knowledge Centre should also be equipped with local experts and should be linked to the local government.
6. NARC, as an institution, focuses mostly on cereal crops. Due to the ineffectiveness of NARC and lack of participation from Nepal's Agriculture University, it is necessary to increase the participation of private sector research on value addition of local products as a primary step towards commercialization. To this end, several agricultural research funds (ARF) have been established, often with substantial World Bank contributions, for example, in some African countries such as Kenya, Tanzania, Ghana, and more recently Cameroon. They offer opportunities to different agencies, in the private and public sector, to propose research programs and to bid for the public funds available to finance approved programs.
7. In terms of extension, an indigenous network through Junior Technical Assistants (JTAs) has already been formed at the local level. Private sector involvement on a larger scale therefore can capitalize on this network while strengthening it with further capacity building activities. The College of Agricultural Sciences & Natural Resources (CASNR) at Texas Tech University (USA) actively contributes to agricultural R&D. CASNR faculty are dedicated to research, priding themselves on the cultivation of future studies and engineers who contribute to innovation and discovery and have pushed toward the systematic development and evaluation of production, processing and preparation methods of food products for decades.
8. Local farmers should be used while conducting extension activities as the farmers can relate more with the local trainer rather than one-time trainers.

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8. Mitigating Crop Failure Risk

A major issue that contributes to crop failure or the loss of products during the post harvesting process is the lack of proper storage methods and inefficient handling and packaging mechanisms. Post handling losses in off-season vegetables make up almost 25 to 50 percent of losses which create supply side pressure on prices. Farmers who transport products to the market on their own lack proper tools to transport and without proper storage and freezing systems food products go to waste. The farmers hence are faced with two choices—either sell their products at low prices to middlemen or let the products go to waste.

Moreover, crop failure also results because the regional markets where the produce is traded are few and not well developed. First of all, producers are poorly connected to these markets because of lacking physical infrastructure. Though the main markets are linked to each other, their connection with the many small farms is poor. Secondly, the market places themselves are not set up with modern storage and cooling facilities. This low degree of market development implies that prices generally are driven up due to additional costs to the producers.

Furthermore, this failure to produce enough quality crops is also exacerbated by the unfavorable weather, lack of quality input seeds and fertilizers and diseases. Analysis of district-level crop production and yields reveal that summer monsoon paddy is at risk of flood and drought in several districts and despite the fact that overall mortality rate for livestock is not available, evidence suggests that mortality rate for cattle and buffalo are between 2 percent and 3 percent respectively (Statistical Information on Nepalese Agriculture, 2017).

The exposure to such problems and risks has been hampering the total production potential of the agricultural sector. As farmers have to face the risk of market and crop failures, they are less encouraged to produce on a larger scale and would only produce at a subsistence scale. That being said, Nepal faces a series of key institutional, financial, technical, and operational challenges in developing crop and livestock insurance products and services which are suited to the needs of the country's small and marginal farmers, and in scaling-up the demand for and supply of crop and livestock insurance. The Government/Insurance Board that has put in place legislative arrangements on agricultural insurance include the Agriculture and Fishery Insurance Abhilekh 2070 BS (2012), Crop and Livestock Insurance Premium Grant Availing Directive 2069 BS (2013). However, the insurance schemes have not been executed.

The Agriculture Development Strategy 2015-2035 has also highlighted the need to promote development and promotion of on-farm storage, cold storage through the combination of public investment, private and cooperative sector investment, PPP, and community participation, focused on the development of prioritized value chains. Similarly, the Budget Speech of 2017 has explicitly stated a subsidy of up to 75 percent of total premium on insurance of investment in agriculture and livestock, and plans to move to the production base agriculture insurance program, and expanded the insurance program to reduce the risk of crop production and storage. Yet, despite these policies, crops go to waste due to inadequate storage facilities.

8.1 Plans and Policies of FY 2020/21

The following are the plans and policies for FY 2020/21 devised by the GoN that are aimed at mitigating crop failure risk:

- Government shall develop necessary infrastructures for agricultural production such as cold stores, collection and distribution centers.
- Minimization of risk to the agricultural sector caused by climate change, impact of diseases and natural disasters through investment in extension of insurance for livestock and farming as well as implementation of climate adaptation program.

8.2 Recommendation

1. The storage facilities can be provided by attracting private sector investments via public-private partnership models so as to equip the farmers with advanced storage facilities, such as chilling centers and silos. In Kenya, the government leased public warehouses to private operators in the framework of public-private collaboration with the engagement of other stakeholders. The private partners were in charge of operating the public warehouses which made them invest in the upgradation of the existing infrastructure to provide for warehouse receipts as well as the insurance for the owners and financiers of warehouse receipts. This created a win-win situation for the government, the private sector and the farmers. The government got to make commercial use of dormant, underperforming infrastructure, the private sector gained access to infrastructure as well as growth in sales of insurance products whereas the farmers reduced their post-harvest losses.
2. Risk Management Systems like Crop and Livestock Insurance systems should be materialized by the public sector and the private sector should be encouraged to do so too. This would create the proper environment for the financial institutions to invest in the agriculture sector and make the access to credit easy for the farmers. In Sweden the Agricultural crop and livestock insurance is provided by three private mutual insurance companies. Lansforsakringar has been the center that dominated the agricultural insurance market with its subsidiary company Agria. Its market share is estimated at 80%-85%. Likewise, the insurance company Dina holds approximately 10%-15% of the agricultural insurance market. Both insurers have regional insurance subdivisions (companies) working in close cooperation within their conglomerates.

9. Enhancing Domestic and International Agriculture Trade

Agriculture in Nepal is dominated by cereal crops, whereas its comparative advantage lies in high value cash crops. Nepal has in the past many years focused on enhancing productivity of cereal crops like paddy, maize, wheat and millet and adapted various policies like minimum support price (MSP) and heavy subsidies. While the per capita expenditure on agricultural products has increased by 80% in the past two decades, its productivity has not experienced similar growth.

Table 1: Production per hectare of Cereal Crops in Nepal, India and Bangladesh

S.N.	Cereal Crop	Yield (kg/hectare)		
		Nepal	India	Bangladesh
1	Paddy	3,154	3878.2	4661.9
2	Maize	2,505	3050	7759.8
3	Millet	1,133	2200	1107.1
4	Wheat	2,329	3216	3157.6
5	Barley	1,157	2640	872.3

Source: Statistical Information on Nepalese Agriculture (2016-17), Ministry of Agriculture; Pocket Book of Agricultural Statistics (2017), Ministry of Agriculture and Farmers Welfare, India; Food and Agriculture Organization Statistics (2017)

Moreover, people in rural areas have stopped producing indigenous crops like buckwheat, uwa, chino, kaguno, millet and barley. The production of millet has decreased from 500 hectares to 300 hectares and barley from 2000 hectares to 600 hectares in the far western region of Nepal.

The inability of Nepal to meet the ever-growing demand of agricultural goods has increased its dependence on the import of agricultural goods, mostly from India. As some notable references highlight, Nepal's reliance on foreign markets for agricultural goods has increased fivefold in the last 10 years. A reversal of the scenario is deemed unlikely in the near foreseeable future. Thus, the current focus of effort and resources towards the less lucrative cereal crops is hindering the usage of agricultural resources in the most optimal manner.

On the other hand, Nepal has a comparative advantage on production of high value cash crops, mainly jute, cotton, tea, coffee, cardamom and ginger. These crops also have huge export potential and account for the majority of agricultural exports.

Table 2: Production per hectare of Cash Crops in Nepal and its Global Consumption

S.N.	Cash Crop	Yield (kg/hectare)	Global Consumption (000, USD)
1	Cotton	1,032	48,230,948
2	Tea	24,359,372	5,941,581
3	Coffee	212.67	31,898,769
4	Cardamom	6,550	726,495
5	Ginger	265,191	5,300,000

Source: Statistical Information on Nepalese Agriculture (2016-17), Ministry of Agriculture International Trade Centre, 2019

The above table depicts the global demand of different products which Nepal can tap into. Additionally, Nepal has recently experienced an increased opportunity in lentil, floriculture and Italian apple production.

While at that, despite agriculture accounting for a total of 31.1 percent of commodity export of Nepal, it adheres to many drawbacks. Firstly, the agricultural products of Nepal are incompetent in terms of price and quantity when compared to that of foreign countries who rely on advanced technologies, considerable economies of scale and heavy government subsidies. Additionally, lack of value addition facilities including quality certification has hindered the salability of the products at competent prices in the international market. While Nepal already has a lower hand in the competition, complexities in the form of export compliance and trade barriers in the importing countries have made it more difficult for Nepalese farmers to supply products in the international markets at lower rates.

Despite being a member of World Trade Organization (WTO) and the South Asian Free Trade Area (SAFTA) Nepal faces a number of non-tariff barriers while exporting its products which continuously hinders the momentum of hassle-free cross border movement of goods and services. For instance, the blockages of shipments of Nepali ginger several times in the previous year's citing adulteration and chemical residue along with the order to obtain a separate license for the import authority had increased the cost of trading.

Furthermore, Nepal exported 33,944 tons of soya oil and 1, 56,101 tons of palm oils during April-November FY 2019/20, as per the Solvent Extractor's Association of India (SEA) data. However, SEA, the apex body of the vegetable oil trade, has called upon the government of India to look for ways to end indirect sourcing of palm oil and soy oil from Nepal and Bangladesh under cover of the South Asian Free Trade Agreement (SAFTA). And clear instances as this could be a big blow for Nepal's export which is often overshadowed by the countries with better grip on the trade policies. Apart from these, there are logistic issues and procedural obstacles, sub-optimal warehousing facilities and customs infrastructure, and the need for informal payments, increasing time and cost or both.

The domestic trade of agricultural products is also constantly hindered by the lack of proper physical and institutional infrastructure like agricultural roads, storage facilities, market information and market intelligence systems.

It is especially important to address the existing problems in the current fiscal year, as international trade is bound to be more difficult as a consequence of the current global crisis. Countries will opt for protectionist policies which might hinder Nepal from reaching even the existing trade target.

9.1 Plans and Policies of FY 2020/21

The following are the plans and policies for FY 2020/21 devised by the GoN that are aimed at enhancing domestic and international agricultural trade:

- National and international marketing of organic agricultural products will be done through certification and brand promotion. By developing a production, processing and utilization chain of cotton, silk, wool and other different types of threads and fiber, commercial production and marketing will be facilitated.

9.2 Recommendation

1. Nepal should shift its priority towards production of high value cash crops and use our lands in the most optimal manner. Policies to incentivize farmers to engage in cultivation of cash crops should be welcomed. However, while doing so Nepal should also make agreements on sufficient delivery of cereal crops with multiple countries.
2. Increase in trade agreements with multiple countries that focus on harmonized trade during and post the Covid-19 crisis. The agreement should consist of measures to avoid tariff and non-tariff barriers in cross border trade. The issues on taxes on imports have important implications for the trade negotiators as the policies must not only include the frameworks on the matters of reducing custom duty, the agreement has to also eliminate or substantially reduce the para-tariffs so that a level playing field is created. Likewise, a major step in tapping the lucrative market for Nepali products could be with a trade agreement that eliminates or substantially reduces the tariffs and para-tariffs levied on meticulously chosen potential Nepali exports and committing to address the major non-tariff barriers.

Indonesia, for example, already is a part of the Association of South East Asian Nations (ASEAN) that enjoys free trade among its member countries including China and India. Recently, in February 2020, it signed Indonesia-Australia Comprehensive Economic Partnership Agreement (IA-CEPA) which implies that goods including agriculture from Australia will get preferential access into Indonesia and vice versa. Indonesia has agreed to provide a market of 500,000 tons of wheat, sorghum and barley each year, increasing at five percent per annum, eliminate outstanding tariff on most cereals and grains, reduce tariff on oats, fruits, nuts, vegetables and animal products. Indonesia has shifted its focus towards export of items like palm oil, rubber, coconut oil and its other advantageous sector and at the same time has enhanced food security in its nation.

3. Easing the process of export through transit points such as Kolkata port requires negotiations from the high level officials of the government.
4. Design and implement packaging, marketing and branding strategies for the Nepalese agricultural products that have a comparative advantage in the world market.

In Sri Lanka, the authority and responsibility of marketing and branding of Ceylon Tea, a globally respected brand, is delegated to Sri Lanka Tea Board. The board currently has a chairperson who has extensive experience in marketing and management and has been successfully able to provide new markets to the tea industry of Sri Lanka. Initiatives that uplift the image of plantation workers, regains lost markets while venturing into the new and positions Ceylon Tea as the premium tea brand in the world are given priority by the board. The board operates as an enterprise in itself.

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