**Fundamental and Applied Agriculture**
Vol. 6(3), pp. 323–335: 2021
doi: 10.5455/faa.89753

AGRICULTURE | REVIEW ARTICLE

# Overview of agriculture in Nepal: Issues and future strategies

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ARTICLE INFORMATION

*Article History*
Submitted: 22 Jun 2021
Accepted: 13 Aug 2021
First online: 29 Sep 2021

*Academic Editor*
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ABSTRACT

The Northern upland of Himalayan, southern plain lowland, with the hill in the arid, make Nepal a potential area for farming different crops. Agriculture in Nepal is largely based on subsistence farming for the majority of the population and can never be underestimated. Agricultural growth in Nepal has been low and highly vulnerable in recent decades. The farming system has changed, management practices have updated, modern technologies have been adopted, the budget allocation has changed, effective programs and strategies are launched, and many agricultural reformations are made. Yet, the pace of agricultural development has not caught the speed as expected. The production has increased, but not at an anticipated rate. Despite having outstanding production potential, farmers in the country are continually facing tremendous challenges. Technological constraints, resource constraints, and capital constraints are still major problems. Poverty, land degradation, low agricultural productivity, improper use of budget and subsidies, lack of agricultural inputs, poor governmental support, etc. have impeded agricultural development. The simultaneous increase in population on one side and reduction in cultivable land on the opposite side has been a challenge to cope up with for maintaining food security. In the long run, agriculture is a very important question for planners and everyone. The government and other organizations are trying to address the key challenges of agriculture in Nepal so that agricultural production in Nepal can sustain in the future.

**Keywords:** Agriculture, constraints, Nepal, production, trade

**Cite this article:** Gyawali P, Khanal S. 2021. Overview of agriculture in Nepal: Issues and future strategies. Fundamental and Applied Agriculture 6(3): 323–335. doi: 10.5455/faa.89753

## 1 Introduction

Climatic diversity, even in a small area of territory, is a unique geographical feature of Nepal ranging from subtropical to arctic in high mountains (Acharya and Kafle, 2009). Farming patterns and production potential differ with ecological zoning i.e., Terai, Hill, and Mountain (Chalise et al., 2019). Though agriculture in Nepal has been practiced since time immemorial, the productivity of crops seems to be unsatisfactory. The sluggish development of agriculture has failed to keep pace with the increasing population of Nepal which is estimated to be 1.85% in the year 2020 (Deshar, 2013). Since the majority of the country's population (66%) and 64% of the total household (DVN 2018/19) relies on farming directly or indirectly for their livelihood, it is important to understand the factors that impede the production of agricultural crops in Nepal. The main objective of the study is to identify and highlight the major factors that are limiting the production of agricultural crops in Nepal as well strategies to promote better production of crops. Although a large percentages of people are engaged in farming, the contribution of agriculture to national GDP is in decreasing trend in few past years. In the year 2016, agriculture contributed 29.15% of the total national GDP. Further, in the year 2017, only 27.08% of the National GDP was contributed. The trend is still declining and it is 24.26% in the year 2019 (MOF, 2020).

Increasing population, increasing average income, and globalization effects in Nepal have increased de-

mand for quantity, quality, and nutritious food, and variety of food. Rapid unmanaged urbanization, plotting of cultivable land for residential and industrial use have further limited the area of cultivated land. Therefore, pressure on decreasing available cultivable land to produce more quantity, variety, and quality of food has increased. Farmers mainly small holders have poor access to modern technology, required input and credit (Thapa et al., 2019). The poverty reduction plan and economic growth of Nepal are driven largely by the growth of its agriculture sector, which contributes substantially to GDP. The sector is important to increase income, mitigate poverty, and improve the living standard of people where about 80 percent of the people are rural (FAO, 2020).

## 2 Agriculture aiding economy and health

Agriculture is the cornerstone of the Nepalese economy and employ two-third of the country labor force which is approximately 8 million peoples (MRSMP, 2017). The role of agriculture in the economic uplifting of Nepal is very high. It contributes approximately 24.26 percent of the national GDP Fig. 1. Therefore, it fairly deserves the topmost concern because the economy is still caught up in the initial stage of its development where the income generated through the industrial and service sector depends upon the development of the agriculture sector. In 2019, approximately 50 percent of Nepal's GDP was from its service sector. Agriculture contributed the second-largest amount, while just 13% came from the industry sector. Elimination of poverty and malnutrition is one of the promising factor of agriculture. Lack of hybrid seeds, fertilizers, use of old and traditional farming technique have caused hindrances for the ample production of crops. This has created food insecurity in the nation leading to malnutrition and poverty. Fig. 2 shows the percentage of malnourishment in Nepal due to food deficiency.

## 3 Agriculture in the past

Traditional agriculture was dominantly subsistence type. The concept of growing crops for commercial purposes was not developed. The government of Nepal has prioritized the importance of agriculture for the last few years. Different plans and policies have been introduced which are aimed at increasing the productivity of crops by proving subsidies, improving irrigation systems, introducing improved and hybrid seeds and introducing modern farming techniques in Nepalese farms. Analyzing the programs and policies, the first periodic plan was introduced in the year 1956 with a budget allocation of 12 million rupees in agriculture (Adhikari, 2015). Further, the five-year plan (1975-1980), nine-year plan (1997-2002), and thirteen-year plan (2013/14-2015/16) are also contributed to improving the agricultural sector of Nepal (Adhikari, 2015). The government focused on irrigation, the introduction of denotified and hybrid varieties, use of fertilizers and pesticides. Further, research activities in agriculture flourished after the establishment of the National Agriculture Research Council in the year 1991 as an autonomous organization under the "Nepal agriculture Research Council Act – 1991" with an aim to uplift the economic level of people. Land under irrigation increased from 6,200 hectares in 1956 to 583,000 hectares in 1990 and reached to 1,433,287 hectares till present (MOEWRI, 2019). The use of chemical fertilizer introduced in the 1950s, climbed to about 47,000 metric tons by 1998 and to 344,004 metric tons by 2020 (MOALD, 2020). Prime Minister Agriculture Modernization Project (PMAMP) was initiated in the year 2016/17 to increase agricultural production and productivity with a budget of Rs 5.78 billion rupees (MOF, 2016). This project was supposed to make Nepal self-reliant in fruits and vegetables in the next year 2017/18, in rice and potato within 2 years, in maize and fish within 3 years, in banana, papaya, and litchi within 4 years, in kiwi, apple, orange, junar, and mango within 10 years (MOF, 2016). Budget allocation for agriculture also increased prioritizing the importance of agriculture in building the national economy. In the year 2002/3, 2.52% of the total national budget was allocated for agriculture which increased to 2.75% in the year 2009/10 and 3.77% in 2014/15 (MOF, 2015). In the year 2020/21, the budget for the agricultural sector was increased by 6.6 billion rupees than the past year 2019/20 and was made 41.40 billion rupees (MOFE, 2019) which is 2.18% of the total national budget. If we analyze the budget allocation in the agriculture sector, the budget allocation does not seem to be satisfactory. In the year 2015/16, 26 billion rupees were allocated for the agriculture sector (MOF, 2015). With a slight increase in budget, 35.86 billion rupees were allocated in the year 2016/17 (MOF, 2016). Further 34.80 billion and 41.40 billion rupees was separated for the agriculture sector in the year 2019/20 and 2020/21 respectivelyFig. 3 (MOF, 2020).

## 4 Agriculture in the present

Out of the total 147,181 square kilometer land area of Nepal, agricultural land is 29% of total land use that is 4,123,120 hectares (out of which 21% is under cultivated and 7% is uncultivated), forestry 29%, shrub land 10.6%, grassland, and pasture 12% and water 2.60% (MOALD, 2020). Nepal gained much speed in agriculture development in past few years. But, poverty, insecurity towards newly released hy-

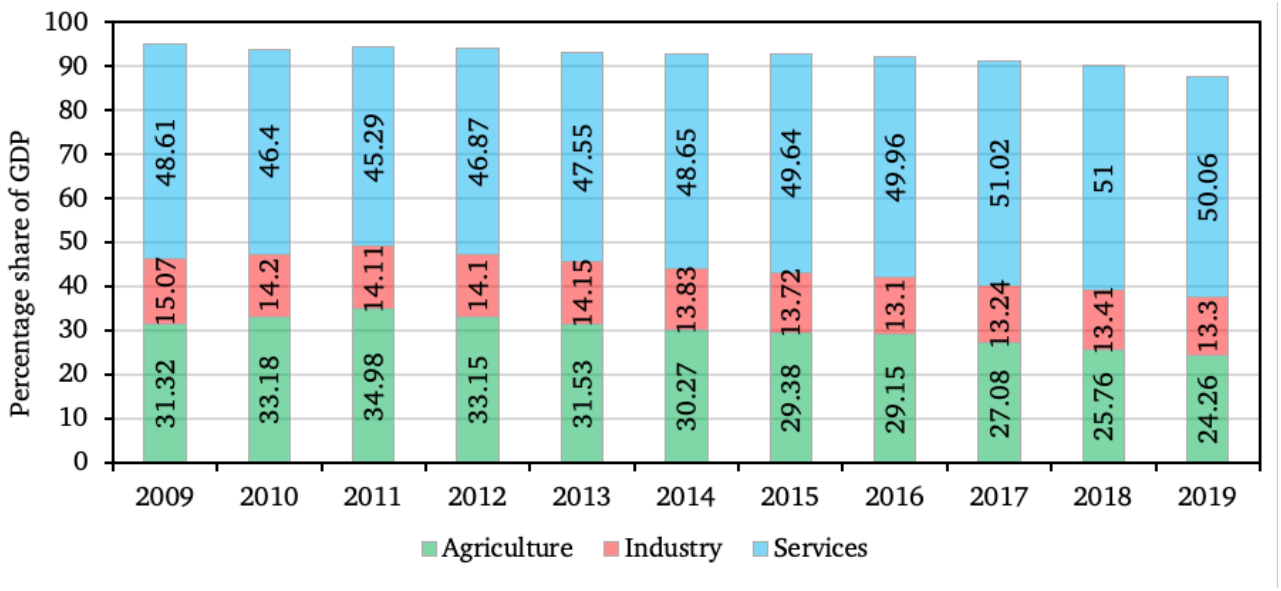


**Figure 1.** Distribution of GDP across economic sectors from 2009 to 2019. Source: Statistica (2021)

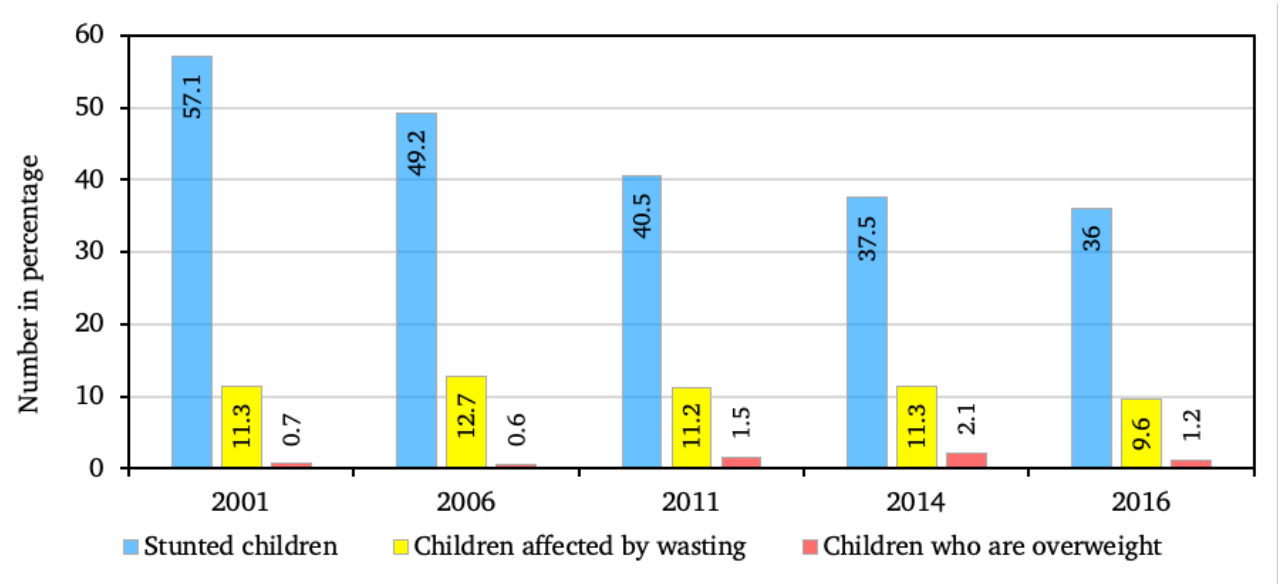


**Figure 2.** Percentage of children malnourishment due to food deficiency. Source: FAO (2020)

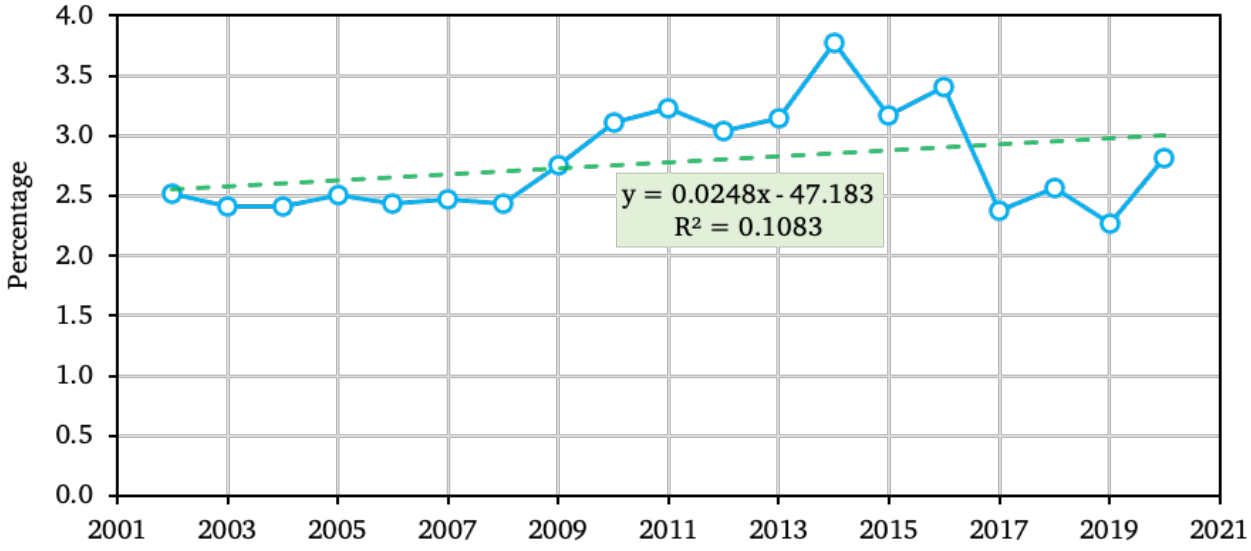


**Figure 3.** Budget Distribution in the agriculture sector in different years in the percentage. Source: MOF (2020)

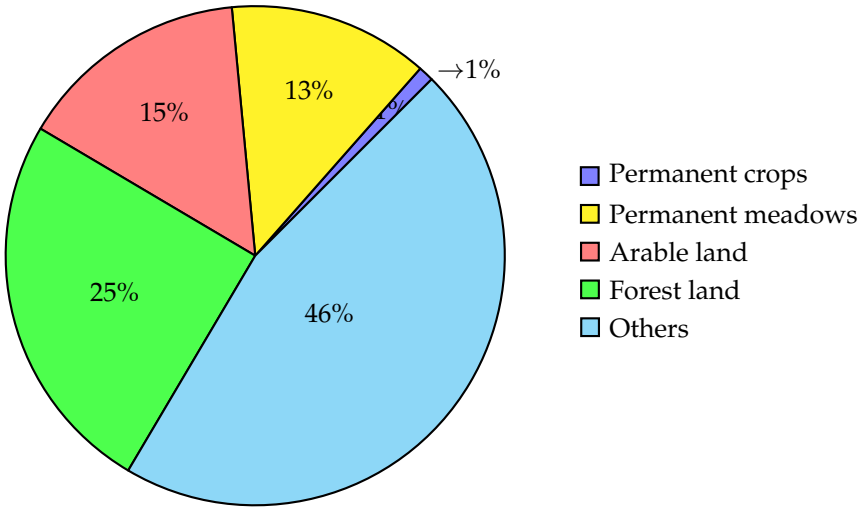


**Figure 4.** Distribution of total area of Nepal. Source: FAO (2020)

brid varieties, lack of extension activities and risk factors (price and market risk, financial risk, risk of sudden pest and disease outbreak) diverted farmers to subsistence farming. Only 25.1% of farmers are doing commercial farming and the remaining 75.9% are doing subsistence farming (Simkhada, 2019). The production of cereals, cash crops, and pulses has significantly increased in the few past years (Table 1) but is still not sufficient for the increasing population. More than one-fourth (26%) of the agricultural landholders in Nepal are women, while the majority of the farm (53%) are small-scale farms with landholding of not more than 0.5 hectares and the remaining 20% are large-scale farms with landholding of more than 1 hectares (FAO, 2020). Permanent crops contribute only 1% of the total land under cultivation, 13% permanent meadows, and 15% arable land as shown in Fig. 4 (FAO, 2020).

New policies have been made to increase agricultural production in recent years. Ministry of Finance has allocated 41.40 billion rupees in the fiscal year 2020/21 for improving agriculture production status which is almost 6.6 billion more than the past year 2019/20. New concepts of food banks have been introduced to maintain stock of foods and to establish 200 food storage centers to ensure the prices of agro products. For these 1 billion rupees has been allocated (MOF, 2020). Further, a new concept of "land bank" has been proposed which is supposed to be established in coordination with federal state, and local government in the upcoming year 2021/22. Irrigation has been prioritized with a budget of 27.96 billion rupees and 3.22 billion for the Prime Minister Agriculture Modernization project to become self-reliant in agriculture products in the coming years (MOF, 2020). The Prime Minister Agriculture Modernization Project has so far developed infrastructures like 583 customs hiring centers, 369 post-harvest centers, 205 high-tech, and semi-high-tech nurseries, and greenhouses. Total 18 industries, cold storage, agricultural produce storage, and laboratories are established. The project has so far mobilized 664 student interns studying graduate level in agriculture (ES, 2019).

## 5 Trade scenario of agricultural commodity

The government of Nepal has introduced many plans, policies, and other initiatives to reduce the trade deficit (Table 2). In this context, geographical scenario, resource tools, available technology, local agricultural workers necessity, sustainable development goals, National agricultural policy, comparative benefit, and Nepal's international treaties are the commitments of the nation and have the main goal of replacing and filling the gap of trade deficit (Magar, 2019). Policy and legal framework have been made to fill the gap existing in the trade of Nepal with other countries (Fig. 5). Nepal ranks 3rd in cardamon export in the world with an export value of 20,437 USD in 2010 and 46,146 USD in the year 2015 (MRSMP, 2017). Further, 235,000 MT of ginger was produced in the year 2013, out of which 65% was exported. In addition, Nepal exports high-quality cardamoms, lentils, crude material, tea, fruit juice, ginger, and other agricultural commodities worth 190,144 thousand USD (Fig. 6). At the same time, Nepal imports high-quality soyabean oil, rice, palm oil, maize, rapeseed, jute, and other agricultural commodities worth 950,397 thousand USD (Fig. 7). Until mid-March of the fiscal year 2018/19, the food and livestock exports have declined by 9.9% to Rs.12.67 billion compared to the export during the fiscal year 2017/18. During this period, exports of tobacco and beverages have increased by 7.7% to Rs.1.7 billion. Export of oil and fat based on vegetable and animal products has increased to Rs.5.8 billion. During this period, the imports of food items and animals have increased by 13.8%, tobacco, and beverage by 17.1%, and vegetable oil and animal fat by 15.3% with a total amount of agricultural imports worth Rs.138.06 billion. During this period, the export of agricultural goods equivalent to 31.1% of the total commodity export has been exported and import of agricultural goods equivalent to 14.6% of the total imports have been imported (ES, 2019). At the same time trade deficit of 760,250 thousand USD was reported in the year 2013 (MRSMP, 2017). This trend increased by a trade deficit of 1133 million USD in 2014/15 (MRSMP, 2017), 1321.43 billion Nepalese rupees in 2018/19, and 1100 billion Nepalese rupees in 2019/20 (MOF, 2020). The trade deficit is increasing every year with a high import, export ratio 15.3:1 (MOF, 2020) which shows the dependence of Nepal on other countries. Due to the shrinkage of agricultural production in present years and decreasing interest of new generation towards farming, food import has increased significantly. This is an alarm that the Nepal government should not underestimate the current situation. This can lead Nepal to a high vulnerability of food insecurity, malnutrition, and future hunger hazards.

## 6 Constraints and challenges

Nepal's long-term agricultural development is at risk due to climate change events, outmigration of the labor force, loss and degradation of lands, environmental pollution, lack of adequate holistic policy, investment framework and land fragmentation for agricultural development (Deshar, 2013). Further, land degradation (Gupta, 2019), high transaction fee, low capacity to bear risk, and low input access (Thapa et al., 2019) has challenged food security in Nepal. Agricultural productivity and profitability from farm-

**Table 1.** Production status of major cereals, cash crops, pulse crops and other crops in Nepal

| Crops | 2016–2017 | | 2017–18 | | 2018–19 | |
|---|---|---|---|---|---|---|
| | Area | Production | Area | Production | Area | Production |
| Cereal crops | | | | | | |
| Paddy | 15,52,469 | 52,30,327 | 14,69,545 | 51,51,925 | 14,91,744 | 56,10,011 |
| Maize | 9,00,288 | 23,00,121 | 9,54,158 | 25,55,847 | 9,56,447 | 27,13,635 |
| Wheat | 7,35,850 | 18,79,191 | 7,06,843 | 19,49,001 | 7,03,992 | 20,05,665 |
| Millet | 2,63,596 | 3,06,704 | 2,63,497 | 3,13,987 | 2,63,261 | 3,14,225 |
| Buckwheat | 11,090 | 12,039 | 10,296 | 11,472 | 10,311 | 11,464 |
| Barley | 27,370 | 30,510 | 24,648 | 30,510 | 24,409 | 30,550 |
| Total | 34,90,663 | 97,58,892 | 34,28,986 | 1,00,12,742 | 34,50,163 | 1,06,85,550 |
| Cash crops | | | | | | |
| Oilseeds | 2,07,978 | 2,14,451 | 2,24,595 | 2,45,867 | 2,60,307 | 2,80,530 |
| Potato | 1,85,879 | 25,91,686 | 1,95,173 | 28,81,829 | 1,93,997 | 31,12,947 |
| Sugarcane | 70,807 | 32,19,560 | 78,609 | 3679508 | 71,625 | 35,57,934 |
| Jute | 7477 | 11018 | 7507 | 11,159 | 7,285 | 10,585 |
| Cotton | 143 | 127 | 120 | 125 | 97 | 99 |
| Rubber | 700 | 805 | 555 | 296 | 476 | 249 |
| Pulse crops | | | | | | |
| Lentil | 2,06,969 | 2,54,308 | 1,98,605 | 2,49,491 | 2,08,766 | 2,51,185 |
| Chickpea | 9,933 | 10,969 | 9,882 | 11,271 | 9,653 | 10,675 |
| Pigeon pea | 17,091 | 16,497 | 16,428 | 16,211 | 16,753 | 16,538 |
| Black gram | 23,429 | 19,499 | 24,305 | 20,839 | 23,492 | 19,928 |
| Grass gram | 8,075 | 9,354 | 7,757 | 9,187 | 7,952 | 9,329 |
| Horse gram | 6,351 | 5,690 | 6,205 | 5,664 | 6,119 | 5,754 |
| Soybean | 23,563 | 29,061 | 21,897 | 27,681 | 25,179 | 31,567 |
| Other crops | | | | | | |
| Fruits[†] | 1,10,501 | 10,18,308 | 1,11,744 | 10,86,931 | 1,20,023 | 11,77,640 |
| Vegetables | 2,77,393 | 37,49,802 | 2,86,864 | 39,58,230 | 2,97,195 | 42,71,270 |
| Tea | 28,522 | 24,653 | 28,595 | 28,804 | 28,732 | 25,206 |
| Coffee | 2,646 | 466 | 2,650 | 513 | 2,761 | 530 |
| Chili | 10,077 | 49,718 | 10,500 | 52,500 | 10,692 | 67,167 |
| Large cardamom | 17,002 | 6,521 | 17,004 | 6,849 | 18,273 | 7,954 |
| Ginger | 22,649 | 2,79,504 | 23,000 | 2,84,000 | 22,132 | 2,97,512 |
| Garlic | 8,116 | 56,668 | 8,500 | 59,500 | 10,107 | 71,902 |
| Turmeric | 6,777 | 65,999 | 7,300 | 71,500 | 10,107 | 71,902 |

[†] = productive area

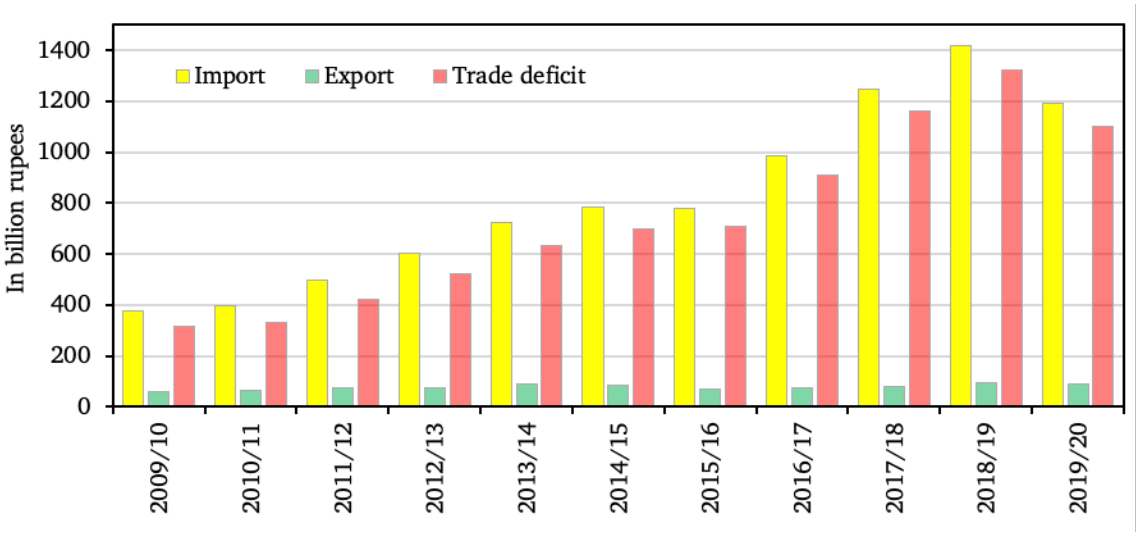


**Figure 5.** The trend of the trade deficit in Nepal. Source: TEPC (2020)

ing are low due to the low use of modern technologies, limited commercialization, and diversification of agriculture.

## 6.1 Hijacked subsidy

Being an agrarian country, the government has developed policies to enhance production, food security, cope with hunger and poverty by providing subsidies in the production process of the agricultural commodity. Agricultural subsidies are aimed to make inputs easily available to the farmers at a reasonable cost to enhance farm productivity and profitability (Timilsina, 2019). Currently, the government has allocated 18 billion rupees to provide subsidies every year and has planned to provide 10,000 youths Rs 14.39 billion as a concessional loan (Timilsina, 2019). But, the subsidy provided by the government is hijacked between the government officials and the farmers. If the subsidy is on the right hand then, why still marginal farmers are starving because of their financial scarcity? Corruption being one major reason for such activity. Transparency indicator ranks Nepal as 117th most corrupted country out of 180 countries with 33 scores out of 100. There raises a question on who has access to subsidies poor or non-poor, farmers or not. There is a need for research, knowledge dissemination, capacity building, and an effective framework for achieving the aims and goals of subsidy.

## 6.2 Land degradation

Land degradation is an agricultural issue that has limited the production of an agricultural commodity in Nepal. Land degradation means declination of land quality or potential productivity of land due to physical, chemical, and biological processes. Which are induced by human activities (Acharya and Kafle, 2009). These activities include soil erosion, acidification, leaching, salinization, a decrease in cation retention capacity, a decline in biodiversity, and depletion of nutrients (Acharya and Kafle, 2009). Most of the land of hills is fragile and vulnerable to landslides whereas, terai is threatened by regular flooding and deposition of sediments. During the past 6-7 decades, over 35% of the total arable land has been degraded due to human, induced activities (Gupta, 2019). Different studies have shown that about 64 t/ha of soil is eroded annually in the Siwalik hill, 22t/ha per year in the barren lands of the Koshi basin of Nepal (Chalise et al., 2019), and a mean soil loss rate of 11.17 t/ha/year in Aringale Khola watershed of Nepal. Soil is being lost from agricultural areas 10-40 times faster than the rate of soil formation (Pimentel and Burgess, 2013) which has challenged human food security (Table 3). Further, it is estimated that 3.16 million hectares have been affected by the degradation process which included 38% of forest land, 37% of pasture land, and 10% of agricultural land (TARLD, 2008). Researches have shown that eroded soil has 1.3-5 times more soil organic matter than the soil left behind (Pimentel and Burgess, 2013) leading to low production. About 16.6 t/ha of the soil loss was estimated in the maize growing hills of Nepal which resulted in the annual loss of 188kg organic carbon, 18.8 kg nitrogen, and 3.8 kg potassium per hector (Chalise et al., 2019).

## 6.3 Insect and diseases

Insect and disease management is an important issue in Nepal. Among the total pesticide consumption, 14-12% is used in pulses, 40-50% in rice, 10-20% in vegetables and fruits, 13-15% in fiber crops (Manandhar and Palikhe, 1999) which indicates the severity of

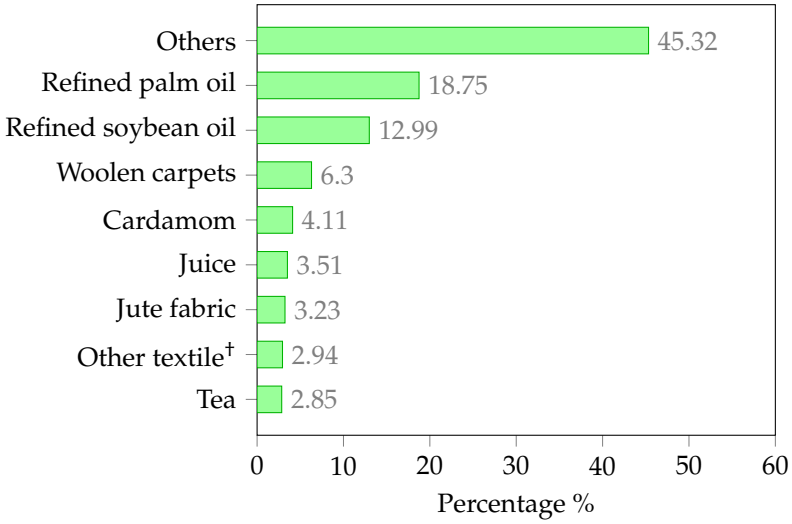


**Figure 6.** Agriculture export shares in Nepal. † = except cotton and woolen products. Source: MOF (2020)

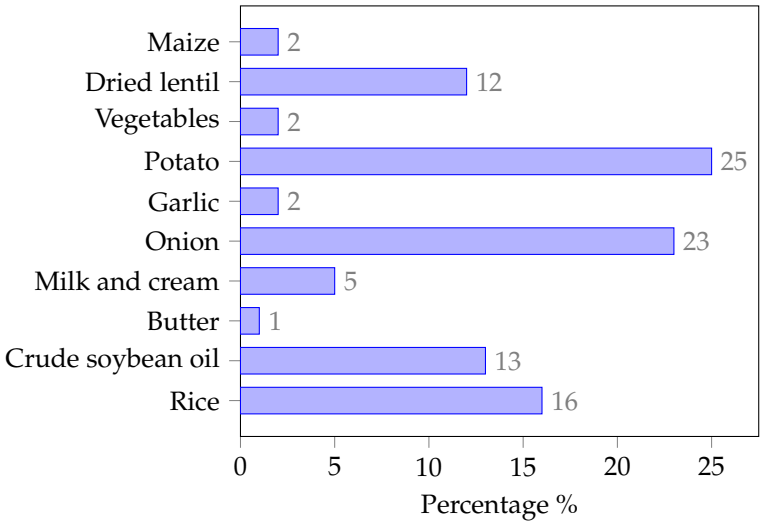


**Figure 7.** Agriculture imports shares in Nepal. Source: MOF (2020); MOALD (2020)

insect and disease in Nepalese crops. Among, commercial crops grown in Nepal, cotton receives the large portion of pesticides (2,560 g/ha) (Ghimire and Khadka, 2005). The increase in the incidence and severity of viral disease and pests have created significant yield loss in Nepal. Viral disease of rice (Rice tungro virus and rice dwarf virus), Potato (PUX and PUV), tomato (Yellow leaf curl virus), Maize virus (Maize leaf fleck virus and maize mosaic virus) are identified as minor diseases in Nepal (Poudel and Khanal, 2018). Further, soybean mosaic virus, tobacco ring spot virus, scab, canker and bacterial wilt are common and frequently occurring diseases in Nepal (Poudel and Khanal, 2018)). For every degree Celsius rise in temperature of earth's surface, insect losses in 3 major grains crops; maize, rice and wheat can increase up to 10-25% (Deutsch et al., 2018). In Nepal, insect and pest infestation can cause loss of about 60% in potato (Giri et al., 2013), 10-100% in maize depending upon maize storage structure and physical environment (Paneru et al., 2018). In Nepal 20-25% of the agricultural production is lost due to pests like insects, rodents, mites, and others (Bhandari et al., 2012).

### 6.4 Weed

Weeds are the problematic unwanted plants in the fields that causes, 33.16% yield loss in food crops, 41.26% in cereals, 31.88% in pulses, 40.82% in oilseeds, 34.23% in fiber crops, and 40.28% in rice crops (Karim, 1998). Further weed competes for water, nutrients, and space with crops. The competitive ability of weed depends on the density of crop and weed, environmental conditions including weather, soil condition, management practices, and minerals and nutrients present in soil (Karim, 1998). Weed causes 16-86% of yield loss in rice field in Nepal depending upon the density, cropping pattern and planting space (Paudel et al., 2017). Further, yield loss of 117% and 108% were reported in Maize crop due to weeds Ageratum conyzoides and Polygonum chinensis in Baglung and Parbat districts of Nepal respectively (Karki et al., 2014). Higher grain yield (7.7 t/ha) was found on weeded field on rice than on unweeded field (1.8 t/ha) in Lamjung district of Nepal (Paudel et al., 2017) which shows the limitation of crop yield due to weed infestation.

### 6.5 Climate change

Climate change has been a serious issue regarding the pattern of growth and development of plants. In a report by MOFE (2019), the mean temperature has been estimated to increase by 0.9-11 °C in the medium-term period [2016-2045] and 1.3-1.8 °C in the long-term period (36-65 °C). It has been shown that since the years 1975 to 2005, Nepal has been warmed by about 0.6 °C per decade (MOFE, 2019). The rapid growth of carbon dioxide and other greenhouse gases has affected agriculture, forestry, biodiversity, ecosystem (Malla, 2009). The frequency of drought, severe floods, landslides, and mixed types of effects on crops have increased rapidly in the nation (Malla, 2009). In research carried by the NARC, to study the effects of carbon dioxide, temperature, and rain on the yield of rice and wheat, showed a positive effect in all regions, but negative effects on maize yield in the terai region. The yield of rice and wheat increased by 26.6% and 18.4% while doubling the quantity of carbon dioxide and 17.1% and 8.6% due to increased temperature respectively (Malla, 2009). Further, vegetables are more sensitive to environmental extremes such as increased temperature, carbon dioxide, soil moisture stress, and greenhouse gases which influence the growth and development of the plant (Naik et al., 2017).

### 6.6 Plotting land for residential use

If we analyze the data of the total agricultural land (1% of land area) in Nepal, in 1961, only 24.846% of the total land area was under cultivation (WB, 2018). The percentage of land under agriculture increased till 2001, with 29.71% of the total land area. But, with the increased population and residential plotting of agricultural land, the agricultural land shrank to 28.748% by the year 2018. A total of 0.962% of the agricultural land is lost which is equals to 1419.1 $km^2$ of land (WB, 2018).

### 6.7 Fragmentation of land

Agricultural land has been continuously fragmented for residential purposes and development work mainly in the terai region of Nepal (Shrestha, 2011). Fragmentation of land has created many negative impacts such as reduce the slope of mechanization, irrigation, soil conservation and thereby decreasing the quality and quantity of the food product (Timilsina et al., 2019). Further, the number of land parcels has significantly increased from 10975 thousand to 12096 thousand from 2001 to 2011 respectively (CBS, 2013) which supports the fact of increasing land fragmentation in Nepal.

### 6.8 Huge price gap

There is a huge gap between the price farmers receive for their agricultural commodity and the price consumers have to pay due to the Presence of brokers. These brokers buy the commodity at low prices with the framers and sell them at high prices to the final consumers. This results from the low net return to the farmers which discourages them from further production of agricultural commodities. There are also a few cold storages running across the country.

**Table 2.** Different trade policies and Legal framework of Nepal

| Policies and legal frameworks | Trade Policies | Agricultural policies | Common policies |
|---|---|---|---|
| International conventions, treaties | Indo-Nepal trade treaty, China-Nepal trade treaty, SAFTA, BIMISTEC, WTO, OBOR | ITPGRFA, CBD | AOA, TRIPs, SPS |
| National policies, strategies, framework | Supply policy, Trade policy, NTIS, Industrial policy | 14th plan Agriculture policy, Seed policy, Seed Vision, Livestock Husbandry policy | ADS, Agri-business promotion policy, National Coffee policy, Dairy policy, National Tea policy, Floriculture promotion policy |
| National legal framework | Competition Promotion and Market Protection Act, SEZ Act, Export and Import Act, 2013 | Plant protection act and rules, The pesticide act 1991 and Regulation 1993 | Industrial Trade Act, Custom Act 2007 |

Source: MRSMP (2017)

**Table 3.** Land area under degradation in Nepal

| # | Land use category | Degraded area (M ha) | Total land area (M ha) | % of degraded land |
|---|---|---|---|---|
| 1 | Forest (poorly managed | 2.10 | 5.828 | 36.02 |
| 2 | Agriculture (poorly managed slopping terraces) | 0.29 | 2.969 | 10 |
| 3 | Pasture/rangeland (degraded) | 0.647 | 1.75 | 37 |
| 4 | Areas damaged by floods and landslides (1984-2003) | 0.106 | 11.551 | 0.92 |
| 5 | Forest encroachment | 0.119 | 5.828 | 2.04 |
| | Nepal | 3.262 | 11.551 | 28.24 |

M ha = million hectare

Only 35 cold storage with an average size of 3,000 metric tons and average annual storage of 1,560 metric tons capacity are underuse (FNCCI, 2005). The annual fresh vegetable production in Nepal is 4,271, 270 metric tons (MOALD, 2020). If we calculate only 54,600 metric tons of agricultural commodities can be stored on average per year. Lack of availability of cold storage further increases the price rate of agricultural commodities in the off-season than at the season period.

## 6.9 Delay in fertilizer import

Nepal fully depends upon its neighboring countries like India and Bangladesh for a fertilizer that is used for the production of agricultural commodities. The agriculture ministry records show that the annual demand for chemical fertilizer is around 800000 tons while only 386000 tons of chemical fertilizer is imported (MOAD, 2016). Further, subsidized fertilizers cover one-fourth of the country's total need, while the other portion of demand is met by informal imports or shipments. The majority of farmers in hills still use FYM as a major source of fertilizers. The FYM used is also prepared by the traditional method which contains only some traces of minerals and essential nutrients. In this regard, the application of chemical fertilizer is most for satisfactory production. But, due to delays in fertilizer import, farmers don't get them on time resulting in a yield decline.

## 6.10 Lack of extension services and poor teaching system

There exists a gap between research workers, their findings, and the farmers. Still, many farmers deny planting hybrid, high-yielding varieties. Major issues found publicly extension systems are lack of motivation among the agricultural youths, farmers; natural resources degradation and global climate change and sustainability issues; the inadequate number of the extension workers and their qualification and skills;

inadequate infrastructure and capacity to be used of ICTs among the bottom level extension workers; lack of monitoring and assessment of the impact of extension activities in rural farmers; low level of need-based extension coverage particularly for tiny farmers; ineffective and weak linkages between stakeholders at different levels; low level of education of farmers; insufficient budget and investment for extension activities; domination of supply-driven approaches instead of demand-driven; inadequate extension services in parts of import addition and market exposure (Dhital, 2017). The extension works are concentrated on some of the lower land areas of Terai region. Hills and Himalaya regions are mostly neglected. There exists a gap between theoretical knowledge and practical knowledge as our universities are poorly managed and cannot provide good practical knowledge to the students demanding to study agriculture. Our universities rely on the old and outdated course syllabus. Universities focus on a theoretically based knowledge system and keep practical knowledge aside. Innovation of new technology is never been heard rather the equipment and technologies within the universities are old, useless, and outdated. Only theoretically based graduates will never understand the problems of farmers.

## 7 Conclusion & Recommendation

Nepal has a lot to improve in its agricultural sector. The condition of agriculture in Nepal is dim and needs some strong and concrete strategies to cope with these limitations. In a long run with the same performance, no agricultural development can be expected and this can lead nation to severe food shortage in near future. So, the country should emphasize the extension activity and should flow the information to our farmers. Developing a landlocked countries like Nepal, agriculture needs to be focused on most. Farming must adapt to new realism and amalgamate between tradition and innovation. For example, organic farming could open up as a profitable source for internal consumption as well as export, as has already started to happen. Major constraints in agriculture development in Nepal are improper use of subsidies, land degradation, insect and disease outbreak, weed infestation, climatic constraints, the huge gap between farm-gate prices to consumer prices, losses of agricultural lands for construction work, and residential use. There are tremendous opportunities for the successful establishment of agriculture in Nepal. But for this, the constraints are needed to be addressed.

The following recommendations have been made to cope with the constraints:

1. Government must, as a matter of necessity, should adopt plan, policies and strategies to engage youths in agriculture by generating necessary subsidies, and loans through micro-finance banks, commercial banks, and development banks with minimum interest.
2. The Government through its agencies needs to identify the hijacked subsidies and fund losses. For this, a separate commission has to be established or the present commission needs to be more alert and active.
3. There must be the provision of the government-to-government process to import necessary fertilizers, tools, and equipment to eliminate the corruption that has been flourishing for decades.
4. Plans and policies need to be developed that can deploy modern agricultural practices in Nepalese farm.
5. The Government through its agencies should seek to increase the extension programs to fill the gap that exists between research workers and the farmers. Dissemination of research finding from researchers to the farmers is necessary for the adoption of new technology and varieties.
6. Policies and programs are often made but not implemented. Funds through budget allocation are lost due to corruption and for other unnecessary administrative works which need to be strictly checked and controlled.

## Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

## References

Acharya AK, Kafle N. 2009. Land degradation issues in nepal and its management through agroforestry. Journal of Agriculture and Environment 10:133–143. doi: 10.3126/aej.v10i0.2138.

Adhikari S. 2015. Contribution of agriculture sector to national economy in Nepal. Journal of Agriculture and Environment 16:180–187. doi: 10.3126/aej.v16i0.19851.

Bhandari G, Thakur P, Achhami B, Sharma PN, Mainali RP. 2012. Review and finding, existing problems and future strategies of maize entomological research of Nepal.

CBS. 2013. Statistical Year Book of Nepal - 2013. Government of Nepal, National Planning Commission Secretariat. Central Bureau of Statistics, Kathmandu.

Chalise D, Kumar L, Kristiansen P. 2019. Land Degradation by Soil Erosion in Nepal: A Review. Soil Systems 3:12. doi: 10.3390/soilsystems3010012.

Deshar BD. 2013. An overview of agricultural degradation in Nepal and its impact on the economy and environment. Global Journal of Economic and Social Development.

Deutsch CA, Tewksbury JJ, Tigchelaar M, Battisti DS, Merrill SC, Huey RB, Naylor RL. 2018. Increase in crop losses to insect pests in a warming climate. Science 361:916–919. doi: 10.1126/science.aat3466.

Dhital PR. 2017. Agriculture extention in nepal: Experience and issues. Journal of Advances in Agriculture 7:1071–1082. doi: 10.24297/jaa.v7i3.6287.

ES. 2019. Economic Survey 2018/19. Government of Nepal, Ministry of Finance, Singh Durbar, Kathmandu, Nepal.

FAO. 2020. FAOstat statistical database on Nepalese Agriculture. Food and Agriculture Organization of the United Nations, Rome. Italy.

FNCCI. 2005. Federation of Nepalese Chambers of Commerce and Industry. Pachali Shahid Shukra FNCCI.Milan Marg, Teku P.O. Box 269, Kathmandu, Nepal.

Ghimire YN, Khadka R. 2005. Pest and disease management in Nepalese hill agriculture: A socioeconomic perspective. Journal of International Society for Southeast Asia Agriculture Science 1:283–293.

Giri Y, Dangi N, Aryal S, Sporleder M, Budha C, Kroschel J. 2013. Biology and management of potato insect pests in Nepal. Training guide for extension officers, International Potato Center. doi: 10.4160/978-92-9060-426-6.

Gupta GS. 2019. Land degradation and challenges of food security. Review of European Studies 11:63. doi: 10.5539/res.v11n1p63.

Karim S. 1998. Relative yields of crops and crop losses due to weed competition in bangladesh. Pakistan J. Sci. Ind. Res. 41:318–324.

Karki TB, Sah SK, Thapa RB, McDonald AJ, Davis AS, Khadka YG. 2014. Weeds and Their Effect on the Performance of Maize and Finger Millet in Mid-Hills of Nepal. International Journal of Applied Sciences and Biotechnology 2:275–278. doi: 10.3126/ijasbt.v2i3.10790.

Magar UBR. 2019. Role of agricultural products in foreign trade of nepal. International Journal of Agriculture System 7:52–64.

Malla G. 2009. Climate Change and Its Impact on Nepalese Agriculture. Journal of Agriculture and Environment 9:62–71. doi: 10.3126/aej.v9i0.2119.

Manandhar PP, Palikhe BR. 1999. Paper presented at regional workshop on management of persistence organic pollutants (POPs). Hanoi, Vietnam.

MOAD. 2016. Food and Nutrition Security Plan of Action (FNSPA) of Nepal. Government of Nepal, Singh Durbar, Kathmandu, Nepal.

MOALD. 2020. Statistical information on Nepalese agriculture 2075/76 (2018/19). Ministry of Agriculture and Livestock Development, Nepal.

MOEWRI. 2019. Current status and future roadmap of energy, water resource and irrigation sector (White paper) 2019/20. Government of Nepal, Singhdurbar, Kathmandu. Retrieved from https://moewri.gov.np/storage/listies/May2020/white-paper-2075-with-annex02.pdf.

MOF. 2015. Nepal foreign trade statistics fiscal year 2015/16. Department of customs. Government of Nepal. Tripureshwor, Kathmandu, Nepal.

MOF. 2016. Nepal foreign trade statistics fiscal year 2016/17. Department of customs. Government of Nepal. Tripureshwor, Kathmandu, Nepal.

MOF. 2020. Nepal foreign trade statistics fiscal year 2020/21. Department of customs. Government of Nepal. Tripureshwor, Kathmandu, Nepal.

MOFE. 2019. Climate change scenarios for Nepal. Government of Nepal Ministry of Forests and Environment, Singha Durbar, Nepal.

MRSMP. 2017. Export Potential of Agriculture and Food Production of Nepal. Market Research and Statistics Management Program. Department of Agriculture. Ministry of Agriculture Development, Nepal.

Naik PS, Singh M, Ranjan JK. 2017. Impact of climate change on vegetable production and adaptation measures. In: Abiotic Stress Management for Resilient Agriculture. Springer Singapore. p. 413–428. doi: 10.1007/978-981-10-5744-1_19.

Paneru RB, Paudel G, Thapa RB. 2018. Determinants of post-harvest maize losses by pests in mid hills of nepal. International Journal of Agriculture, Environment and Bioresearch 3:110–118.

Paudel B, Shrestha A, Amgain LP, Neupane MPN. 2017. Weed dynamics in various cultivars of rice (*Oryza sativa* L.) under direct seeding and transplanting conditions in Lamjung. International Journal of Applied Sciences and Biotechnology 5:159–167. doi: 10.3126/ijasbt.v5i2.17611.

Pimentel D, Burgess M. 2013. Soil erosion threatens food production. Agriculture 3:443–463. doi: 10.3390/agriculture3030443.

Poudel NS, Khanal K. 2018. Viral diseases of crops in Nepal. International Journal of Applied Sciences and Biotechnology 6:75–80. doi: 10.3126/ijasbt.v6i2.19702.

Shrestha B. 2011. The land development boom in Kathmandu Valley. CDS contribution to ILC Collaborative. Research Project on Commercial Pressures on Land, Rome.

Simkhada S. 2019. Review on Nepal's increasing agricultural import. Acta Scientific Agriculture 3:77–78. doi: 10.31080/asag.2019.03.0650.

Statistica. 2021. Nepal: Distribution of gross domestic product (GDP) across economic sectors from 2009 to 2019. Retrieved from https://www.statista.com/statistics/425750/nepal-gdp-distribution-across-economic-sectors/.

TARLD. 2008. Thematic assessment report on land degradation. The National Capacity Needs Self Assessment Project. Ministry of Environment, Science and Technology, Government of Nepal and United Nations Development Program.

TEPC. 2020. Trade and Export Promotion Centre. Glimpse of Nepal's foreign trade. Retrieved from Trade and Export Promotion Centre: https://www.tepc.gov.np/pages/tepc-publication.

Thapa G, Kumar A, Joshi PK, editors. 2019. Agricultural Transformation in Nepal. Springer Singapore. doi: 10.1007/978-981-32-9648-0.

Timilsina K. 2019. Agricultural subsidies: Are they effective? The Himalayan Times. Retrieved from https://thehimalayantimes.com/opinion/agricultural-subsidies-are-they-effective.

Timilsina R, Ojha G, Nepali P, Tiwari U. 2019. Agriculture Land use in Nepal: Prospects and impacts on food security. Journal of Agriculture and Forestry University 3:1–9.

WB. 2018. Agricultural land (% of land area) - Nepal. World Bank, World development indicator, Retrieved from https://data.worldbank.org/indicator/AG.LND.AGRI.ZS.



The Official Journal of the **Farm to Fork Foundation**
ISSN: 2518–2021 (print)
ISSN: 2415–4474 (electronic)
http://www.f2ffoundation.org/faa