

## Agricultural Scenario of Nepal: Growth Performance and Swot Analysis

Sudhan Bhusal, Raju R., Nithyashree M. L.,  
Harish Kumar H.V.

Received 5 July 2023, Accepted 17 May 2024, Published on 15 July 2024

### ABSTRACT

This study aimed to determine the performance of agriculture sector in Nepal which would help in formulating better policies for its improvement. The study estimated the growth and instability for the period 2001-02 to 2020-21, dividing it into two periods, period-I (2001-02 to 2010-11) and period-II (2011-12 to 2020-21). The growth and instability analysis indicated that the growth of production of almost all crops were increased during period-II. Oilseeds showed the highest increase in production with growth rate of 6.26%, whereas millet and coffee showed decreasing rate of production in period-II. The area under wheat and millet decreased drastically in period-II. Although instability in area increased in period-II for almost all the crops, tea experienced highest increase. Instability in coffee

production decreased from 41.85% in period-I to 15.92% in period-II, highest among selected crops. The instabilities in production were due to natural calamities, lesser and untimely availability of inputs, less priority in the research sector for minor crops and so on. Livestock subsector has been performing well as compared to the crop sector. Prioritization by the government and wide climatic conditions are the major strengths of the sector whereas unavailability of inputs in time and lack of investment frameworks are the weaknesses. Farm mechanization, topography and agri-tourism are some opportunities and climate change, fragmentation of arable land, brain-drain are the threats to this sector in Nepal. The major focus of the government should be on utilizing the rural labor force on agriculture sector through different schemes such as effective crop and livestock insurance, timely supply of demanded inputs and proper extension services.

**Keywords** Agriculture sector performance, Instability, Growth, SWOT analysis.

### INTRODUCTION

Although, agriculture sector is considered as an important sector of Nepal, the contribution of this sector to the national GDP has been continuously and gradually declining. This statement can be supported with the fact that the contribution of agriculture sector in Nepal's national GDP was 32.68%, 28.43%, 25.16% and 23.95% in 2011/12, 2015/16, 2019/20 and 2021/22, respectively (MoALD 2022). Agriculture

---

Sudhan Bhusal<sup>1</sup>, Raju R.<sup>2\*</sup>, Nithyashree M. L.<sup>3</sup>,  
Harish Kumar H.V.<sup>4</sup>

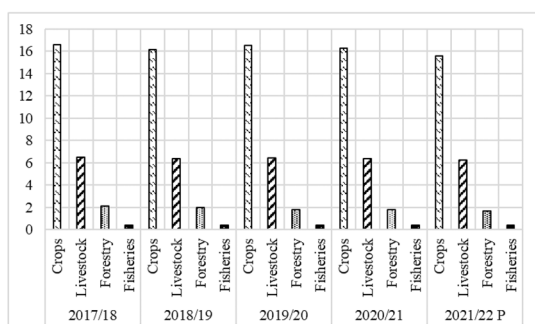
<sup>2</sup>Senior Scientist, <sup>3,4</sup>Scientist

<sup>1,2,3</sup>Division of Agricultural Economics, ICAR-Indian Agricultural Research Institute, New Delhi 110012, India

<sup>4</sup>ICAR-Indian Agricultural Statistics Research Institute, New Delhi 110012, India

Email : [r.raju@icar.gov.in](mailto:r.raju@icar.gov.in)

\*Corresponding author



**Fig. 1.** Share of agriculture subsectors to the agricultural GDP. P=Preliminary, Source: (MoALD 2022). Source: (MoALD 2022)

sector is followed by the wholesale and retail trade with the contribution of 15.96% in the year 2020/21. The share of different agriculture sub-sectors to the agricultural GDP is shown in the Fig. 1. The growth rate of agricultural GDP of Nepal has been highly fluctuating; this may be attributed to the massive earthquake of 2015, followed by the 6-months long blockade from India and the deadly COVID of 2020. However, the major reason could be the fluctuating production of the major crops in the country that has high linkage with the unpredictable weather conditions, especially the rainfall as majority of the farmers are relying on the rainfed agriculture (Jha *et al.* 2021). Further, fragmentation and transformation of the productive agricultural lands to non-agricultural sector is also another major reason for this lacunae (Bhattarai *et al.* 2020).

For the growth of agriculture sector, Nepal Government has formulated several policies and included agriculture at the top-most priority in almost all of the five years plan. After the completion of 20-years long Agriculture Perspective Plan (APP) in 2015, Prime Minister Agriculture Modernization Project (PMAMP) and Agriculture Development Strategy (ADS) are the prime agricultural programs being implemented in the country. Even private sectors are playing a major role for development of agriculture sector in the field of commercial production, seeds, inputs, technologies. These private sectors also are directly or indirectly utilizing the labor force in the agricultural sector and as per the CBS (2019), 60.4% of the population of Nepal are engaged in the agriculture. Besides, the unemployment rate in Nepal increased

from 1.33% in 2008 to 5.05% in 2021. The status of youth unemployment is even worse which ascended to 9.5% in 2021 from 2.19% in 2008 (O'Neill 2022). These unemployed youths can be best utilized in the commercial agricultural production sector in order to steer this sector towards growth. The attraction of the youths in this sector is only possible if the government or other private organizations focus on the incentives or insurance schemes of these youths. This study examines the agricultural sector primarily on the growth and instabilities of different crops grown in Nepal and the challenges and opportunities.

## MATERIALS AND METHODS

### Methodology

This study was based on the secondary data on area, production and productivity of different crops grown in Nepal. The crops selected for the study were: Cereal Crops (Rice, Wheat, Maize, Barley and Millet), Cash Crops (Oilseeds, Potato, Sugarcane, Jute, Tea and Coffee), Legumes (Lentils, Soybean and Black gram), Spices (Cardamom, Ginger and Garlic) and Fresh vegetables and Fruits (Aggregate).

The area, production and productivity data were extracted from the year wise issues of Statistical Information on Nepalese Agriculture published by the Ministry of Agriculture and Livestock Development (MoALD). Livestock data were collected from Livestock Statistics of Nepal, a publication of MoALD. Twenty-years data were collected (2001-02 to 2020-21) which was divided in 2 periods viz., Period-I (2001-02 to 2010-11) and Period-II (2011-12 to 2020-21). However, for the spices, the growth and instability were calculated only for the Period-II due to the limitation of data availability.

A non-linear growth function was used to analyze the growth rate of area, production and productivity of selected crops,

$$Y_t = ab^t$$

Where,

$Y_t$  = Dependent variable (Area/Production/Yield) in

time period 't'.

a = Intercept

b = Regression coefficient

t = Independent variable (time in years taking value 1, 2, 3, ..., 20)

The non-linear function was transformed into a log-linear estimated form which is,

$$\ln(Y) = \ln(a) + t \ln(b)$$

Where, ln refers to natural logarithm.

The Compound Annual Growth Rate (CAGR) was calculated as,

$$CAGR = \{Antilog(\ln b) - 1\} * 100$$

The significance in the regression coefficient was tested using student's t-test.

The instability in the area, production and productivity was calculated using Cuddy-Della Valle Index (CDVI).

$$CDVI = CV * (1 - Adj, R\ square)^{0.5}$$

Where,

CV = Coefficient of Variation.

In case of negative value of adjusted R-square, CV was used as the instability index (Udhayakumar *et al.* 2021).

## RESULTS AND DISCUSSION

### Crop sector performance

#### *Area, production and productivity of selected crops*

The average area, production and productivity of the selected crops is shown in Table 1. It shows that the average area under cultivation has increased for all the crops except Rice, Barley, Jute and Black gram in the period-II from period-I. The highest area under cultivation was seen in case of Rice followed by maize and wheat in both periods. In case of production, all the crops had increased production in the period-II except that of Jute and Black gram whose production

**Table 1.** Average area, production and productivity of selected crops.

Crops	Area (ha)		Production (t)		Productivity (kg/ha)	
	Period-I	Period-II	Period-I	Period-II	Period-I	Period-II
Rice	1523474	1467342	4223989	5087634	2771	3465
Wheat	695125	735309	1455941	1947041	2091	2655
Maize	859520	917208	1767241	2424146	2052	2634
Barley	26896	26424	28521	32893	1066	1247
Millet	263120	267671	290039	311796	1102	1165
Oil-seeds	189532	229892	141073	226379	743	978
Potato	152248	195225	1861455	2873380	12111	14726
Sugar-cane	60686	70731	2438801	3362686	40181	47474
Jute	11384	8738	16207	12412	1422	1423
Tea	15624	22970	13456	23003	847	1040
Coffee	1243	2389	340	443	273	194
Soy-bean	23332	24787	21025	29764	899	1202
Lentil	188045	206013	160789	240640	853	1157
Black gram	31956	24109	25210	20424	789	849
Vegetables	197466	272081	2348284	3746551	11786	13752
Fruits	60652	112422	598523	1079227	9852	9577

decreased in the period-II as compared to the period-I. Similarly, the productivity of all other crops except coffee increased in the period-II. The productivity of coffee decreased from 273 kg/ha in the period-I to 194 kg/ha in the period-II.

#### ***Growth in area of selected crops***

The area under rice were not statistically significant at both the periods. Maize had an increasing rate in area under cultivation in the period-II (1.39%) that increased from 0.91% in the period-I. These values were statistically significant at 1% level. Cereal crops such as wheat, barley and millet showed a decreasing growth in the area in period-II.

In case of cash crops, only potato, tea and coffee showed significant increase in area by 0.4%, 3.65% and 11.92%, respectively, in period-I. In period-II, the area under oilseeds, potato, Jute and coffee had an increasing rate of 2.41%, 0.67%, 1.22% and 5.75 %, respectively, that were all statistically significant at 1% level. Area under cultivation of all the cash crops showed increasing growth rate except Jute which

**Table 2.** Growth rate of area, production and productivity of selected crops. \*\*\*, \*\* and \* represents significance at 1%, 5% and 10% level.

Crops	Area (ha)		Production (t)		Productivity (kg/ha)	
	Period-I	Period-II	Period-I	Period-II	Period-I	Period-II
Rice	-0.29	0.05	0.23	2.04**	0.53	1.99***
Maize	0.91***	1.39***	3.25***	4.17***	2.32***	2.73***
Wheat	1.39***	-1.05***	2.55***	1.63***	1.14*	2.72***
Barley	-0.21	-2.73***	-1.33	-2.42***	-1.31**	0.31
Millet	0.53***	-0.57***	0.71***	0.54**	0.18	1.12***
Oilseeds	0.79	2.41***	2.34**	6.26***	1.53***	3.76***
Potato	0.40***	0.67***	0.38***	0.55***	0.31***	0.38***
Sugarcane	0.4	1.01*	0.43***	1.31	0.21***	0.62**
Jute	0.5	1.22***	0.98	1.13***	0.58	0.38
Tea	3.65***	0.5	9.55***	2.75***	5.69***	2.24
Coffee	11.92***	5.75***	10.04*	-3.68*	-1.68	-8.92***
Soybean	2.57***	-0.3	3.66***	1.78**	1.06***	2.11***
Lentil	0.84**	-0.02	1.69	2.04***	0.85	2.12***
Black gram	-0.19	-0.86	0.26	-0.15	0.46	0.72***
Vegetables	4.93***	1.97***	7.31***	2.68***	2.27***	0.69***
Fruits	5.03***	2.29***	5.45***	3.57***	0.4	1.26

was declining by 2.76% (Table 2). The area under coffee declined from 11.92% in period-I to 5.75% in period-II. NTCDB (2022) reported that the farmers were more attracted towards the cultivation of coffee as the export as well as the domestic market demand of coffee increased considerably after 2002. Similarly, Cumulative fresh vegetables and fruits both showed decreasing growth rate in period-II viz. 1.97% and 2.29%, respectively, which were 4.93% and 5.03% respectively in period-I. Reduction in area for cereals can also be evidence for the increase in area for vegetables. Ghimire *et al.* (2018) reported from a time series data of 40 years, the area, production and productivity of vegetables increased by 222.8%, 728.21% and 15.6% respectively between 1977-78 and 2016-17. The reasons behind these could be the awareness and interest of farmers towards more cultivation because of increasing production and productivity resulted by the use of technologies, information and timely availability of the inputs as compared to the previous periods. Area under the cereals should keep on increasing as Kumar *et al.* (2019) estimated that the cereals demand in Nepal would increase from 5.7 million tons in 2011 by 7.4 million tons in 2025 and 8.5 million tons in 2035.

#### ***Growth in production of selected crops***

The growth rate of rice production was 2.04% during period-II. Among cereals, highest growth rate was

seen in production of maize which increased from 3.25% in the period-I to 4.17% in the period-II. The growth rate of production of wheat, contrastingly decreased in the period-II (1.63%) from 2.55% in the period-I. In case of Barley, a decreasing trend of growth rate was seen in period-I and II. Among the cash crops, highest increase in production from period-I to period-II was seen in case of oilseeds with a margin of almost 4% (Table 2). Jute production has increased in the period-II but it is not as increasing satisfactorily. The main obstacles to jute production and processing included inconsistent or low prices for raw jute, a lack of high-quality jute seed, restricted irrigation water during sowing, diseases complex (wilt), a workforce scarcity during peak season, weed issues, and a dearth of retting pond (Ghimire and Thakur 2013). Although all the cash crops showed increasing trend in production during the transition from period-I to period-II, tea and coffee showed quite the opposite values. The growth in production for both tea and coffee increased in decreasing manner during the period-II. In addition to this, the growth rate in production of coffee in the period-II reached to negative 3.68% which was 10.04% in the period-I. Most coffee farmers in Nepal raise their crop on a small scale, using 100 to 150 plants revealing that large-scale coffee production is not yet being pursued by farmers. Further, to assist the farmers in growing coffee, there is a shortage of coffee specialists and organizations because of which growers do not re-

ceive the necessary recommendations or assistance regarding coffee cultivation procedures from the relevant organizations (Tiwari 2010). This might be the reason for reduction in the growth rate of coffee production in the period-II.

Among legumes, only soybean showed a statistically significant growth. The production of soybean decreased from 3.66% in the period-I to 1.78% in period-II. In horticulture sector, both vegetables and fruits production increased decreasingly during the period-II. The pandemic in the 2019-20 had made the marketing and production of vegetables difficult. This can be supported with the findings of MOF (2021) that the production of vegetables reduced by 7.2% in the year 2019-20. Majority of the crops' production has increased during the period-I. This is obvious because Agriculture Perspective Plan (APP), which was the primary policy of Government of Nepal for agriculture growth and modernization, was under implementation during this period. This plan prioritized the technology driven growth, fertilizers, roads and irrigation for the increase in production and productivity of the crop (IBN 2017).

#### ***Growth of productivity of selected crops***

Rice had a growth in productivity by 1.99% significant at 1% level of significance. Highest growth rate among cereal was seen in maize with rate of 2.73% in period-II. There was decrease in growth rate in productivity of barley in period-I by 1.31%. Among Cash crops, the growth rate in productivity increased during the period-II in all crops except Jute which was not statistically significant. Tea had the highest growth rate in productivity in both the periods with 5.69% in period-I followed by 2.24% in period-II. Coffee showed decreasing trend of growth rate in both periods. Productivity was decreasing at rate of 8.92% in period-II.

Among legumes, productivity of lentil had highest growth of 2.12% in period-II followed by growth in productivity of soybean with 2.11%. The yield of oilseeds is lesser than other crops which is mainly due to the deficiencies of micronutrients, inappropriate use of fertilizers, poor plant population and lack of suitable cropping system (Nepali and Bhandari 2019).

Coming to the horticulture sector, productivity in vegetable had been increasing at rate of 2.27% in period-I, 0.69% in period-II. The growth rate in productivity of fruits did not show any significant results.

#### ***Instability in area of selected crops***

Table 3 shows the instability in area of selected crops. Among the cereals, the instability in area under cultivation was increasing in the period-II when compared to the period-I except wheat whose instability decreased in the period-II to 1.43% from 2.29% in period-I. Coming to the cash crops, the instability potato decreased in the period-II (3.16%) from 6.56% in the period-I whereas the instability of other cash crops had increased during the period-II. The highest transition of instability in area among the selected crops was recorded in tea which was 18.9%. The instability of area under tea was 5.43% in the period-I that increased to 24.33% in period-II. According to Rimal (2009), the major problems in the tea industry were lack of advanced technology to compete with highly maintained quality and lack of government support to find out the international markets. Further, strikes between the labor unions could also be the reasons for the instability in tea production.

Among the legumes, the instability in area of soybean increased whereas that of Lentil and Black gram decreased in the period-II. Similarly, instability of fruits decreased from 3.83 to 2.83 in the period-II and that of vegetables increased from 2.04 to 3.25 in the period-II.

#### ***Instability in production of selected crops***

The instability in production has increased in the period-II in case of all the cereal crops except wheat and barley. The major reason for the instability in production of cereals is flood, landslides and lack of assured irrigation (DVN and DoA 2018). The instability in production was seen highest in Coffee in the period-I i.e., 41.85% which reduced to 15.92% in the period-II which was still the highest among all the crops. Legumes had decreasing instability in production in the period-II as compared to the period-I. For the legumes, no proper research has been addressed due to the low productivity of these

**Table 3.** Instability in area, production and productivity of selected crops.

Crops	Area (ha)		Production (t)		Productivity (kg/ha)	
	Period-I	Period-II	Period-I	Period-II	Period-I	Period-II
Rice	2.59	3.98	6.2	7.01	4.31	4.16
Maize	0.8	2.49	2.64	5.57	2.12	3.95
Wheat	2.29	1.43	6.34	5.04	4.99	5.24
Barley	3.29	4.3	7.62	4.89	5.31	5.89
Millet	0.46	0.99	1.11	1.98	1.32	1.3
Oilseeds	4.83	6.17	7.55	5.00	3.28	3.36
Potato	6.56	3.16	3.51	5.4	2.75	4.44
Sugarcane	6.1	9.25	3.93	12.47	1.95	5.7
Jute	8.48	11.7	8.29	10.7	5.06	3.4
Tea	5.43	24.33	10.01	6.01	5.8	20.87
Coffee	9.33	10.12	41.85	15.92	37.99	14.04
Soybean	5.7	8.9	6.97	5.36	1.15	5.12
Lentil	3.24	1.95	9.72	4.16	6.25	3.63
Black gram	5.9	5.24	6.99	5.63	4.35	1.39
Vegetables	2.04	3.25	2.25	4.21	1.11	1.62
Fruits	3.83	2.83	4.56	6.8	2.56	6.23

crops because of which, there has been hampers in the quality seeds availability, availability of irrigation in winter which has reduced the productivity of the legumes. In 2018, DVN and DoA reported that the production and productivity of legumes in Nepal are lesser than the averages of SAARC regions which is mainly due to the lack of quality seeds, irrigation facilities and poor technology. In case of horticultural crops, instability increased in the period-II. Fruits recorded highest instability of 6.80% followed by the vegetables with instability of 4.21% in production during the period-II.

#### *Instability in productivity of selected crops*

The instability in productivity of Barley was highest among the cereals which was 5.31% in period-I and 5.89% in period-II (Table 3). The cereal crop with lowest instability in productivity was Millet. Coming to the cash crops, tea and coffee were the crops with highest instability in the productivity. The instabil-

ity of productivity of tea increased from 5.80% in the period-I to 20.87% in the period-II whereas the instability in productivity of coffee decreased from 37.99% in period-I to 14.04% in the period-II. The instability of lentil declined from 6.25% in period-I to 3.63% period-II. Productivity of vegetables seemed to be stable during these years. However, fruits' productivity was a bit more instable than the vegetables. The instability in productivity of fruits increased from 2.56% in the period-I to 6.23% in the period-II.

#### *Growth and instability of spices*

The growth and instability of selected spice crops is calculated only for the period-II. This was due to the unavailability of data for the period-I. The compound annual growth rate and instability of spices is mentioned in the Table 4. It has been seen that the area under garlic and cardamom increased by 6.97% and 4.15% respectively. The production of garlic, cardamom and ginger was recorded to be 7.99%,

**Table 4.** Growth and instability of spices in period-II. Area in ha, production in tonnes and productivity in kg/ha. \*\*\* and \*\* represents significance at 1% and 5% level.

	Area	Average		Area	CAGR (%)		Area	Instability (%)	
		Production	Productivity		Production	Productivity		Production	Productivity
Cardamom	13174	6777	511	4.15***	5.85***	1.63	6.46	11.6	8.04
Ginger	22274	271997	12233	0.93	2.06**	1.12	6.7	5.42	6.9
Garlic	7974	55599	6935	6.97***	7.99***	0.96**	4.67	5.52	3.66



**Table 5.** Growth rate of livestock population by category.

Livestock	Period-I 2001/02-2010/11)	Period-II (2011/12-2020/21)
Cattle	0.46***	0.37***
Buffaloes	3.38***	0.16
Sheep	-0.47***	-0.05
Goat	3.85***	3.92***
Pigs	1.99***	4.06***
Fowl	4.42**	7.26***
Duck	-0.90***	1.57***
Milking cow	1.30***	1.78***
Milking buffaloes	3.42***	2.65***
Laying hen	1.57***	6.02***
Laying duck	-2.42***	1.94***

5.85% and 2.06% respectively. The growth rate of productivity of garlic showed a very small increase of 0.96 and growth rate in productivity of ginger and cardamom were not statistically significant. In case of area, the instability was higher in ginger (6.70%) followed by cardamom (6.46%) and garlic (4.67%). Similarly, for production, cardamom showed higher instability (11.60) followed by garlic (5.52) and ginger (5.42). The instability in productivity was higher for cardamom followed by ginger and garlic. The spice crops are doing well in the economy. However, lack of improved high yielding varieties, appropriate processing and scientific cultivation practices are the hindrances in the spice production. Fresh gingers that are unwashed, face quarantine problems during the trade and hence, farmers are compelled to sell it unofficially at lower prices ( Thapa *et al.* 2022).

## Livestock sector performance

### *Growth of livestock population*

Table 5 presents the growth rate of livestock population category-wise. It shows that the cattle population increased with a decreasing rate in the period-II as compared to the period-I. Among the livestock, the highest growth rate was seen in fowl population which increased from 4.42% in the period-I to 7.26% in the period-II. The growth in population of sheep, duck and laying duck was negative in the period-I. In the period-II, the growth in population of duck and laying duck increased however that for sheep was not significant. Livestock sector is another important subsector contributing around 25% of the national

**Table 6.** Instability in livestock population.

Livestock	Period-I 2001/02-2010/11)	Period-II (2011/12-2020/21)
Cattle	0.49	0.40
Buffaloes	0.30	1.09
Sheep	0.54	0.93
Goat	1.15	1.46
Pigs	1.78	2.01
Fowl	14.50	8.94
Duck	0.84	1.27
Milking cow	0.89	3.68
Milking buffaloes	0.48	3.24
Laying hen	1.05	11.88
Laying duck	3.97	3.93

agricultural GDP of Nepal (MoAD 2015). The livestock population has been increasing in the period-I as well as period-II. In the recent years, the increase in cattle/buffalo farms as well as the pig/poultry farms had led to the increase in the livestock population in the country (Khanal *et al.* 2022).

### *Instability in livestock population*

The instability in the livestock population is shown in Table 6. The highest instability in the period-I was seen in case of fowl which was 14.50% followed by laying duck which was 3.97%. For the rest, the instability in the period-I was less than 1%. In the period-II, the instability of laying hen was the highest (11.88%) which increased from 1.05% in the period-I. The instability for fowl reduced to 8.94% in the period-II. In the period-II, the lowest instability was seen in case of cattle which was only 0.40%.

### *Growth of livestock products*

The growth rate of different livestock products is shown in Table 7. Every livestock product increased

**Table 7.** Growth rate of livestock products. \*\*\*represents significance at 1% level.

Livestock products	Period-I (2001/02-2010/11)	Period-II (2011/12-2020/21)
Milk production (Ltr)	3.27***	4.87***
Meat production (MT)	3.34***	6.92***
Egg production ('000 numbers)	2.51***	9.05***
Wool production (kg)	-0.45***	0.11

**Table 8.** Instability in livestock products.

Livestock products	Period-I (2001/02-2010/11)	Period-II (2011/12-2020/21)
Milk production (Ltr)	0.49	3.04
Meat production (MT)	2.59	13.78
Egg production ('000 numbers)	1.97	10.72
Wool production (kg)	0.74	1.29

in period-II as compared to the period-I. The compound annual growth rate of milk production increased from 3.27% to 4.87%. The highest increase in growth rate was recorded for egg production. The egg production increased from 2.51% in period-I to 9.05% in the period-II. Wool experienced a negative growth in production in the period-I. The growth rates for wool production in the period-II was not significant statistically. With the increase in the livestock population, different livestock products like meat, milk and egg are also increasing. The production in wool has declined due to the decrease in the population of sheep.

#### *Instability in livestock products*

Meat production had the highest instability in both the periods viz. 2.59% and 13.78% respectively in period-I and period-II. The instability of meat production increased significantly in period-II. Similar is the case of egg production also. The instability of egg production increased from 1.97% in the period-I to 10.72% in the period-II (Table 8).

#### **SWOT analysis of agriculture sector in Nepal**

##### *Strengths*

Agriculture sector contributes almost one-fourth (24.95%) to the National GDP as of 2020-21. This shows that this sector still has the potentiality to boost up the national economy. Not only this, according to the National Labor Force Survey of 2018, 60% of the total labor force of the country is utilized by this sector. A diverse range of climatic condition is available in Nepal dividing the country into three main ecological regions namely, temperate, sub-tropical and tropical regions. A wide variety of crops can be grown in these different ecological regions like horticultural

commodities in the temperate and sub-tropical regions and foodgrains especially in the tropical region. The altitudinal variation is capable of producing wide range of commodities in Nepal (UN 2013). Further, only 0.01% of the earth's surface is covered by Nepal, but it is home to 3.2% of the world's plant life (MoFSC 2014). Nepal is so rich in biodiversity that it ranks 27<sup>th</sup> overall, 10<sup>th</sup> in Asia and second in South Asia among nations having high biological diversity (Shrestha and Bajracharya 2019). In 2020-21, 553435 tonnes of spice crops were produced from an area of 70230 ha with the productivity of 7.88 tonnes per ha which included large cardamom with an area, production and productivity of 18791 ha, 15668 tonnes and 8.29 tonnes per hectare, respectively (MoALD 2022). These spice crops (large cardamom, ginger, cinnamon) have a high demand in the international market and the increase in their area and production is a good strength of Nepalese agriculture sector. Not only this, majority of the rural farmers have a quite good traditional and indigenous knowledge of farming (Regmi and Naharki 2020). This helps them get rid of the problems of diseases and pests in the production of agricultural commodities. Further, Government of Nepal has been prioritizing the agricultural sector with prime importance. The implementation of projects like ADS, PMAMP, APP and inclusion of this sector in all of the five-years plan can be considered as a strength for this sector.

##### *Weakness*

The geographical make-up of Nepal is both boon as well as curse for the Nepalese agriculture sector. Several factors like climate change and global warming, unavailability of labor due to outmigration, degradation and fragmentation of agricultural land, lack of investment frameworks are hindering the development of this sector in Nepal (Gauchan 2018).

Further, with the increase in population, the food demand is increasing and similar is the case of input demands. Relating to the current situation in case of inputs availability, inability to fulfil the input demand is another major challenge to the agriculture sector of Nepal. The farm inputs such as seeds, fertilizers and plant protection chemicals are not available to the farmers at right time. The fertilizers are being import-



ed through informal channels and there is no one to assess the quality of those imported inputs. Exporting of the agricultural produce is also a challenge due to the quality benchmarks and pesticides-free requirements of the trading nations. ITC (2017) reported that the traditional method of drying the spices is failing to satisfy the international requirements of quality and hence negatively affecting the trading channels.

### *Opportunities*

A CBS (2013) report showed that only 22% of households in Nepal are using tractor and 20.96% are using threshers which shows that the agriculture sector is labor-intensive in Nepal and also the mechanization is increasing. Increasing mechanization can be a good alternative for the labor unavailability and migration. For this, government has been providing subsidies for agricultural equipment through Prime Minister Agriculture Modernization Project. The topography is also suitable for the development of this sector. The plain regions of Terai fit the production of foodgrains as well as tropical horticultural crops whereas the agricultural lands in the hills produce other fruits and high value crops. Beautiful landscape, use of diverse resources and biodiversity own an enormous strength for the flourishing of agro-tourism in Nepal (Maharjan and Khatri-Chhetri 2006). The unique cultural traditions of farming in the rural communities lures the tourists which could be a best remunerative for the agriculture sector. Not only this, due to the availability of diversified flora all over the country as well as the appropriate climatic conditions, bee-keeping will also be one of the most important income generating activities in Nepal that would help the agriculture sector to flourish. Agriculture Development Strategy (ADS) also emphasized in the high value commodities like large cardamom, ginger and garlic, these commodities solely can comprise a very good percentage in the Nepalese agriculture export. Further, although climate change is negatively influencing this sector of Nepal, the wide range of ecology and temperature variation fosters the production of diversified crops here.

### *Threats*

As discussed by Ahmed and Suphachalasai (2014), the increase in temperature in Nepal will be of 1.6°C–2°C

by 2030, 2.3°C–2.9°C by 2050, and 3.4°C–5.0°C by 2080. This increase in temperature will for sure decrease the production and productivity of crops indicating that the global warming and climate change is hampering and will hamper the agriculture sector of Nepal to a greater extent. As this sector in Nepal is depending greatly on rainfall, the climate change and fluctuations in the rainfall pattern is a great threat to this sector. Still, the agriculture focused programs and development projects are not much inclined towards climate smart agriculture for the mitigation of climate change effects. In addition to this, more than 60% of Nepal's total export is with India due to the landlocked nature of the country and open-border on the east, west and southern part of Nepal. The inability of Nepal to find other international markets, if keeps on persisting, would be one of the greatest threats to the agriculture sector of the country.

Migration of youths from hilly region to Terai region for education and other infrastructures is increasing these days that results in leaving the productive lands of those areas fallow. This also reduces the number of agricultural laborers in the hilly regions. Not only this, brain-drain is a serious issue currently in Nepal as many of the skilled graduates are leaving the country for better income and opportunities. Another major threat is the fragmentation and degradation of agricultural land. The average size of land owned by the household declined from 1.1 ha in 1995 to 0.70 ha in 2010. Additionally, these landholdings are frequently fragmented, averaging 3.1 parcels with average size of 0.21 ha per parcel (CBS 2013). Such a frequent deterioration of the agricultural land is inviting a great threat to the agricultural sector of Nepal.

### **SWOT analysis of the agriculture sector**

<b>Strengths</b>	<b>Weakness</b>
Major contribution to the national GDP (MoALD 2022)	Lack of investment frameworks (Gauchan 2018)
Wide range of climatic conditions (UN 2013; MoFSC 2014)	Non availability of farm inputs in time
Prioritization of the sector by the government	Underutilization of farm laborers
Traditional and indigenous knowledge in farmers (Regmi and Naharki 2020)	Inability to fulfil quality benchmarks in exporting commodities (ITC 2017)

**Opportunities**

Farm Mechanization (CBS 2013)  
Topography  
Agri-tourism (Maharjan and Khatri-Chhetri 2006)

**Threats**

Climate change and Global warming (Ahmed and Suphachalasai 2014)  
Fragmentation and deterioration of agricultural land (CBS 2013)  
Immigration of skilled manpower  
Unorganized trade with other countries

**CONCLUSION**

Although the share of agriculture sector in the national GDP is decreasing gradually throughout the years, the sector has achieved some great milestones. The area under cultivation and production of major crops are expanding, though not with a satisfactory rate. The major focuses should be given to the minor crops and industrial crops through research and technological change. Climatic variability is one of the major problems of natural origin for the decline in productivity of these crops. Livestock sub-sector has also shown a positive performance with the increase in population and productions. Even though there have been instabilities in the production and productivity, these are because of the fragmentation of land, massive earthquake of 2015, blockade from India and the recent pandemic. Policies to stop fragmentation of land, timely availability of fertilizers, measures to efficient provision of irrigation, effective crop and livestock insurance, proper extension of the technologies and information can definitely boost up the agriculture sector in the coming years.

**REFERENCES**

- Ahmed M, Suphachalasai S (2014) Assessing the Costs of Climate Change and Adaptation in South Asia. Asian Development Bank. <http://hdl.handle.net/11540/46>. License: CC BY 3.0 IGO.
- Bhattarai K, Yousef M, Greife A, Naraharsetti SCS (2020) Influence of topography on sustainable land management : An analysis of socioeconomic and ecodemographic conditions of Nepal. *Agriculture* 10 (06) : 224. <https://doi.org/10.3390/agriculture10060224>.
- CBS (2013) National Sample Census of Agriculture Nepal 2011/12. [https://nepalindata.com/media/resources/bulkuploaded/12\\_Okhalhunga.pdf](https://nepalindata.com/media/resources/bulkuploaded/12_Okhalhunga.pdf).
- CBS (2019) Report on the Nepal Labor Force Survey, 2017/18. [https://cbs.gov.np/wp-content/uploads/2019/05/Nepal-Labor-Force-Survey-2017\\_18-Report.pdf](https://cbs.gov.np/wp-content/uploads/2019/05/Nepal-Labor-Force-Survey-2017_18-Report.pdf).
- DVN, DoA (2018) Inter Provincial Dependency for Agricultural Development. [http://www.doanepal.gov.np/downloadfile/Final-Report-Inter-Provincial-Dependency-on-Agriculture-DVN-2018\\_1548834926.pdf](http://www.doanepal.gov.np/downloadfile/Final-Report-Inter-Provincial-Dependency-on-Agriculture-DVN-2018_1548834926.pdf).
- Gauchan D (2018) Agricultural Development in Nepal: Emerging Challenges and Opportunities. In SK and M Khatri (eds). *Discourses on Nepal's Development* (Volume I) (pp 211—240). Nepal Policy Research Center. [https://www.researchgate.net/publication/328963861\\_Agricultural\\_Development\\_in\\_Nepal\\_Emerging\\_Challenges\\_and\\_Opportunities](https://www.researchgate.net/publication/328963861_Agricultural_Development_in_Nepal_Emerging_Challenges_and_Opportunities).
- Ghimire D, Lamsal G, Paudel B, Khatri S, Bhusal B (2018) Analysis of trend in area, production and yield of major vegetables of Nepal. *Trends in Horticulture* 1(2): 1—11. <https://doi.org/10.24294/th.v1i2.914>.
- Ghimire T, Thakur N (2013) Constraint and opportunity of raw jute production : A case study of eastern terai, Nepal. *Agromony Journal of Nepal* 3 : 117—122. <https://doi.org/10.3126/ajn.v3i0.9013>.
- IBN (2017) Agriculture Sector Profile. <https://ibn.gov.np/wp-content/uploads/2020/04/Agriculture-Sector-Profile.pdf>
- ITC (2017) Nepal National Sector Export Strategy Large Cardamom 2017—2021. In Government of Nepal, International Trade Center. <http://www.intracen.org/>.
- Jha S, Singh B, Poudel D, Shingh S, Tiwari P, Shrestha P (2021) Analyzing the growth and performance of agriculture sector in Nepal. *Asian Journal of Advances in Agricultural Research* 16 (3) : 22—40. <https://doi.org/10.9734/AJAAR/2021/V16I330175>.
- Khanal P, Dhakal R, Khanal T, Pandey D, Devkota NR, Nielsen MO (2022) Sustainable livestock production in Nepal: A focus on animal nutrition strategies. *Agriculture (Switzerland)* 12 (5) : 1—20. <https://doi.org/10.3390/agriculture12050679>.
- Kumar P, Kumar A, Joshi PK (2019) Food Demand System and Projections to 2035: Nepal. In Thapa G, Kumar A and Joshi PK (eds). *Agricultural Transformation in Nepal: Trends, Prospects, and Policy Options*. Springer Singapore, pp 159—198
- Maharjan KL, Khatri-Chhetri A (2006) Household Food Security in Rural Areas of Nepal: Relationship between Socio-economic Characteristics and Food Security Status (2006 Annual Meeting, August 12—18, 2006, Queensland, Australia, Issue 25624). *International Association of Agricultural Economists*. <https://doi.org/DOI:10.22004/ag.econ.25624>.
- MoAD (2015) Agriculture Development Strategy (ADS) 2015 to 2035. Ministry of Agriculture Development, Singhadurbar, Kathmandu.
- MoALD (2022) Statistical Information on Nepalese Agriculture 2077/78 (2020/21). Ministry of Agriculture and Livestock Development, Singhadurbar, Kathmandu.
- MOF (2021) Economic Survey 2020/21. [https://www.mof.gov.np/uploads/document/file/1633341980\\_Economic-Survey-\(English\)-2020-2021.pdf](https://www.mof.gov.np/uploads/document/file/1633341980_Economic-Survey-(English)-2020-2021.pdf)
- MoFSC (2014) Nepal Biodiversity Strategy and Action Plan:2014-2020. Kathmandu: Ministry of Forest and Soil Conservation

- (MoFSC), Government of Nepal.  
<https://www.cbd.int/doc/world/np/np-nbsap-v2-en.pdf>.
- Nepali B, Bhandari D (2019) Enhancing the yield and quality of oilseed crops in Nepal through application of sulfur fertilizers. *Big Data in Agriculture* 1(2) : 10—11.  
<https://doi.org/10.26480/bda.02.2019.10.11>.
- NTCDB (2022) Coffee History. <https://www.teacoffee.gov.np/coffeeinfo/coffeehistory>
- O'Neill A (2022) Nepal - youth unemployment rate 1999-2021 Statista.  
<https://www.statista.com/statistics/812273/youth-unemployment-rate-in-nepal/>.
- Regmi S, Naharki K (2020) A SWOT analysis of agribusiness entrepreneurship in Nepal. *Food and Agribusiness Management* 1 (2) : 60—65.  
<https://doi.org/10.26480/fabm.02.2020.83.88>.
- Rimal SP (2009) A study of tea sector in the context of Nepal's membership into the WTO (Issue February). Tribhuvan University.
- Shrestha KK, Bajracharya SB (2019) Biodiversity in Nepal. In *Global Biodiversity Volume 1: Selected Countries in Asia*, edited by T Pullaiah, 1<sup>st</sup> ed. 1 : 427—472. *Apple Academic Science*.  
<https://www.taylorfrancis.com/books/edit/10.1201/9780429487743/global-biodiversity-pullaiah>.
- Thapa MB, Sharma BP, Adhikari RN. n.d. Development and prospects of spices in Nepal. In *Horticultural, In last six decades* (pp. 163—180). Retrieved September 18, 2022, from <https://horticulturenepal.org/pages/horticulture-in-last-6-decades>.
- Tiwari KP (2010) Agricultural policy review for coffee promotion in Nepal. *Journal of Agriculture and Environment* 11 : 138—147.  
<https://doi.org/10.3126/aej.v11i0.3661>.
- Udhayakumar M, Karunakaran KR, Thilagavathi M, Ashok KR (2021) State-wise production performance of basmati and non-basmati rice in India. *Asian Journal of Agricultural Extension, Economics and Sociology*, pp 17—31.  
<https://doi.org/10.9734/AJAEES/2021/V39I430559>.
- UN (2013) Country Policy Analysis: Nutrition Impact of Agriculture and Food systems, Nepal. United Nations System, Standing Committee on Nutrition.  
[http://www.unscn.org/files/Publications/Country\\_Case\\_Studies/UNSCN-country-case-study-Nepal-FINAL.pdf](http://www.unscn.org/files/Publications/Country_Case_Studies/UNSCN-country-case-study-Nepal-FINAL.pdf).