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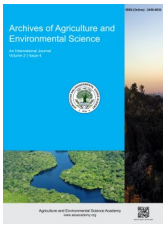

ORIGINAL RESEARCH ARTICLE

Production status, export analysis, and future prospects of ginger in Nepal

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ABSTRACT

Ginger is one of the high-value spices crops of Nepal possessing the huge potential of export to the global market. Among Nepal's natural gifts are agricultural diversity and varied topography making the land suitable for ginger production. The main aim of this study was to scrutinize the current status of ginger production, annual growth rate, its import and export as well as prospects of the Nepali ginger. Fundamentally, secondary data were collected from authentic sources, and then were assembled in Microsoft Excel, and diagrams were generated. ArcGIS software was used to create the map. Findings revealed that the production of ginger is in an increasing trend with an average annual growth rate of 6.67%. Nepal contributed about 9.2% of the global ginger production, despite its small area. Ginger is exported primarily to India because of the lack of an internationally accredited testing laboratory. From this study, it can be concluded that Nepal has comparative advantages in growing ginger, which is noticeable with the geographical features and well-adapted local varieties. The trend of enormous growth in ginger production and its export indicates that ginger production and trade could be a potential enterprise contributing to the national economy. It is recommended to focus on enhancing ginger productivity by providing training and extension services to farmers, subsidies, establishing ginger processing units, easy and reliable certification within the country, and enhancing diplomatic relations for easy market accessibility for strengthening the ginger sub-sector.

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INTRODUCTION

Ginger (*Zingiber officinale* var. Roscoe), belonging to the family Zingiberaceae is a subtropical perennial, herbaceous plant that is grown for its underground branched stem called rhizome (Aleem *et al*., 2017; Singh *et al*., 2018). The fresh or dried rhizome is important as a spice, flavoring agent, and traditional herbal remedy as anti-emetic, anti-oxidant, and anti-inflammatory against respiratory tract infections (Singh *et al*., 2018; Shahrajabian *et al*., 2019). Because of the overwhelming health benefits of ginger, it has been scattered all across the globe and is grown in most tropical and sub-tropical regions. It is primarily produced in India, China, Nepal, Nigeria, Thailand, Indonesia, Bangladesh, Japan, and Cameroon with altogether almost 50% of the global production (Maps of World, 2020). In Nepal, ginger is planted in 22,132 hectares of land producing 284,427,000 kg (AITC, 2020); with an engagement of 1.2 million people i.e. about 4.3% of the Nepali population (GIZ, 2017). The agriculture sector contributes about 28.79% to the total Gross Domestic Product (GDP) (AITC, 2020). The Agriculture Development Strategy (2015–2035): a long-term vision that guides agriculture sector of Nepal has also prioritized ginger sub-sector for value chain development (ADS, 2014). Ginger possesses high export potential which helps earn foreign currency, eradicating the existing poverty, and thus uplifting the living standard of the Nepalese farmers and ultimately national economy (NTIS, 2016).

Mainly two varieties of ginger are cultivated in Nepal. They are: Kapurkot ginger-1 and Kapurkot ginger-2 (NARC, 2020). Fresh ginger is used for flavoring food due to the presence of aroma and pungency, and to obtain dried ginger (Adamade, 2017). Ginger rhizomes that are to be transformed into dry ginger

must attain full maturity of 8–9 months and should be sun-dried for one week to attain a moisture content of not more than 12% (Bag, 2018). About 99% of Nepal's ginger is exported to India, about three fourth of which is fresh ginger while the remaining is in dried form locally known as '*sutho*' (Acharya *et al*., 2019). The dried form is pulverized and used as tea bags, while the fresh one is utilized to brew wine (Shahrajabian *et al*., 2019). Ginger farming is mostly concentrated in the eastern hills of Nepal. At present, among 77 districts of Nepal, Ilam is the greatest producer with a total production of 46,059,000 kg (MoAD, 2018). 15 out of 48 VDC's of Ilam produce ginger in huge amounts (Adhikari, 2016). Salyan is the second-largest ginger-producing district in the country (MoAD, 2018); Malneta in Dandagaun VDC has historically been recognized as the national production center for quality ginger. It is also well known for fresh and dried ginger "Sutho" (Adhikari, 2016).

Global ginger production is increasing every year. Overall production during 2009 was 167,0252,000 kg which increased to 2,785,574,000 kg in 2018 (MoAD, 2018; FAOSTAT, 2020). Nepal contributed 10.16% of the global production whereas 12.47% of the total production in Asia in 2018 (FAOSTAT, 2020). This increment in production, as well as, area is due to the high value of the ginger crop. Among all other spices crops in Nepal, Ginger is the most prioritized one bearing huge potential. Nepal has to depend on India for certification because of the lack of an internationally accredited testing laboratory which harms the freshness of ginger. But, still, there is huge scope for Nepalese ginger growers as there is an increasing demand for ginger in neighboring countries like India, Pakistan, and Bangladesh. There is rising demand for ginger in Ayurveda medicine as well (Shahrajabian *et al*., 2019). This study aimed to investigate the trend of ginger production over time, its export potential, and the production and marketing prospects of Nepali ginger, to identify and analyze the sector's strengths, weaknesses, challenges, and opportunities, and to take the necessary steps for its development on time.

MATERIALS AND METHODS

The study was carried out to unveil the production as well as marketing status of ginger in Nepal and the global context. Fundamentally, secondary data were collected from authentic sources such as periodic publications of government authorities, the Central bank of Nepal, FAO statistics, and various internet sources. Different pertinent policies, programs, laws, and regulations in this sector were also taken into consideration. The collected secondary data were assembled in Microsoft Excel and diagrams were generated. ArcGIS software was used to create the map.

Percentage change was estimated with the following expression:

$$\text{Percentage (\%) change} = A2 - A1/A1 * 100$$

Where "A2" is the final observation and "A1" is the initial observation.

For estimating the average annual change in the case of ginger production in Nepal, linear trend line analysis was carried out, Mathematical expression for linear trend line:

$$Y = a + bt.$$

Where "Y" is a production of the ginger at a time (t), "b" is an average annual growth (kg), "t" is a time factor in years, and "a" is an intercept.

RESULTS AND DISCUSSION

Ginger production in Nepal

Ginger farming was found to be conducted on 22,132 hectares in Nepal with the production of 284,427,000 kg (AITC, 2020) (Table 1). It has been valued as a High-Value Crop (HVC) in Nepal for a long time. It was estimated that about 1.2 million people (4.3% of the Nepali population) grew ginger all over Nepal, especially in the Eastern and poor Western regions (Lex van Boeckel, 2017). It was also found to be cultivated by over 66,000 families in five regions of Nepal, and due to its high value, it has a greater impact on smallholder farmers (NEAT, 2011). Nepal has been recognized as the world's fourth-largest ginger producer after India, China, and Indonesia with a production of approximately 245 thousand metric tons per year (GIZ, 2017). Among Nepal's natural gifts is agricultural diversity and varied topographical, altitudinal, and temporal conditions, making the land suitable for, among many others, ginger production. The agriculture sector profile prepared by the Government of Nepal had mentioned the opportunities that have existed in the production, processing, packaging, and branding of Ginger (IBN, 2019). The area used in ginger farming, as well as production is increasing tremendously. In the base year 1999/2000, the ginger producing area was in 8,314 hectares with the production of 74,994,000 kg while it grew in the recent fiscal year 2018/19 to 22132 hectares accounting for the production of 284,427,000 kg (FAOSTAT, 2020; AITC, 2020). Therefore, Figure 1 depicted the increasing trend of the ginger-producing area and ginger production in Nepal.

The average annual growth rate of ginger production in Nepal was estimated at around 6.67%. The average annual growth rate for the individual fiscal year was shown in Figure 2. Further estimation of the % change in ginger production from the base year (1999/2000) to the recent fiscal year (2018/19) showed a 279.266% increase. While similar estimation for the ginger cultivated area showed that there was an increase of ginger cultivating area by 166.202% from (1999/2000) to fiscal year (2018/19). Over the last two decades, Nepal's ginger production has witnessed a significant increase in terms of both area and production.

Among the top five species grown in Nepal, Ginger is the most prioritized one with the largest area and largest total production over the past three years (AITC, 2020) (Figure 3). The total production of ginger in the fiscal year 2018/19 was found to be

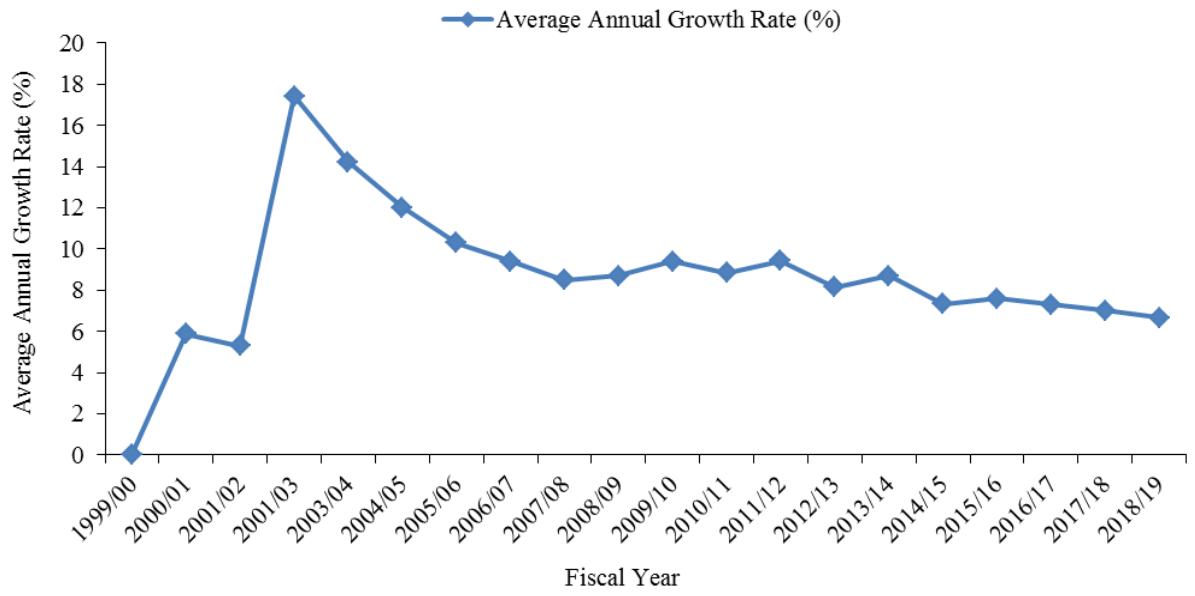

Figure 1. *Average annual growth rate of ginger production in Nepal (Source: FAOSTAT, 2020; AITC, 2020).*

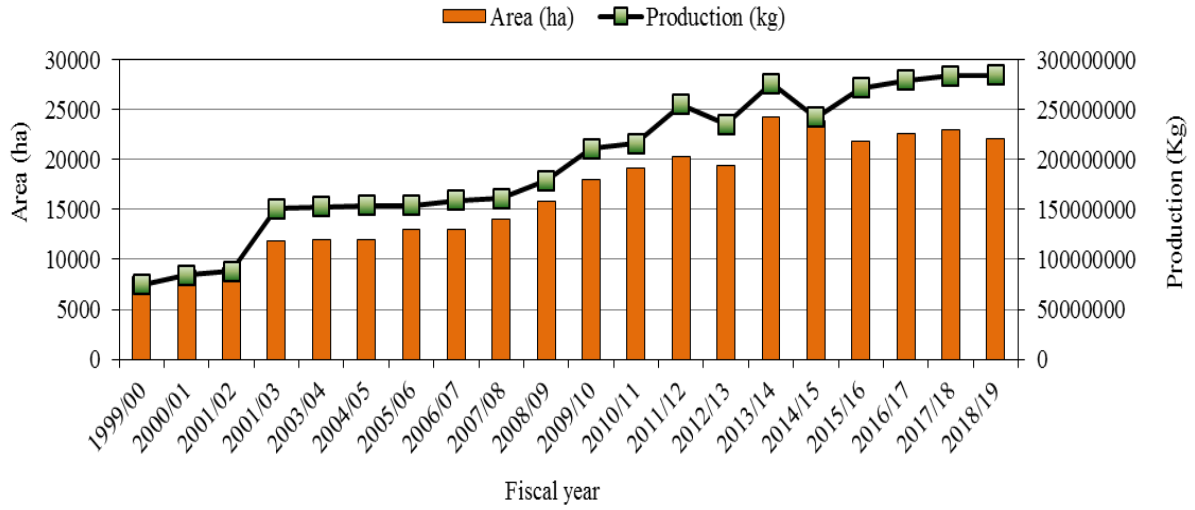

Figure 2. *Plantation and Production trend of ginger in Nepal (Source: FAOSTAT, 2020; AITC, 2020).*

Table 1. Total area and production of different spice crops in Nepal during 2016-2019 years (Source: AITC, 2020).

Year	2016/17		2017/18		2018/19	
Spices crops	Area (ha)	Production (tonnes)	Area (ha)	Production (tonnes)	Area (ha)	Production (tonnes)
Ginger	22,649	279,504	23,000	284,000	22,132	284,427
Turmeric	6,777	65,999	7,300	71,500	10,160	98,904
Garlic	8,116	56,668	8,500	59,500	10,107	71,902
Chilli	10,077	49,718	10,500	52,500	10,692	67,167
Cardamom	17,002	6,521	12,769	6,849	15,055	7,954

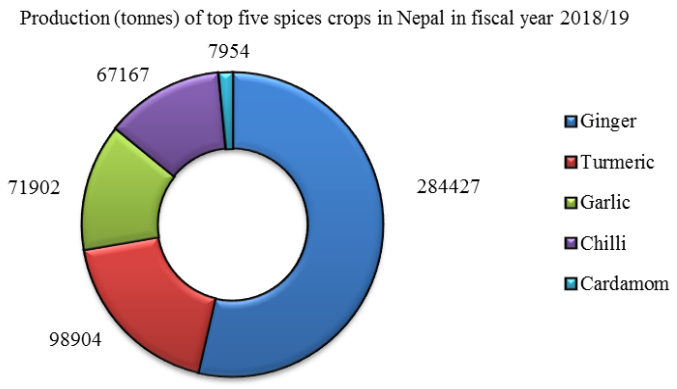

Figure 3. *Top 5 spices crops grown in Nepal in fiscal year 2018/19 (Source: AITC, 2020).*

284,427,000 kg which is by far greater than other spice crops such as turmeric, garlic, chili, and cardamom, grown in the same year. Similarly, when compared to other spice crops, the overall area used in ginger growing has been discovered to be bigger. This demonstrated the value of ginger to Nepalese farmers in terms of improving their living standards as well as the country's economy.

Top ginger producing districts of Nepal

Nature has glorified Nepal with an ideal climate for growing ginger scattered from east to west of mid-hill regions of the country up to 1,600 meters above sea level (Mahat *et al.*, 2019).

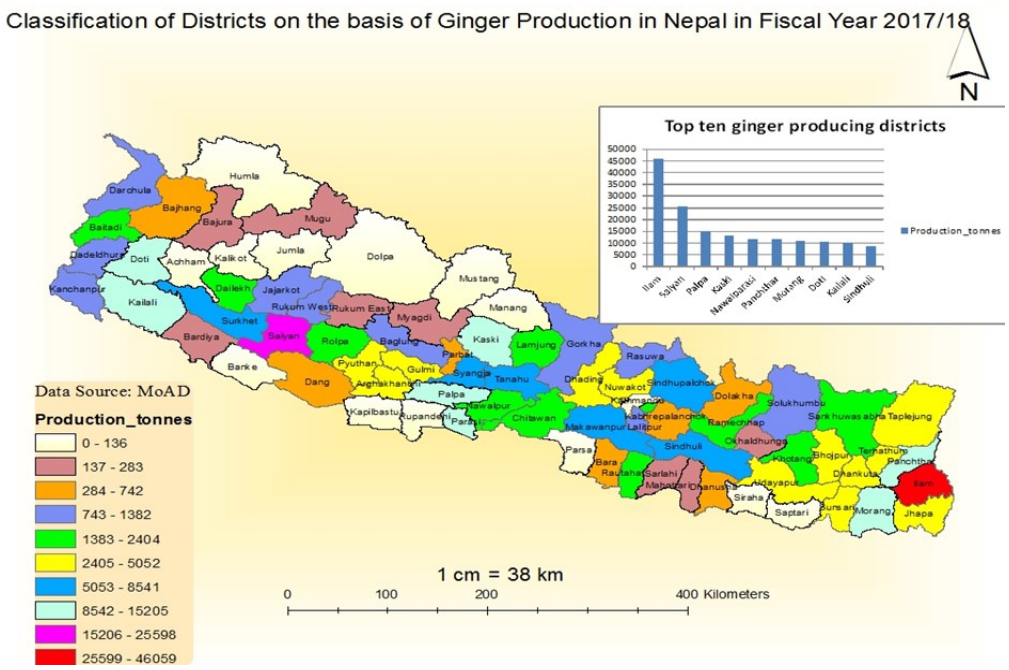

Figure 4. *Map showings districts of Nepal based on their ginger production in Fiscal year 2017/18 (Source: MoAD, 2018).*

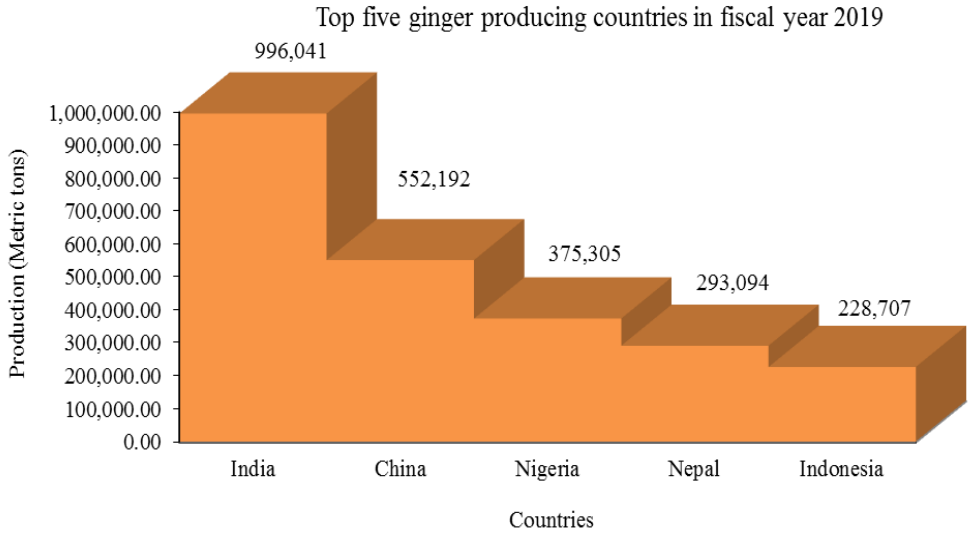

Figure 5. *Top five ginger producing countries in 2019 (Source: FAO, as cited in NationMaster, 2020).*

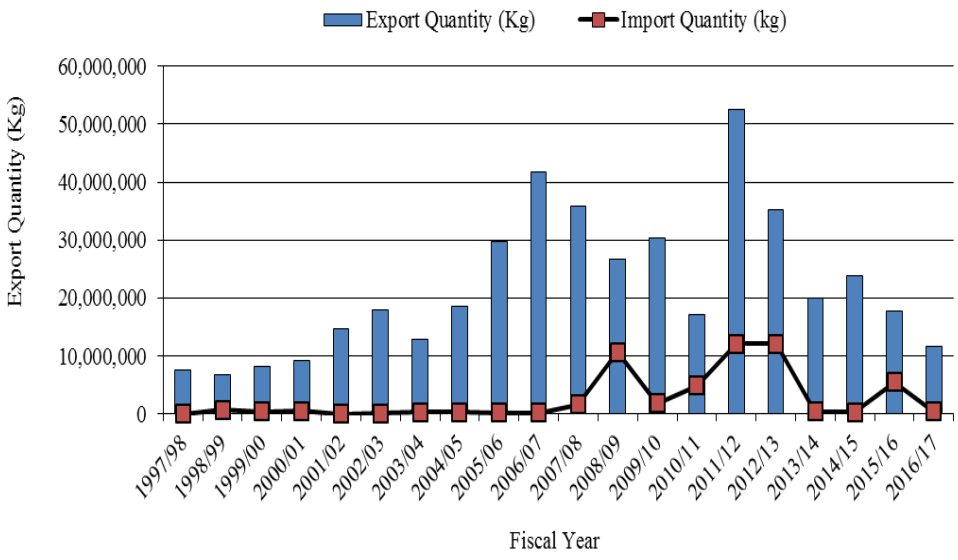

Figure 6. *Export and import quantity of ginger in Nepal during 1998-2017 years (Source: FAOSTAT, 2020).*

Ilam, Salyan, Palpa, Kaski, Parasi, Panchthar, Morang, Doti, Kailali, and Sindhuli are the top ten producers of ginger in Nepal together occupied about 57.6 % of the country's total production as shown in the map (MoAD, 2018). Among 77 districts of Nepal, Ilam is the greatest producer with a total production of 46,059,000 kg. 15 out of 48 VDCs of Ilam produce ginger in huge amounts (Adhikari, 2016). The second-largest ginger-producing district in Nepal is Salyan. Malneta in Dandagaun VDC has historically been perceived as the national production center for high-quality ginger. Salyan district shared 8.95% of total national ginger production and shared 8.83% of total cultivated land area (MoAD, 2018). Palpa, Kaski, Nawalparasi (Susta Pashim), Panchthar, Morang, Doti, Kailali, and Sindhuli are also found to be the greatest contributors to Nepal's ginger production (Figure 4).

Global ginger production

India, China, Nigeria, Nepal, and Indonesia are the top five producers of ginger in 2019 (NationMaster, 2020); as shown in Figure 5. India's ginger production increased by 11.5% in 2019 as compared to the previous year and was ranked number 1 in the production of ginger. Since 2014, ginger production in Nepal rose 1.2% year on year, and in 2019, was ranked number 4 among other countries with the production of 293,094 Metric Tons (NationMaster, 2020). Nepal was found to be overtaken by Nigeria, whose total production was 375,305 Metric Tons. Nepal has been contributing a significant amount to global ginger production for years.

Export and import of ginger in Nepal

The overall trend is varying for the export and import of ginger in Nepal. Export of the ginger from Nepal is relatively high as compared to import it as shown in Figure 6. Ginger is one of the 12 priority export products of the Nepal Trade Integration Strategy (NTIS, 2010); defined by the Government of Nepal. NTIS (2016) has identified priority export potential goods and services based on the two broad criteria: i) export performance and ii) inclusive and sustainable development. Export size, export growth, export potential, potential value addition, and the potential destinations were the sectors for evaluating the export performance. Similarly, regions, environment, employment impact, women involvement, skills, and earnings were for assessing the inclusive sustainable development impact. The overall export performance and inclusive sustainable development impact of Nepalese ginger are shown in Table 2. Until 2020, this national strategy aims to increase the export price for Nepalese ginger via value addition in the country from 217 US$/MT to 815 US$/ MT (IBN, 2019).

Nepal ranked fourth in the world for overall ginger production, but sixteenth in terms of overall export value. This disparity exists due to a lack of competent laboratory testing and a reliance on India (Sharma and Shrestha, 2018). Since the past 20 years, export quantity has been found increasing for some years, while decreasing for the other. It was found to be highest for the fiscal year 2011/12 with 52,477,000 kg (FAOSTAT, 2020). Figure 7 showed that the export value was also found highest for the same fiscal year *i.e.*, 10,757,000 US$ (FAOSTAT, 2020). Similarly, import value was lowest for the fiscal year 1997/1998 and highest for the fiscal year 2008/2009 (FAOSTAT, 2020).

Top exporters and importers of ginger around the world

China, Netherlands, Thailand, Peru, and India are the top five exporters of ginger in the world which together occupy about 85% of total ginger exports as shown in Figure 8. China's export of ginger has decreased by 2.8% year on year. But still, China was ranked the first (No. 1) comparing other countries in the export of ginger with the value of $476,065,914.9 in 2019. China has been aggressively entering into the ginger market and there is a risk of displacement of Nepalese ginger from the Indian market by an oversupply of better quality cool-season products from Tibet of China (GIZ, 2017). Netherlands, Thailand, and Peru respectively ranked Nos. 2, 3, and 4 in this ranking (NationMaster, 2020) Since 2014, the export of ginger in Nepal rose 1% year on year. In 2019, the country was ranked No. 16 among other countries in the export of Ginger with an export value of $4,019,828.72 (FAOSTAT; NationMaster, 2020). Nepal was found to be overtaken by Italy, which was ranked No. 15 at $4,292,261.56 export value and was followed by France with the export value of $3,796,429.3 (UNSD, 2020 as cited in NationMaster, 2020). These data revealed that there are enormous opportunities for Nepalese ginger growers to enhance their export amount as well as value. For doing so, the Government of Nepal should work on establishing proper laboratory testing and certification within the country to ensure ginger's freshness as well as quality.

Table 2. Export performance and inclusive sustainable development impact.

Sectors	Ginger
Export size	Low
Export growth	Medium
Export potential	High
Potential Value Addition	High
Potential Destination	Medium
Regions	High
Environment	High
Employment impact	High
Women involvement	Medium
Skills + earning	Low

Source: (NTIS, 2016).

United States, Japan, Netherlands, Pakistan and Bangladesh are the top five importers of ginger around the world with the value of $128,164,452.33, $100,758,986.17, $83,854,092.93, $81,509,225.36, and $71,324,637.58 respectively in 2019 (UNSD, 2020 as cited in NationMaster, 2020). The amount of ginger imported by individual countries was found to differ with the types of ginger and its quality. With a $1,008,661.6 value in 2019, Nepal was ranked 59th comparing other countries in the import of ginger. Nepal was found to be overtaken by the Philippines, which was number 58 at $1,169,230 and is followed by Mexico with $1,002,967 (NationMaster, 2020).

Ginger market

Nepal is the fourth-largest producer of ginger in the world with 9.2 % of the global share in 2019 (FAOSTAT, 2020). India and China have 35.2% and 18.3 %, respectively. The amount of ginger production in Nepal has risen by 9.5% in the past five years (FAOSTAT, 2020). The world export market of ginger is growing by 27.14% by value and 5.18% by volume annually (NEAT, 2011). Still, the share of ginger in the total agricultural exports of Nepal is only about 3 to 4 % (IBN, 2019). The export price for Nepali ginger is US$ 217/MT which is 20 % of China's price and 60 % of India's price. NTIS 2016 forecasts to increase the price of Nepalese exports to 75 % of the Chinese export price (IBN, 2019). India is the major export destination for Nepalese ginger (Arun, 2019) and accounts for close to 99% of the export quantity going there followed by Bangladesh (Department of Customs, 2017, as cited in Sharma and Shrestha, 2018). Nepal enjoyed free entrance to India's market for ginger trade. India and Bangladesh shared 3.0 and 1.7%, respectively of global ginger import. The southern neighbouring country imported close to 94% of Nepal's fresh ginger and 6% of processed ginger. Nearly, 75 % of Nepalese ginger is traded in fresh form and the remaining 25% in processed form, mainly as Sutho (ginger dried in a traditional method) and powdered ginger. Different forms of ginger like fresh ginger, dried ginger, powder, etc. are found to be exported from Nepal (GIZ, 2017). However, the export of ginger to India faced a significant collapse, largely due to spasmodic export bans by India (Sharma and Shrestha, 2018).

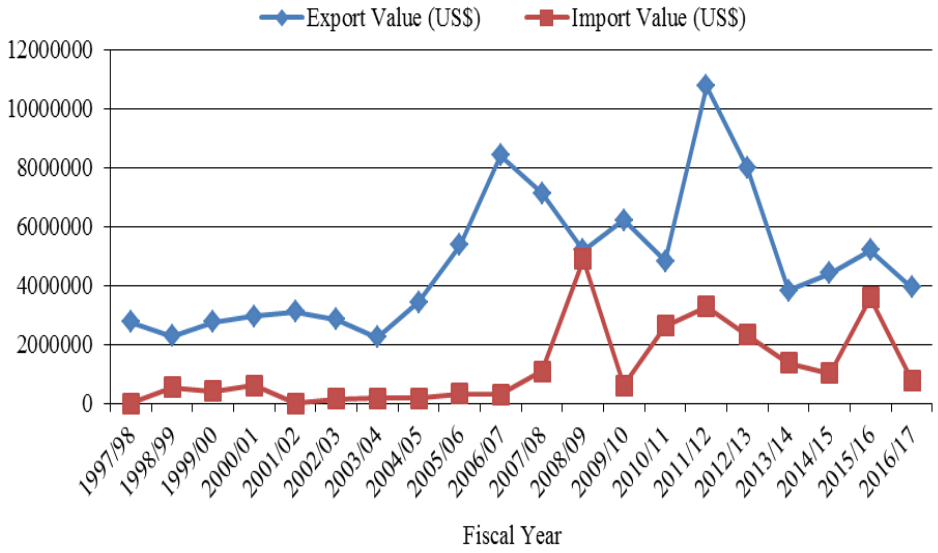

Figure 7. *Export and import value of Ginger in Nepal during 1998-2017 years (Source: FAOSTAT, 2020).*

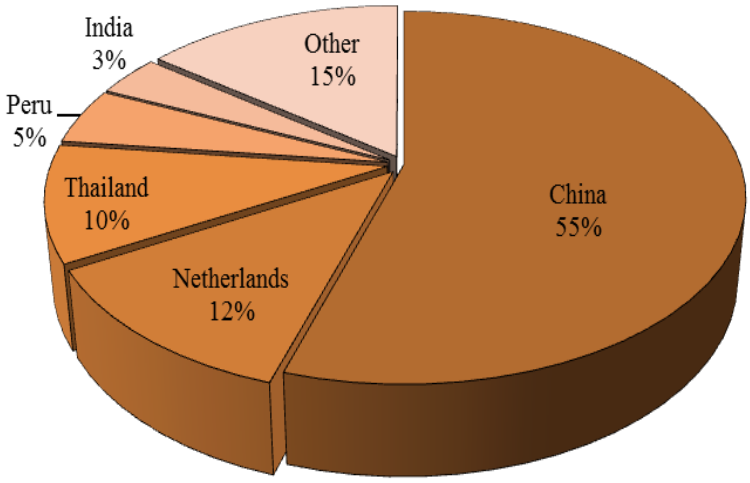

Figure 8. *Top five exporters of ginger in the world in fiscal year 2019 (Source: UNSD, 2020 as cited in NationMaster, 2020).*

Nepal lacked an internationally authorized testing laboratory because of which ginger shipments are needed to undergo strict testing at the Central Food Laboratory (CFL) in Kolkata, India, which took a longer time—up to 75 days, destroying the product freshness (ITC, 2017). There is a significant demand for Nepalese ginger in Europe also, but entering and performing in the market is very difficult. Tests performed by the Nepal Bureau of Standards and Metrology (NBSM) and the Department of Food Technology and Quality Control (DFTQC) are not accepted by India (Arun *et al*., 2019). Utilizing labour-intensive and tedious traditional techniques, farmers continue to make dried ginger (IBN, 2019). In addition, the lack of sophisticated ginger peelers, washing facilities, and mechanical dryers continues to create major post-harvest and export problems. Establishing modern processing industries could result in the massive production of ginger for export to international markets (IBN, 2019).

Nepal has immense opportunities in enhancing the ginger industry with favourable market access conditions in most of the export destinations, especially in duty-free access in a destination. To improve the trade-related environment and to strengthen the export potential of the ginger value chain, the Ministry of Commerce with the support of the program should ensure effective implementation of the Nepal Trade Integration Strategy (NTIS). Moreover, assistance should be provided to the sector association Nepal Ginger Producers and Traders Association (NGPTA), with regards to product diversification, international market access, capacity building, and policy advocacy (GIZ, 2017). The potential ginger exporting companies are also provided with international market exposure through trade fair participation and Business to Business meetings (IBN, 2019).

SWOT analysis of the ginger sector

The contribution of the Nepalese ginger to the global ginger production, suitable climate, rate of growth in its production, its export potential, the interest on the part of the Nepalese ginger farmers, and the identification of ginger as a priority product for development by Nepal Trade Integration Strategy (NTIS) — all point to its potential, emerging as an important enterprise. Its development would contribute to creating employment and raising income and standard of living of rural dwellers. Therefore, it is necessary to identify and analyse the strengths, weaknesses, challenges, and opportunities of the ginger sector, so that the necessary steps required for its development are taken out on time. The following section deals with the strength, weaknesses, opportunities, and threats of the ginger sector in Nepal.

Strengths

- Significant source of income and employment for small farmers.
  Fourth largest producer of ginger in the world.
- Low price level compared to other countries.
- Strong pungency, aroma, and good chemical properties for further processing.

Weaknesses

- Poor washing, poor storage, and poor packaging.
- Very few processing facilities in Nepal .
- Lack of internationally accredited laboratories with sufficient test parameters for quality grading.
- Little cooperation in the value chain dominated by middlemen.

Opportunities

- Government has identified as one of the priority products .
- Increasing demand from India, Bangladesh, and Pakistan.
- Due to richness in oil and oleoresin, high potential for value addition.
- Rising demand for Ayurveda medicines and other uses

Threats

- Incidence and control of disease- pest (Rhizome rot, rhizome fly) discouraging farmers to invest.
- High price fluctuation.
- Cheap and quality ginger being produced in China.

Conclusion

Among the top spices crops of Nepal, ginger had already established itself as one of the most valued crops in terms of economy. Ginger cultivation is the major contributing sub-sector in uplifting the livelihood and living standards of poor Nepalese farmers. Due to its high volume and value in a unit area compared to competitive crops like maize, it has a bigger impact on smallholder farmers. The area under cultivation for ginger is also growing over time. As a result, overall production and export value will rise. It is, nevertheless, still unsatisfying. A small percentage of farmers in rural areas of the country are still uninformed about contemporary and scientific farming techniques. Most ginger growers in Nepal have been cursed by the lack of processing facilities. Nepal lacks an internationally authorized testing laboratory because of which ginger shipments are needed to undergo strict testing at the Central Food Laboratory (CFL) in Kolkata, India, which takes a longer time—up to 75 days, degrading the product freshness. Training and extension services by the government on ginger cultivation should be enhanced. Policies and programs to attract youth towards ginger farming should be formulated and implemented. The ginger sub-sector needs to be technologized by initiating advanced modern technology, tools, and equipment which will help to foster the overall ginger production and attract more farmers in this sector. Also, government intervention is quite needed for price fixation. Farmers should be provided with the overall knowledge regarding the management of diseases and pests of ginger. At last, every farmer should be made aware of the high value that ginger possesses and should also be encouraged by the government. Thus, the government should focus on improving the status of the domestic ginger estate to enhance their production per unit of land. There is a need for adequate,

efficient, and effective extension services to the ginger growers regarding inputs, cultivation practices, inputs, diseases, pests, and postharvest management. Policies to attract youth towards ginger farming and price fixation by the government should be formulated and implemented. The ginger sub-sector needs to be technologized by initiating advanced modern technology, tools, and equipment that can foster the overall ginger production and attract more farmers in this sub-sector.

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