Royal Government of Bhutan
Ministry of Agriculture and Forests

SELF-SUFFICIENCY AND DIETARY ENERGY SUPPLY OF FOOD CROPS IN BHUTAN

(A STATUS REPORT)

OCTOBER 2021

Agriculture Research and Extension Division
Department of Agriculture

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ROYAL GOVERNMENT OF BHUTAN

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FOREWORD

Food Self-sufficiency refers to a country's capacity to meet its own food requirement from domestic production. One of the mandates and objectives of the Department of Agriculture is to boost agriculture production for self-sufficiency, nutritional security and income generation. Bhutan still remains dependent on food imports from India and other countries to feed its population which is projected to continue to increase. The agriculture sector employs 49.7% of population but contributes a disproportionately lower 15.8% to the country's GDP. This report analyzes the status of the country's domestic food production and its ability to meet its demand internally. It is also important to understand the dietary energy supply from agriculture commodities and assess where the nutritional composition and their supply status stand currently, so as to help provide better perspective on resource allocation, prioritization and focus on commodity development programs. We need to constantly emphasize and remind ourselves of the significance of policies that are designed to boost production as well as interventions to maximize food self-sufficiency, and thereby mitigate risks associated with excessive reliance on external food imports.

The Department of Agriculture is pleased to present a status report on Self-Sufficiency and Dietary Energy Supply of Food Crops in Bhutan. The status report provides an overview of Food Self-Sufficiency Ratio (SSR), Import Dependency Ratio (IDR) and the available Dietary Energy Supply (DES) of agriculture crops. The assessment was carried out for 51 selected crops amongst seven commodities (cereals, oilseed, pulses, vegetables, fruits & nuts, roots & tubers, and spices) that contribute substantially to Bhutanese diet as well as comprise prominent income generating crops. The report is based on analyses of production, import and export data for the crops for the past 14 years (2006-2019) and also includes assessments on food trade balance of the major crops for the same period.

We would like to congratulate the team for putting together this important status report and for all their concerted efforts in seeing this crucial task through. Further, we would like to extend our sincere thanks to Food Security and Agriculture Productivity Project (FSAPP) for their financial support in the publication of this report. We hope and expect that this report will serve as formal and ready reference on SSR, IDR and DES of agriculture crops for all readers.

Tashi Delek!

Wangda Dukpa
Offtg. Director

EXECUTIVE SUMMARY

Food availability and food self-sufficiency are important determinants of food security. They are essential indicators of a nation's ability to meet its food demand from domestic production as well as its economic preparedness to respond to extreme food price volatilities. The Covid-19 pandemic in particular have exposed our vulnerability in responding to food production and supply, thereby underpinning the essential role of the agriculture sector. Self-sufficiency ratio (SSR), national level dietary energy supply (DES), import dependency ratio (IDR) and food trade are some of the key parameters widely used for proper practical understanding of food self-sufficiency concepts, which in turn provide analytical perspective that not only present a snapshot of the domestic food availability but also help table options and basis for policy decisions regarding food and food production.

Food SSR, IDR, and available DES have not been formally documented to date, and the Department of Agriculture (DoA) carried out an assessment of these parameters to provide a ready reference source on the country's food production and domestic availability whilst offering some insights into opportunities, and thereby, help effect evidence-based decision and planning. The exercise included 6 cereals, 1 oilseed, 4 pulses, 18 vegetables, 17 fruits & nuts, 2 roots & tubers, and 3 spices crops whose production, import and export figures from 2006 – 2019 were analyzed. While SSR and IDR were simply functions of domestic production, export and import, expressed in percentage, the per capita commodity available for consumption (kg/person/year) is computed by dividing the net available figure for consumption by the total eligible population. Net available figure for consumption is the amount after adjusting for post-harvest losses, and quantities retained for seed and processing for other purposes including brewing. Available DES in per capita calorie per day (calories/person/day) for respective commodities were then calculated using standard conversion factors for calorie supply from 100 grams of each commodity. The National Statistics Bureau (NSB)'s population projection data for the period 2006 – 2019 is used to obtain the total "eligible population".

Over the period of 14 years (2006-2019), the average SSR for cereals including rice, maize, wheat, buckwheat, millet and barley is estimated at 77.30% and the corresponding IDR at 26.55%, and the per capita available for consumption stands at 215.66 kg/year. There has been a steady decline in the rice SSR over the years with an average SSR of 47.08%. While other cereals like wheat and maize also show a decline in SSRs, we are self-sufficient in buckwheat, millet and barley with an average SSRs of ≥ 94.44%. Bhutan is highly import-dependent in vegetable oils with an average SSR of only 28.86%, and the per capita available for consumption averaged at 2.19 kg per year. Potato is a major cash crop and

evidently its SSR for the period averaged at 153.76% with an increasing trend and an average trade surplus of Nu 311.23 million a year. Amongst pulses, kidney beans have the highest average SSR at 103.84% while lentil recorded the lowest at 3.7%.

In terms of vegetables, the average SSR for 18 major vegetables stands at 84%. The average per capita available for consumption is estimated at 73.5 kg/year which is one of the highest in South Asia, and supplies a total of 53.5 kcal energy, 2.7 g protein and 0.4 g fat in terms of dietary composition. The SSRs of "priority vegetable crops" like chilli, bulb onion and tomato are computed at 84%, 18% and 22%, respectively. Bulb onions and tomatoes are largely imported to meet the internal demand. With an average value of Nu 7.79 million, carrot has the highest value of trade surplus recorded. Conversely, chilli recorded the highest negative trade volume amongst the listed vegetables with an average deficit of Nu 53.57 million. Major export in spices like cardamom and ginger helped reel in trade surplus with averages of Nu 610.18 million and Nu 41.9 million, respectively over the 14-year period. Ginger has maintained a steady run in export volume while cardamom has seen exponential increase except for 2018 when it took a dip.

Twenty-five different fruit crops are cultivated in the country with an overall production of 177,640 MT. This exercise covered 17 whose overall SSR stands at 115% with an IDR of around 10%. Apple production has decreased over the years, and consequently its SSR has slumped from 357% in 2006 to 276% in 2019. Mandarin returned the highest trade balance with an average estimated balance of Nu 387.29 million, and its current SSR at 220% is an increase over its 2006 figure of 142%. Nonetheless, other fruits like banana, pineapple, papaya, mango, pear, guava and cucumber are on the deficit side.

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1 Background

Although Bhutan has seen major economic progress since the introduction of planned development process in 1961, agriculture sector still remains the major source of livelihood with its share at 49.7% of the employed population (NSB, 2020a). The sector's GDP contribution, inclusive of livestock and forestry stood at 15.82% in 2019. Although the share of GDP contribution has seen a decrease by 7.18% between 2005 - 2019, the gross output or the gross value added (GVA) figures for the crops sector has seen an increase from Nu 5,043.49 million to Nu 15,918.43 million in the same period (NSB, 2020b). With its mandate to increase food production in order to ensure household food security, alleviate poverty, substitute imports, generate marketable surplus and enhance income and generate employment opportunities, the agriculture sector still underpins Bhutan's economy.

Over the last half-century, world population has doubled and food supply tripled to keep up with the burgeoning population. By 2050, 10 billion people will live on the planet and demand for food, feed, fiber and bio-fuels could double from its 2005 levels (Beltran-Peña et al., 2020; Porkka et al., 2013). With an additional two billion mouths to feed, the coming decades pose major challenges in achieving global food security as land and water resources deplete rapidly and effects of climate change become more pronounced (Hertel, 2015). Taking cue from the achievements of the 11th FYP as well as modeling on the fast-evolving climate and economic scenarios, the Department of Agriculture's 12th FYP priorities involve pursuing enterprise development and commercialization as an integral approach to agriculture diversification while building resilience to climate impacts. Increasing domestic production to improve food self-sufficiency, therefore, continues to play a principal role in posturing national aspiration for economic self-reliance, climate resilience and sustainable development.

Food availability and food self-sufficiency are important determinants of food security. They are essential indicators of a nation's ability to meet its food demand from domestic production as well as its economic preparedness to respond to extreme food price volatilities like the one experienced during the 2007-08 world food crisis. The Covid-19 pandemic in particular have exposed our vulnerability whilst responding to food production and supply, thereby underpinning the important role of the agriculture sector for economic self-reliance. It is therefore important to assess the food availability status and certain aspects of food security in the country. Self-sufficiency ratio (SSR), national level dietary energy supply (DES), import dependency ratio (IDR) and food trade are some of the key parameters widely used for proper practical understanding of food self-sufficiency concepts. They provide analytical perspective that not only present a snapshot of the domestic food availability but also help table options and basis for policy decisions regarding food and food production.

Food self-sufficiency has different interpretation for different countries as policy choices, national priorities and economic outputs are unique to each country. While food self-sufficiency illustrates the share of domestic food production in relation to a country's required food supply, it is not an indication of a nation's food security status. Food self-sufficiency does not necessarily ensure food security and the FAO advises due judgement and care in approaching SSR concepts to reflect the overall food situation of a country (Clapp, 2017). Food self-sufficient countries may actively import or export food, and there can be instances where a country produces one food commodity extensively while depending on imports for others.

Although governments have for long followed food self-sufficiency as an important national policy objective, its place in mainstream economics is widely debated. Food self-sufficiency goals have been decried as inefficient and market distorting with a section of economists even labelling it as a threat to the long-term goal of food security (Clapp, 2017; Naylor & Falcon, 2010). This is because self-sufficiency as a national policy run the risks of disrupting domestic food supplies, discourage export-oriented production, and exert pressures on already constrained land and water resources. Yet, such policies not only contribute to increasing domestic food production but also insulate countries from supply disruption in times of economic slowdown or political crises, and thereby to a major extent, help enhance a country's food system resilience.

2 Objectives

This assessment neither provides a discourse on the conceptual precepts of food self-sufficiency nor debates the policy relevance of food trade balance vis-à-vis a nation's political or sovereign rights. Food SSR, IDR, and available DES have not been formally documented to date. The report, therefore, attempts to provide a ready reference source on our food production and domestic availability status by drawing possible relationship amongst production, import, and domestic availability of important agriculture commodities as well as shed light on our food trade network with neighboring countries. In doing so, the report reflects the status of agriculture development while offering insights into opportunities and potential thereof, and aid in evidence-based planning. The primary objectives of this report are to:

1. Provide an overview of the concept of food self-sufficiency, import dependency ratio, dietary energy supply
2. Look at trends in domestic production of selected agriculture commodities.
3. Compute the self-sufficiency ratio (SSR) and evaluate SSR trends for selected agriculture commodities.
4. Determine import dependency ratio (IDR) and look at the IDR trends for selected agriculture commodities.

5. Analyze the per caput national dietary energy supply (DES) in calories/person/day as well as dietary nutrient supply from selected agriculture commodities.
6. Assess the value of agriculture trade and review food trade balance over the years.

For this report, DES, SSR, IDR, and food trade balance are computed for a selected commodity from agriculture sector that contribute substantially to Bhutanese diet as well as prominent income generating horticultural crops. It is important to have a snapshot of the foods we depend upon for our dietary energy and nutritional requirements and assess how the requirements are being met. Calorie supply from different commodities help provide better perspective on resource allocation, prioritization and focus on commodity development programs.

3 Methodology

a. Commodity Coverage

Descriptive statistical analyses were carried out to determine the SSR, IDR, DES and Food Trade Balance (FTB) for priority agriculture crops. FAO (2001) recommends, in principle, inclusion of all potential edible commodities in such exercises regardless of their uses. However, an exhaustive list would certainly present major conceptual and statistical challenges. Hence, FAO advises countries to adjust commodities accordingly. Therefore, for practical purpose, this exercise has adopted a workable and realistic list of commodities, primarily based on their roles in the country's food self-sufficiency, nutrition security, income and employment generation and food trade.

The selected commodities include 6 cereals, 1 oilseed, 4 pulses, 18 vegetables, 2 roots and tubers, 3 spices, and 17 fruits crops as listed hereunder.

Table 1. Selected Agriculture commodities

I	Cereals & Oilseeds	V	Vegetables	VI	Fruits & Nuts
1	Rice	1	Bulb onion	1	Apple
2	Wheat	2	Chilli	2	Areca nut
3	Buckwheat	3	Cabbage	3	Banana
4	Millet	4	Cauliflower	4	Guava
5	Maize	5	Broccoli	5	Jackfruit
6	Barley	6	Beans	6	Litchi
7	Mustard	7	Tomato	7	Mandarin orange
II	**Pulses**	8	Green leaves	8	Mango
1	Lentil	9	Peas	9	Papaya
2	Mung bean	10	Brinjal	10	Passion fruit
3	Kidney bean	11	Asparagus	11	Peach
4	Soya bean	12	Carrot	12	Pear

III	**Roots & tubers**	13	Turnip	13	Persimmon
1	Potato	14	Radish	14	Pineapple
2	Tapioca	15	Pumpkin, squash & gourd	15	Plum
VI	**Spices**	16	Mushroom	16	Pomegranate
1	Cardamom	17	Lady finger	17	Walnut
2	Garlic	18	Cucumber		
3	Ginger				

b. Data

The exercise used crop production and harvest data spanning the years 2006 to 2019 from RNR Census, Agriculture Statistics and RNR Statistics (DoA, 2009, 2010, 2012, 2013, 2014, 2015, 2016, 2017; RSD, 2018, 2019, 2020); (see respective commodities for details). Import and export data for the period were sourced from Bhutan Trade Statistics (BTS) (DRC, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020), Bhutan Agriculture and Food Regulatory Authority (BAFRA), and the Food Corporation of Bhutan Limited (FCBL).

For areca nut, imports from only India were covered in the study since those from countries like Indonesia, Malaysia and Singapore were too huge to be credible and could not be verified at the same time.

c. Analysis

Measures of food availability and domestic production status covered by this exercise - SSR, IDR and DES – were computed adopting standardized procedures from the Food and Agriculture Organization (FAO)'s Food Balance Sheet Handbook (FAO, 2001) while Food Trade Balance is the net value of export and import of these listed crops. The FAO handbook is regularly referred to as a formal basis for similar exercises widely accepted and reported from elsewhere.

3.1 Self-sufficiency Ratio (SSR)

This exercise adopts the FAO definition for SSR (FAO, 2001; Ingot et al., 2019) which expresses it as the magnitude of production in relation to domestic utilization, and is defined as:

$$SSR = \frac{Production}{Production + Imports - Exports}\ x\ 100$$

It is the extent to which a country can supply its food needs from its own domestic production (FAO, 1999). Although SSR can be worked out for groups of commodities with similar nutritional values with appropriate conversion factors applied to the aggregate, this study computed SSR for individual crops and considered the following:

i) Data on domestic production for the listed crops were prepared from available sources for the years 2006 to 2019.
ii) Import figures were sourced for the listed crops for the same reference period.
iii) Imports also includes flour in case of cereals from which their corresponding quantities in grain equivalent were computed using respective milling recovery rates. This is then added to grain import figures to derive the total imports.
iv) For rice, semi-milled categories were considered under milled rice imports. Broken rice imports are excluded as they are assumed to be used in breweries. Likewise, paddy imports ("rice in husks") are accordingly converted to milled rice equivalent by applying a milling recovery factor of 65%.
v) Imports of apple, mandarin orange, mango, and pineapple in juice forms were not considered for lack of credible method to convert juice into quantity of fruits. Similar approach was taken for processed forms of cereals like cornflakes, rice flakes, etc., and domestic fruit production used in processing due to the absence of reliable conversion factors.
vi) Additionally, productivity (kg/acre) or (kg/tree) for selected crops were computed taking the production over area cultivated, or production over number of bearing trees for fruits.

3.2 Import Dependency Ratio (IDR)

The IDR helps classify the available domestic food supply into proportions that are imported and those that come from the country's own production. It represents a nation's food situation by indicating its ability to meet its domestic consumption from domestic supply. IDR is expressed as:

$$IDR = \frac{Imports}{Production + Imports - Exports} \; x \; 100$$

Accordingly, IDR for listed commodities were computed with similar considerations as listed under SSR section.

3.3 Dietary Energy Supply (DES)

Dietary Energy Supply (DES) is used as a measure of food availability. It is the per capita or *per caput* food supply available for human consumption during the reference period (FAO, 2001; Porkka et al., 2013). This is derived from the total supplies available for the human population available for the reference period – often referred to as the in-area or *de facto* population within geographical boundaries of the country.

In terms of quantity, it is expressed in kilograms or grams per person per day (kg or g/person/day), whereas the energy value is given in per capita calorie per day (calories/person/day).

3.3.1 Assumptions for DES estimation

The DES estimation in this study considered the following:

i) The total annual production of listed crops in the country from 2006 to 2019 were used.
ii) For some crops (pulses, for instance) where data for certain years were entirely unavailable, a 3-year average back-cast was done to populate the missing figures.
iii) Key assumptions including rates for milling recovery, post-harvest losses, seed use, and other parameters along respective commodity value chain were factored in as described in Table 1**.**

3.3.2 Procedures for estimating DES

i) Annual domestic production data for listed crops were sourced and compiled for the years 2006 to 2019.
ii) Annual export and import figures were sourced for the listed crops for the same reference/study period. Additional imports include flour, groats, starch for maize and wheat, and edible oil in case of mustard.
iii) Total quantity available for supply is computed by adding the domestic production and imports and subtracting exports.
iv) Post-harvest loss and seed retention are accounted for by deducting appropriately from domestic production (see Table 2).
v) Allocations for industrial use such as brewing for instances are accordingly made by deducting the appropriate proportions (see Table 2) from the total available supply. The resulting figure is the net available for consumption.
vi) The per capita commodity available for consumption in kg/person/year is then computed by dividing the net available figure for consumption by the total eligible population.
vii) The total "eligible population" is derived from the population figures of the National Statistics Bureau (NSB)'s population projection data for the period 2006 – 2019 (NSB, 2006, 2019). The projection is inclusive of the tourist, migrant laborer from India and expatriate population in the country. The eligible population in this exercise for all the years include only 50% of the projected population for the age group 0-4 year since this age group is assumed to consume only half of the adult consumption of the listed food commodities.

viii) Accordingly, the above figure is then converted to per capita gram per day.

ix) Finally, the Dietary Energy Supply (DES) in kcal/per person/day or the per caput dietary energy supply from the listed commodities is estimated by applying the standard calorie content conversion factor recommended for each item (see Tables 3, 4, 5). The standard conversion factor for calorie supply from 100 grams (kcal/100 grams) of each crop is based on the FAO Food Balance Sheet Handbook. For those commodities not covered in the handbook, the study used the standards prescribed by the United States Department of Agriculture (USDA).

3.4 Food Trade Balance

Balance of trade is the difference between the total value of the country's export and the total value of the country's import.

Balance of Trade= Total Country's Export – Total Country's Import

Table 2. Key assumptions and available parameters factored in DES estimation

Sl	Commodities	Parameter	Factor	Source
1	Rice	Milling recovery	65%	Dhankar (2014)
2	Wheat	Extraction rate	95%	Finnie and Atwell (2016)
		Postharvest loss	2%	Baloch (1999)
		Seeds rates (kg/ac)	40	NSC (2019)
		Brewing	20%	
3	Buckwheat	Milling recovery	85%	Pomeranz and Lorenz (1983)
		Seed rate (kg/ac)	21	NCOA (2020)
4	Maize	Postharvest loss	20%	UN-Bhutan (2016)
		Seed rate (kg/ac)	15-20	Katwal et al. (2007)
		Brewing	7%	DAMC (2019)
		Grits recovery	45%	Baik et al. (2011)
5	Barley	Extraction rate	90%	
		Seed rate (kg/ac)	40	NSC (2019)
		Brewing	55%	
6	Mustard	Portion for oil extraction	90%	
		Postharvest loss & seed rate (kg/ac)	5	NSC (2019)
7	Lentils	Milling recovery	75%	Sing and Zimik (2020)
		Postharvest loss	3%	Lal and Verma (2007)
		Seeds (kg/ac)	14	DoA WB (2019)
8	Mung bean	Postharvest loss	3%	Statista (2021)
		Seeds (kg/ac)	9	Statista (2021)
9	Kidney beans	Postharvest loss	3%	Statista (2021)
		Seeds (kg/ac)	30	NSC (2019)

10	Soya beans	Seeds	3%	NSC (2019)
11	Potato	Postharvest loss	13%	FAO (2001)
		Seeds (kg/ac)	1	NSC (2019)
12	Tapioca	Postharvest loss	15%	FAO (2001)
13	Bulb Onion	Postharvest loss	15%	Raj et al. (2016)
14	Chili	Postharvest loss	8%	NPHC (2020)
15	Cabbage	Postharvest loss	11%	NPHC (2019)
16	Cauliflower	Postharvest loss	15%	Acedo Jr. and Easdown (2015)
17	Broccoli	Postharvest loss	15%	Acedo Jr. and Easdown (2015)
18	Beans	Postharvest loss	20%	Acedo Jr. and Easdown (2015)
19	Tomato	Postharvest loss	22%	Acedo Jr. and Easdown (2015)
20	Green leaves	Postharvest loss	18%	Raj et al. (2016)
21	Peas	Postharvest loss	30%	Acedo Jr. and Easdown (2015)
22	Brinjal	Postharvest loss	10%	Raj et al. (2016)
23	Asparagus	Postharvest loss	31%	Raj et al. (2016)
24	Carrot	Postharvest loss	12%	Raj et al. (2016)
25	Turnip	Postharvest loss	15%	Raj et al. (2016)
26	Radish	Postharvest loss	15%	Raj et al. (2016)
27	Pumpkins, squash & gourds	Postharvest loss	15%	Raj et al. (2016)
28	Mushroom	Postharvest loss	13%	IIHR (2014)
29	Lady finger	Postharvest loss	31%	Raj et al. (2016)
30	Cucumber	Postharvest loss	5%	IIHR (2014)
31	Apple	Postharvest loss	13%	Rinchen et al. (2019)
32	Areca nut	Postharvest loss	18%	IIHR (2014)
33	Banana	Postharvest loss	7%	IIHR (2014)
34	Guava	Postharvest loss	18%	IIHR (2014)
35	Jackfruit	Postharvest loss	7%	IIHR (2014)
36	Litchi	Postharvest loss	6%	IIHR (2014)
37	Mandarin	Postharvest loss	17%	Kitinoja and Kader (2015)
38	Mango	Postharvest loss	13%	IIHR (2014)
39	Papaya	Postharvest loss	7%	IIHR (2014)
40	Passion fruit	Postharvest loss	7%	Paull and Chen (2014)
41	Peach	Postharvest loss	18%	Khan et al. (2008)
42	Pear	Postharvest loss	25%	Gotame et al. (2015)
43	Persimmon	Postharvest loss	5%	Do Su et al. (2017)
44	Pineapple	Postharvest loss	28%	Acedo Jr. and Easdown (2015)
45	Plum	Postharvest loss	18%	Khan et al. (2008)
46	Pomegranate	Postharvest loss	11%	Sudharshan et al. (2013)
47	Walnut	Postharvest loss	3%	Sudharshan et al. (2013)
48	Garlic	Postharvest loss	2%	Raj et al. (2016)
		Seeds (kg/ac)	223	DoA (2019)
40	Ginger	Postharvest loss	7%	IIHR (2014)
		Seeds (kg/ac)	250	DoA (2019)

Table 3. Food composition table - Standard conversion factor as in 100 g retail weight for cereals, pulses, and roots and tubers

Sl	Commodity	Calories (kcal)	Protein (g)	Fat (g)	Source
	Cereals & Oilseeds				
1	Rice	360	6.7	0.7	FAO (2001)
2	Wheat flour	364	10.9	1.1	FAO (2001)
3	Buckwheat flour	330	11	2	FAO (2001)
4	Millet	340	9.7	3.0	FAO (2001)
5	Maize	356	9.5	4.3	FAO (2001)
6	Barley	332	11.0	1.8	FAO (2001)
7	Mustard	469	24.9	28.8	FAO (2001)
	Pulses				
1	Lentil	346	24.2	1.8	FAO (2001)
2	Mung bean	342	23.4	1.8	FAO (2001)
3	Kidney bean	341	22.1	1.7	FAO (2001)
4	Soya bean	335	38	18	FAO (2001)
	Roots & Tubers				
1	Potato	67	1.6	0.1	FAO (2001)
2	Tapioca	109	0.9	0.2	FAO (2001)

Table 4. Food composition table - Standard conversion factor as in 100 g retail weight for fruits and nuts

Sl	Commodity	Calories (kcal)	Protein (g)	Fat (g)	Source
	Fruits & Nuts				
1	Apple	48	0.1	0.3	FAO (2001)
2	Areca nut	342	10.2	5.2	USDA (2020)
3	Banana	60	0.7	0.3	FAO (2001)
4	Guava	68	2.6	1	USDA (2020)
5	Jackfruit	95	1.5	0.3	USDA (2020)
6	Litchi	66	0.8	0.4	USDA (2020)
7	Mandarin orange	53	0.8	0.3	USDA (2020)
8	Mango	45	0.4	0.2	FAO (2001)
9	Papaya	26	0.4	0.1	FAO (2001)
10	Passion fruit	97	0.7	2.2	USDA (2020)
11	Peach	33	0.5	0.1	FAO (2001)
12	Pear	57	0.4	0.1	USDA (2020)
13	Persimmon	82	0.6	0.3	FAO (2001)
14	Pineapple	26	0.2	0.2	FAO (2001)
15	Plum	52	0.7	0.6	FAO (2001)
16	Pomegranate	83	1.7	1.2	USDA (2020)
17	Walnut	289	6.4	27.8	FAO (2001)

Table 5. Food composition table - Standard conversion factor as in 100 g retail weight for vegetables

Sl	Commodity	Calories (kcal)	Protein (g)	Fat (g)	Source
IV	**Vegetables**				
1	Bulb onion	2.98	0.15	0.20	FAO (2001)
2	Chilli	25	1.1	0.3	FAO (2001)
3	Cabbage	19	1.0	0.1	FAO (2001)
4	Cauliflower	9	0.8	0.1	FAO (2001)
5	Broccoli	34	2.82	0.4	USDA (2020)
6	Beans	50	3.0	0.4	USDA (2020)
7	Tomato	17	0.8	0.2	FAO (2001)
8	Green leaves	16	2.1	0.3	FAO (2001)
9	Peas	189	1.45	0.25	FAO (2001)
10	Brinjal	21	0.9	0.1	FAO (2001)
11	Asparagus	12	1.6	0.1	FAO (2001)
12	Carrot	38	0.9	0.2	FAO (2001)
13	Turnip	91	1.6	0.2	FAO (2001)
14	Radish	31	1.6	0.3	FAO (2001)
15	Pumpkin, squash & gourd	19	0.9	0.1	FAO (2001)
16	Mushroom	160	1.25	0.2	FAO (2001)
17	Lady finger	31	1.6	0.3	FAO (2001)
18	Cucumber	13	0.5	0.1	FAO (2001)

4 Results and Discussion

4.1 Cereals

The overall average cereals SSR for the study period is estimated at 77.30% and the corresponding IDR at 26.55% (Table 6). The lowest SSR was observed for wheat at 41.41%. In Bhutan, wheat is not a staple cereal as far as consumption is concerned; it is mostly used for home brewing, as light snacks and for rituals. Barley, a high-altitude cereal, recorded the highest average SSR at 99.23% followed by buckwheat (97.15%) and millets (94.64%). Buckwheat, millets and barley are largely grown in marginal lands under rain-fed conditions and mostly used for home consumption with limited imports.

The major staple cereals are rice and maize, with a distinct preference for rice as food. Rice SSR is low (47.08%) with IDR of 53% (Table 6). The major constraining factors in rice production are limited area and low production due to land fallowing and scarcity of water and labor shortage. On the other hand, maize recorded a high SSR at 84.28%; but it is not preferred as a food item by Bhutanese.

Rice available for per capita consumption is 150 kg/year which is highest amongst the cereals, indicating a marked preference of rice over all other cereals. At the global level,

per capita consumption of rice in 2018 is 78.43 kg/year (FAO, 2021a). This is not unique to Bhutan but it generally applies to all the Asian countries. Although there is adequate production, the average maize available for per capita consumption over the 2006-2019 period is a meager 40.02 kg/year, followed by wheat (16.01 kg/year), buckwheat (5.72 kg/year) and other cereals.

In terms of dietary energy supply, cereals contribute 2117.47 kcal, 45.51 g/day protein and 8.66 g/day fat. Due to the high per capita consumption, rice alone contributes 1481.41 kcal, 27.57 g/day protein and 2.88 g/day of fat which is the highest compared to other cereals. Bangladesh and Vietnam reported 1891 and 1629 kcal from rice (Timmer, 2010).

Table 6. SSR (%), IDR (%), per capita consumption (kg/year) and per capita dietary composition of cereals, 2006-2019

Sl	Commodity	SSR (%)	IDR (%)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
						Calories (kcal)	Protein (g/day)	Fat (g/day)
1	Rice	47.08	53.00	150.20	411.50	1481.41	27.57	2.88
2	Maize	84.28	15.72	40.02	109.64	390.33	10.42	4.71
3	Wheat	41.41	81.51	16.01	43.87	159.69	4.78	0.48
4	Buckwheat	97.15	2.94	5.72	15.66	51.68	1.72	0.31
5	Millets	94.64	5.36	2.74	7.50	25.49	0.73	0.22
6	Barley	99.23	0.77	0.97	2.67	8.87	0.29	0.05
	Cereals	**77.30**	**26.55**	**215.66**	**590.85**	**2117.47**	**45.51**	**8.66**

In 2018, per capita consumption of cereal worldwide was 174.14 kg/year and 186.17 kg/year (Table 7) in South Asia. The per capital consumption of Sri Lanka is 214.99 kg/year which is close to the average figure for Bhutan at 215.66 kg/year. The per capita consumption in Nepal and Bangladesh is higher than Bhutan.

Table 7. Cereal food supply quantity in 2018

Country/region	Food supply quantity (kg/capita/yr)	Food supply (kcal/capita/day)	Protein (g/capita/day)	Fat (g/capita/day)
World	174.14	1307	32.35	6.07
Southern Asia	186.17	1390	33.14	5.78
Sri Lanka	214.99	1443	32.05	3.56
Pakistan	149.96	1238	31.50	7.29
Nepal	241.01	1703	40.45	8.58
Maldives	114.63	982	21.18	4.21
India	178.8	1334	31.96	5.54
Bangladesh	279.14	1899	37.64	4.80

Source: FAO (2021a)

4.1.1 Rice

Evidently, rice is the most important staple food in Bhutanese diet. Analysis of import and export data from 2006-2019 show a steady decline in the rice SSR over the years from 58.49% in 2006 to 34.71% in 2019, with a corresponding rise in IDR percentages from 41.51 to 65.32 (Figure 1, 2 & 3). The average SSR for the last 14 years stood at 47.08%. Rice import, mostly from India, has been growing over the years making Bhutan an increasingly import-dependent nation. According to Ingot et al. (2019), for a nation to be declared self-sufficient, the critical point or minimum value for SSR is 80% and IDR 20%. The SSR value is far below this threshold. The per capita rice available for consumption is 150 kg/year (Annex A.1).

Although limited by data, an analysis of the SSR trend in rice was carried out for the years 2006-2019. It showed a declining trend with a weak R^2 of 0.57 as shown in figure 3. For more realistic trend analysis, data covering a greater number of years will be required. The annual average SSR decrease is 3.7% over the past 14 years. The productivity of rice has increased from 1101 kg/ac in 2006 to 1648 kg/ac in 2019 (Figure 1).

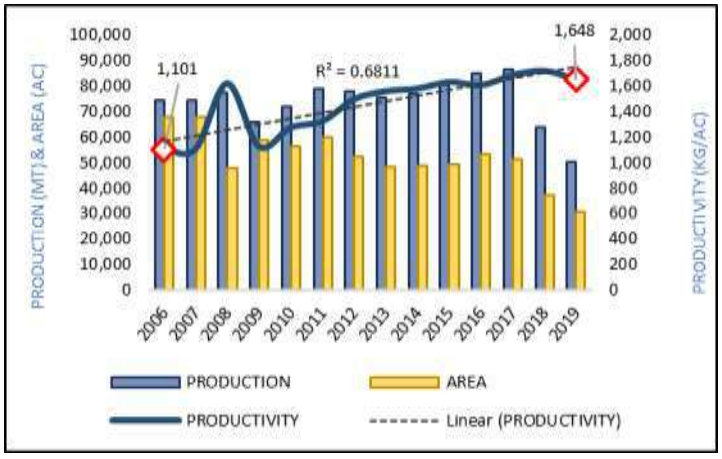

Figure 1. Rice production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

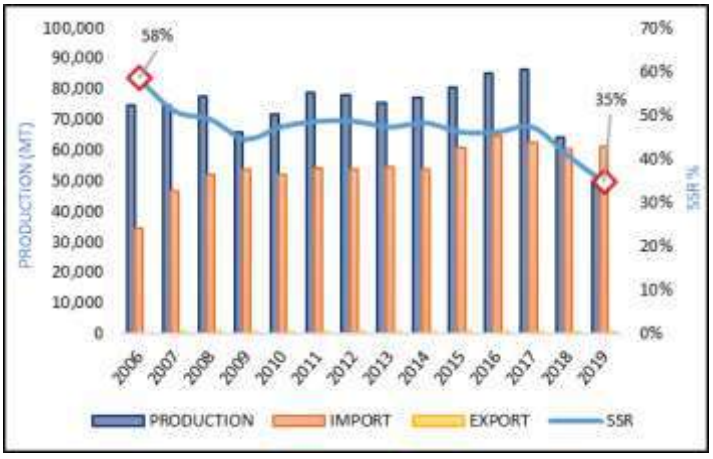

Figure 2. Rice production (MT), import (MT), export (MT) and SSR from 2006 to 2019

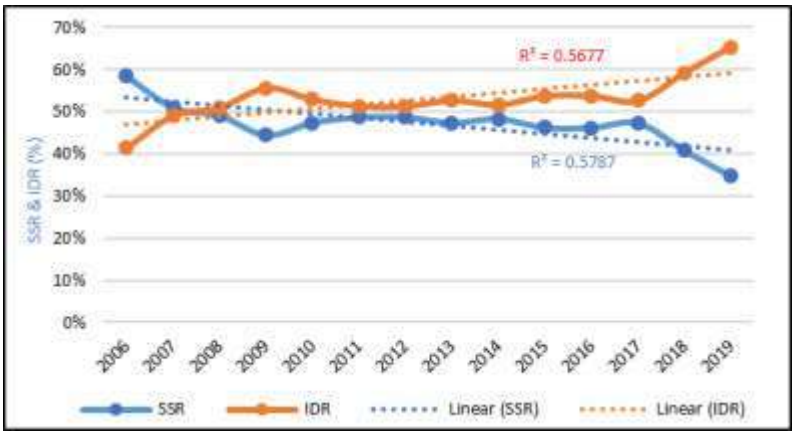

Figure 3. Trends of SSR and IDR of rice from 2006 to 2019

4.1.2 Maize

Maize ranks first among cereals in total production, with the cultivation range extending from less than 300 to over 3000 m.a.s.l. (Katwal et al., 2007). The productivity of maize has increased from 942 kg/ac in 2006 to 1423 kg/ac in 2019 (Figure 4). Like in the case of rice, the SSR for maize also show a steady declining trend from 99.20% in 2006 to 72.27% in 2019, with an average of 84.28% for the past 14 years (Figure 5) (Annex A.2). This can be attributed to the decline in domestic production due to decrease in cultivated area, crop losses to wild animals, declining soil fertility, dry spells, and challenges associated with diseases and weed infestations (Katwal et al., 2007).

The average maize import stood at 14,097.68 MT which is almost entirely for the livestock sector that comprises cattle and poultry feed. The per capita maize available for consumption is 109.64 g/day. The SSR trend is declining over the years and R^2 value of 0.85 (Figure 6). Over the past 14 years, the SSR decreased at an annual average rate of 2.20%.

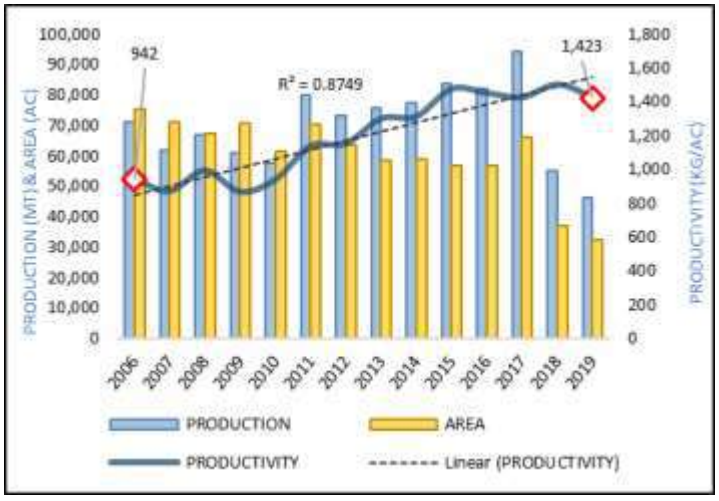

Figure 4. Maize production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

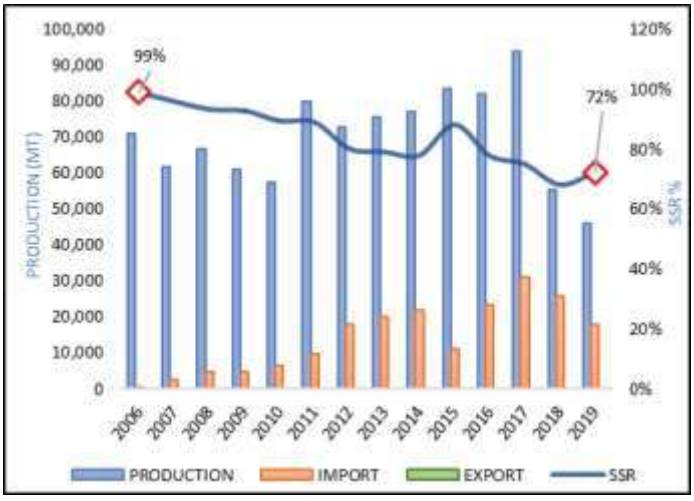

Figure 5. Maize production (MT), import (MT), export (MT) and SSR from 2006 to 2019

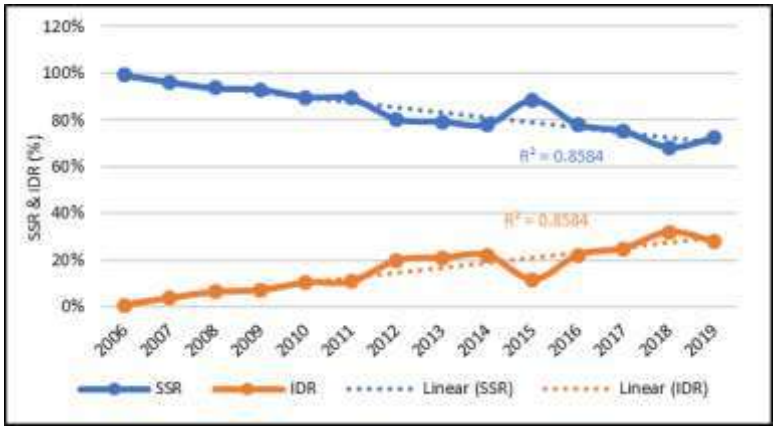

Figure 6. Trends of SSR and IDR of maize from 2006 to 2019

4.1.3 Wheat

Production-wise amongst cereals, wheat ranks third after maize and rice (Bajgai et al., 2019) in the country. It is grown after rice in irrigated or wetland system, and as a spring and winter crop under dry-land system. The domestic production has drastically declined from 9586 MT in 2006 to 1319 MT in 2019 (Figure 7 & 8) with a corresponding decrease in SSR from 104.25% to 10.70%. The decrease in production, according to Bajgai et al. (2019) is driven by a reduction in area rather than a decline in productivity.

The import of wheat increased by 66% from 2006 to 2019, mostly in the form of flour which is used in the expanding bakery and confectionary industry. Wheat is also used both for human consumption and for animal feed. Wheat is consumed traditionally as *kapchi* which is a flour product after roasting and grinding, in addition to its use in brewing into *banchang* and *ara*. Wheat flour is also used to make *torm* (NBC, 2014). The per capita wheat available for consumption is estimated at 43.88 g/day. The SSR is declining with R^2 value of 0.67 (Figure 9). Over the past 14 years, the annual average SSR decrease is 8.37%. For more details, see Annex A.3.

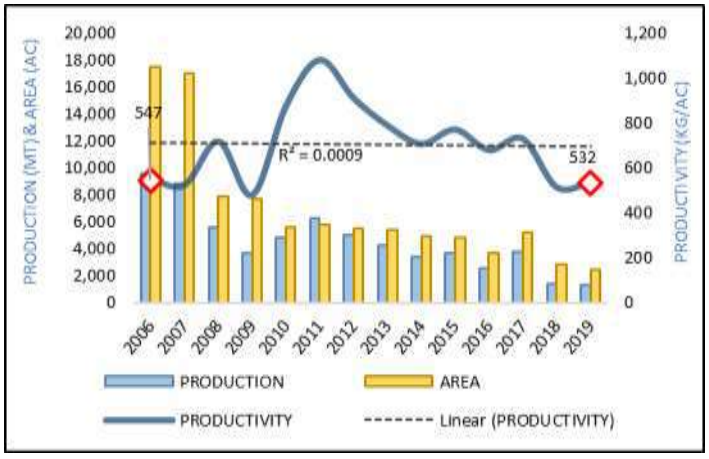

Figure 7. Wheat production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

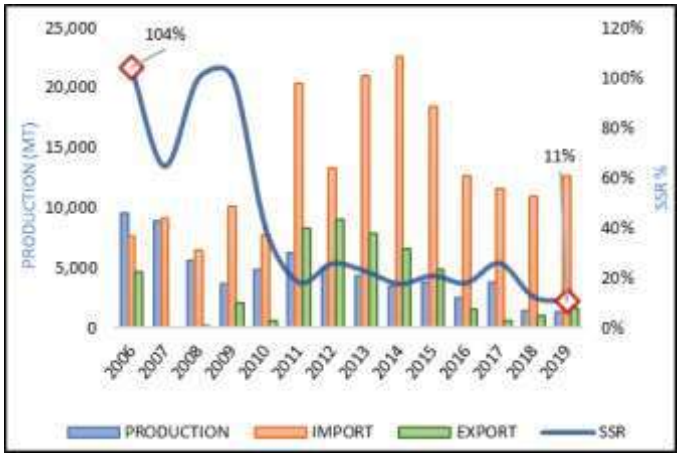

Figure 8. Wheat production (MT), import (MT), export (MT) and SSR from 2006 to 2019

Figure 9. Trends of SSR and IDR of wheat from 2006 to 2019

4.1.4 Other Cereals

Although cultivated in small scale, other cereals such as buckwheat, millet and barley are important for food security of mostly marginal farmers. Bhutan is almost self-sufficient in buckwheat production and consumption with an average SSR of 97.15%. In recent years, small amount of the buckwheat is exported and the import is limited to an average of 105 MT (Annex A.4). Buckwheat products range from *keptang* (flat bread), *khuli* (pancake), *puta* (noodles) and *dengo* (cooked dough).

There are three species of millets grown in Bhutan, viz. finger millets (*Eleusine coracana*), foxtail millets (*Setaria italica*) and common millets (*Panicum miliaceum*). The most widely adapted and commonly cultivated species is the finger millet (NBC, 2014). Millets SSR ranged from 89.9% to 100% with an average of 94.64% (Annex A.5). There was no import recorded from 2012 onwards. The average annual import and the average domestic production for the previous years were 843 MT and 3914.5 MT, respectively. Millets are consumed as *keptang* or *roti* (traditional pancakes) or *dengo* or *dhido* (cooked dough), apart from *banchang*, *tongba* and *ara* (traditional drinks). Millets also provide straws that serve as important cattle feed during times of fodder scarcity (NBC, 2014).

Barley, mostly hull-less type, is well adapted to higher altitudes. In fact, barley is the only grain crop available to farmers and livestock herders above 3500 m.a.s.l. Barley is consumed as *nabchi* (roasted and powdered) in addition to brewing alcoholic drinks. Bhutan grows both hulled and hull-less types of barley (NBC, 2014). Bhutan is self-sufficient in barley with an average SSR of 99.23% and the average per capita available for consumption for the 2006-2019 period is calculated at 2.67 g/day (Annex A.6).

4.2 Oilseeds

The predominant oilseed crops in the country are mustard and rapeseed (*Brassica juncea* and *B. campestris*) grown at altitudes from about 200 to 3000 m.a.s.l. The acreage under oilseed crop is slowly diminishing as it is not economically viable. This is due to the limited choice of cultivars and the high cost of production; thus, cheaper imports depress domestic production. For instance, the cost of production for mustard is estimated to be Nu.51 per kg. Further, in the wetlands, there are other competing crops, such as wheat and vegetables. In the dryland, mustard is grown as a secondary crop under rainfed conditions (Ghimiray, 2005).

Table 8. SSR (%), IDR (%), per capita consumption (kg/year) and per capita dietary composition of oilseeds, 2006-2019

Commodity	SSR (%)	IDR (%)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
					Calories (kcal)	Protein (g/day)	Fat (g/day)
Mustard	28.86	71.47	2.19	5.99	28.08	1.49	1.72

Table 8 summarizes the self-sufficiency, per capita consumption and dietary energy supply from oilseeds. Bhutan is highly import-dependent in vegetable oils with an average SSR of only 28.86%. The domestic production has sharply declined from 3706 MT in 2006 to 394 MT in 2019 (Figure 10 &11). The per capita available for consumption averaged at 2.19 kg per year, providing an available dietary energy supply (DES) of 28.08 kcal, 1.49 g/day protein and 1.72 g/day fat.

The trend analysis of SSR for oilseeds from 2006-2019 indicates a sharp decline ($R^2 = 0.57$) as shown in figure 12. However, it should only be construed as indicative in the absence of adequate long-term data that is requisite of a time series analysis. The average annual SSR decreased by around 2% over the past 14 years. As compared to 43.74 % in 2006, the SSR have decreased to 15.66 % in 2019. For more details, see Annex B.

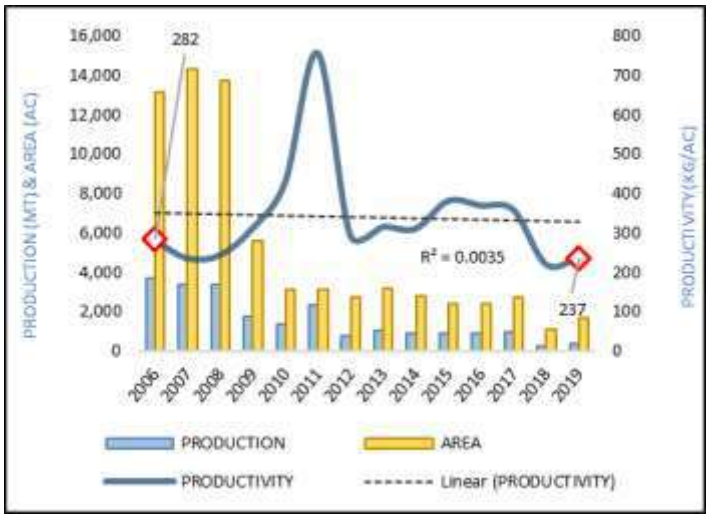

Figure 10. Oilseeds production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

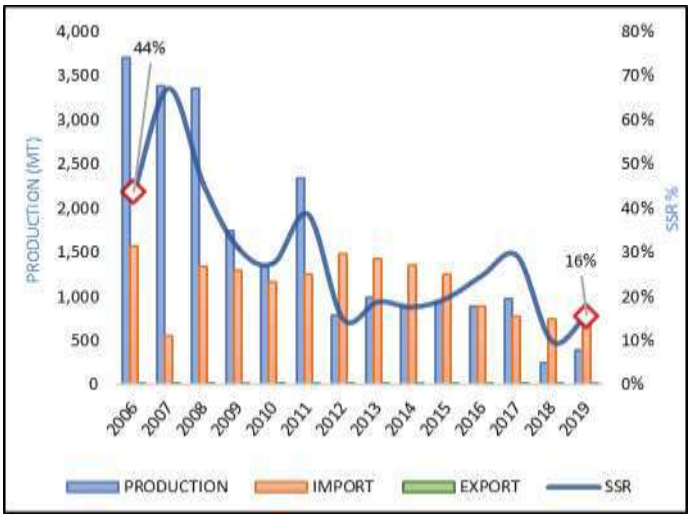

Figure 11. Oilseeds production (MT), import (MT), export (MT) and SSR from 2006 to 2019

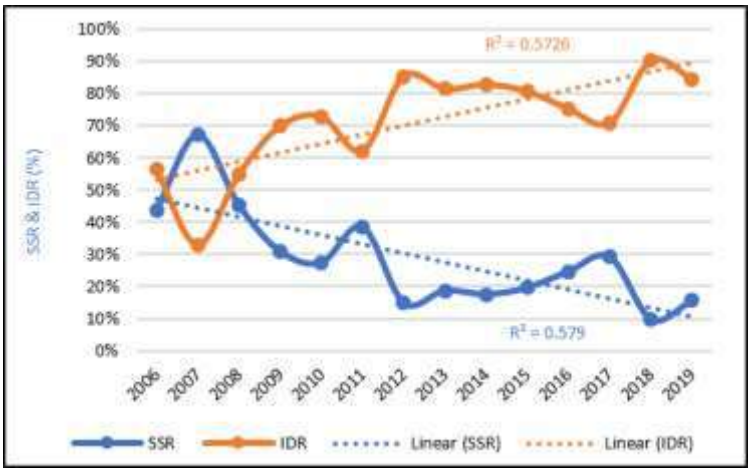

Figure 12. Trends of SSR and IDR of oilseeds from 2006 to 2019

4.3 Pulses

Pulses are dry edible seeds of plants of *leguminosae* family. They are also known as grain legumes. They are consumed in form of seeds in whole, split, hulled split or flour. Pulses are nutritious and inexpensive source of protein as compared to animal protein. Growing pulses promote sustainable agriculture as it decreases greenhouse gases, improves soil fertility and uses less water (GPF, 2020). They also contain phytochemicals which can help in combating certain type of cancer and diseases. As a source of nutrition, animal feed and soil sustainability, pulses play a major role in food security which is expected to increase in future (GPF, 2020). According to FAO (2021a) India is the largest producer, consumer and importer of pulses in the world.

For the assessment of SSR, IDR and per capita available for consumption of pulses, four crops were considered - lentil, mung bean, kidney bean and soya bean. These pulses were considered after assessing one or many of the factors, such as production, import, export and consumption in the country. The overall average SSR is analyzed at 64.2% and IDR at 38.1%. On an average, the per capita available for consumption is 6.25 kg/year, which is above the global per capita consumption of 3.98 kg/year.

Amongst the South Asian countries, Nepal has the highest per capita pulses supply at 11.18 kg/year, followed by India with an available supply of 9.87 capita/kg/year (FAO, 2021). Our analysis estimates that pulses in total supply 58.45 kcal energy/day, 4.76 g/day protein and 1.1 g/day fat per capita (Table 9). Amongst the pulses, the SSR of kidney bean is found to be the highest at 103.84% and the lowest SSR for lentil at 3.7% for the assessment period as the domestic production is minimal and correspondingly there is a huge import to fulfill the requirement.

Table 9. SSR (%), IDR (%), per capita consumption (kg/year) and per capita dietary composition of pulses, 2006-2019

Sl	Commodity	SSR (%)	IDR (%)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
						Calories (kcal)	Protein (g/day)	Fat (g/day)
1	Lentil	3.70	100.06	2.64	7.24	25.06	1.75	0.13
2	Mung bean	100.07	0.07	0.64	1.75	6.00	0.41	0.03
3	Kidney bean	103.84	0.20	1.18	3.23	11.00	0.71	0.05
4	Soya bean	49.02	52.06	1.79	4.89	16.38	1.86	0.88
	All pulses	**64.16**	**38.10**	**6.25**	**17.11**	**58.45**	**4.76**	**1.10**

4.3.1 Kidney bean

Kidney bean is also known as chilli bean due to its dark red colour. It is high in fibre content that helps in lowering cholesterol levels. The average SSR of kidney bean is worked out to

be 103.9% and IDR stands at 0.19% (Figure 13, 15 & 17). On an average, the per capita supply available for consumption is 1.18 kg/year. The total dietary supply is 11 kcal (energy), 0.71 g (protein) and 0.05 g (fat) per day per person. It is also exported, thereby contributing to annual household income. There is a steady decline in the SSR at an average annual rate of 0.42%. As compared to 105.75% in 2006, the SSR have decreased to 99.14% in 2019. For more details, see Annex C.1.

4.3.2 Lentil

Lentil is among the oldest crops domesticated in the world. It is adapted to various growing conditions and is drought tolerant (Abraham, 2015). In Bhutan, lentil is a minor crop, usually grown in southern parts of the country in small pockets. However, its per capita availability for consumption is the highest among the pulses, contributed by the huge volume of import. It is usually consumed in the form of soup. The per capita supply available for consumption is calculated at 2.64 kg/year. The SSR and IDR of lentil are estimated at 3.7% and 100.06%, respectively. Lentils supplies 25.06 kcal of energy, 1.75 g protein and 0.13 g fat per day per person. On an average, there is an annual decrease of 0.59% in SSR. As compared to 3.87% in 2006, the SSR have decreased to 2.67% in 2019.

Lentil production dropped to its lowest in the years 2012 and 2013. In 2018, the production reached the highest, primarily driven by the support provided to farmers in the highest lentil growing area of Sarpang in terms of lentil post production facilities in the year 2017. For more details, see Figure 14, 16 & 18; Annex C.2.

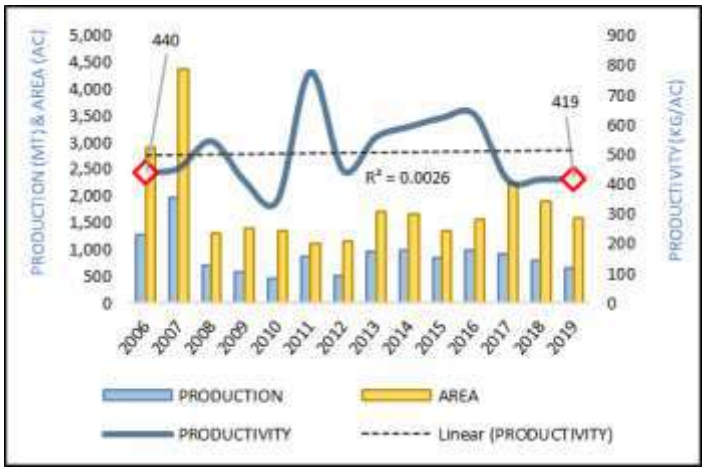

Figure 13. Kidney bean production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

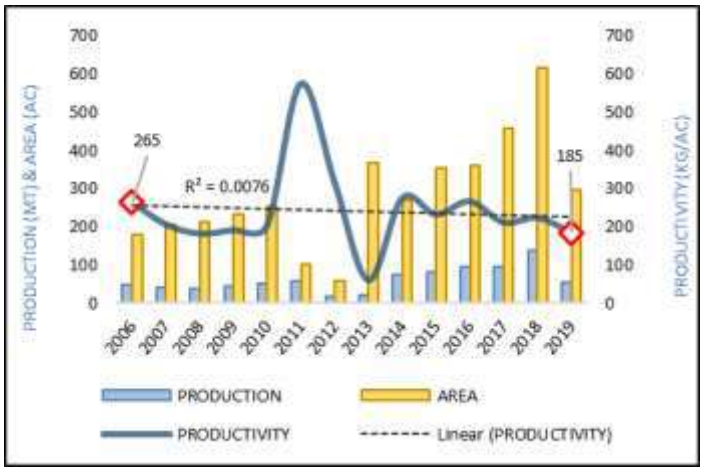

Figure 14. Lentil production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

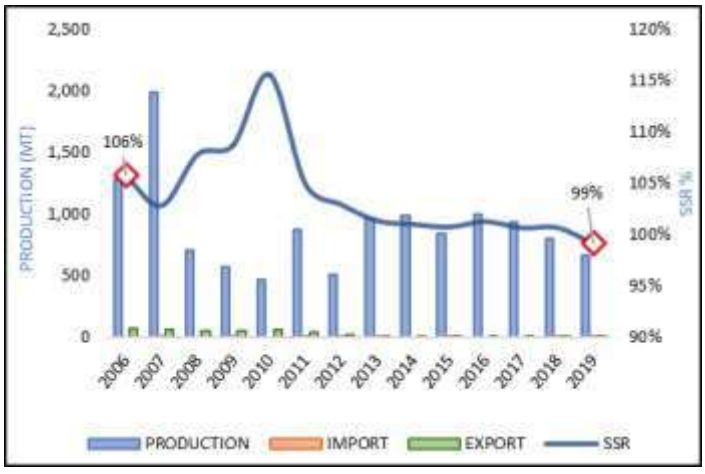

Figure 15. Kidney bean production (MT), import (MT), export (MT) and SSR from 2006 to 2019

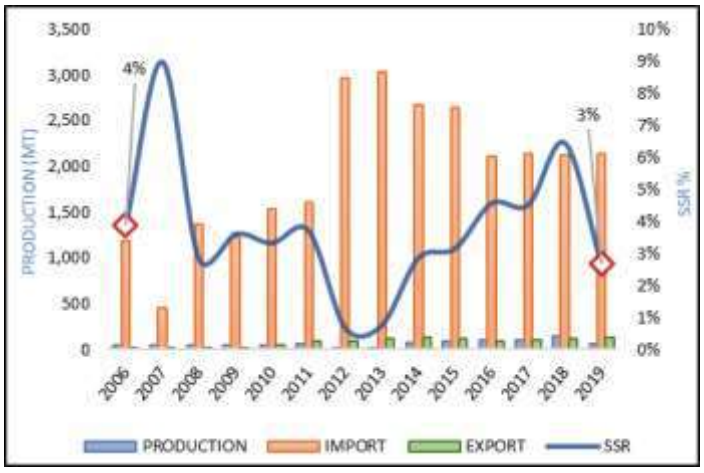

Figure 16. Lentil production (MT), import (MT), export (MT) and SSR from 2006 to 2019

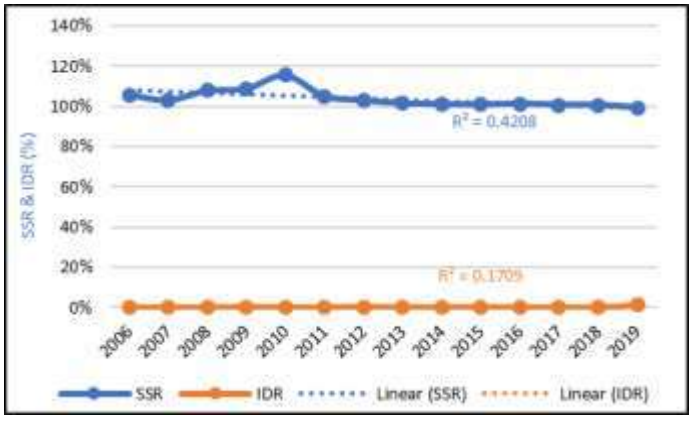

Figure 17. Trends of SSR and IDR of kidney bean from 2006 to 2019

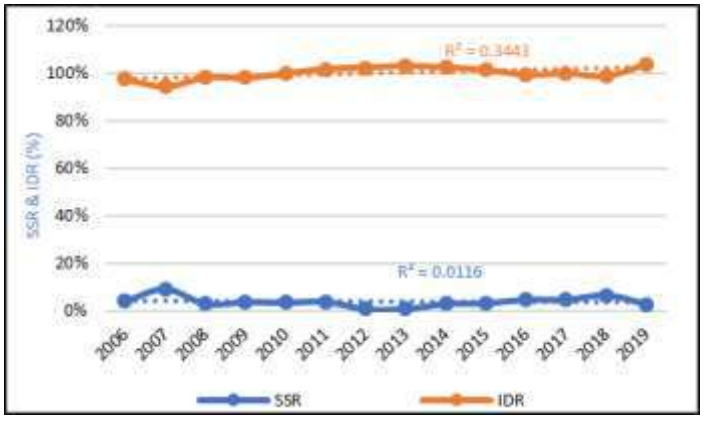

Figure 18. Trends of SSR and IDR of lentil from 2006 to 2019

4.3.3 Mung bean

Mung bean is also known as green gram, golden gram and chop suey bean. It is mainly grown for human consumption. However, it can also be used as green manure crop and animal feed. The colour of matured seeds can be green, yellow, brown or mottled black depending on the variety (Oplinger et al., 1990). Like lentils, mung beans are also cultivated on a small scale in warmer regions of the country. The average SSR is calculated at 100.07% and IDR at 0.07% since import is minimal. The per capita supply available for consumption is 0.64 kg/year. Mung beans supply 6 kcal energy, 0.41 g protein and 0.03 g fat to a person per day.

Import is not recorded for the year 2012. On the other hand, few metric tons were exported. In 2013, the export was a little higher than import, resulting in highest SSRs during these two years. The SSR in 2006 and 2019 has not changed and remain at 100 %. For more details, see Figure 19, 21 & 23; Annex C.3.

4.3.4 Soya bean

In countries around the world, soya bean is mainly grown for oil extraction. However, in Bhutan it is mainly grown to be consumed as green matured seeds or dried roasted seeds. In the past, farmers used to extract soya milk and make soya cheese for home consumption. Due to the form in which the crop is used, it is clubbed under the group pulses.

The SSR stood at 49.02% and IDR at 52.06% over the 14-year period. The per capita supply available for consumption is estimated at 1.79 kg/year. The dietary supply from the crop includes 16.38 kcal of energy, 1.86 g of protein and 0.88 g of fat on an average. As compared to 96.22% in 2006, the SSR have decreased to 81.77% in 2019.

Soya bean recorded the lowest production in 2018, consequently resulting in huge imports. The trend was reversed in 2019 as production increased and import dropped to its lowest, thereby, pushing up the SSR. For more details, see Figure 20, 22 & 24; Annex C.4.

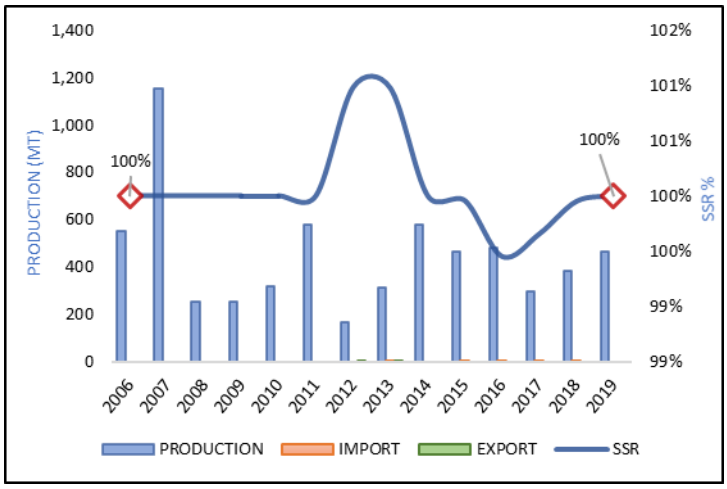

Figure 19. Mung bean production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

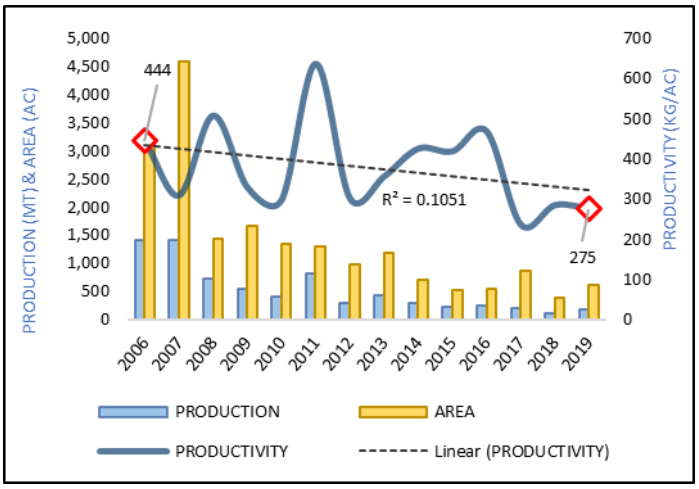

Figure 20. Soya bean production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

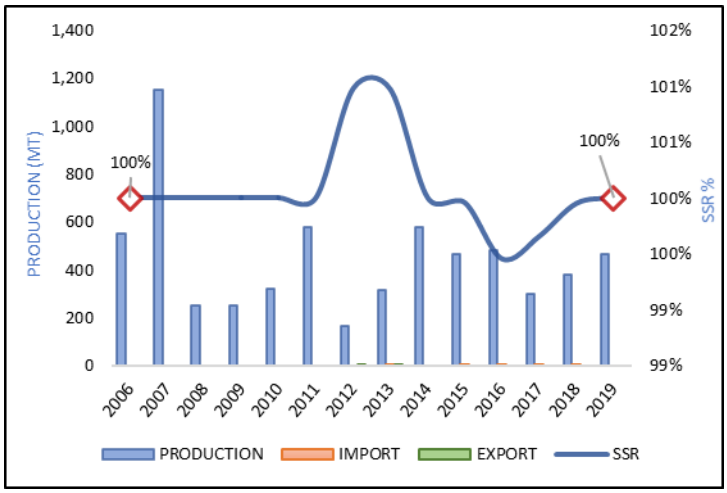

Figure 21. Mung bean production (MT), import (MT), export (MT) and SSR from 2006 to 2019

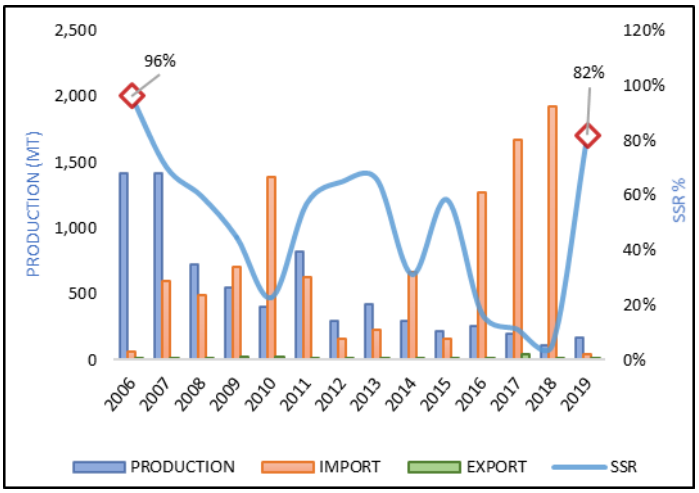

Figure 22. Soya bean production (MT), Import (MT), export (MT) and SSR from 2006 to 2019

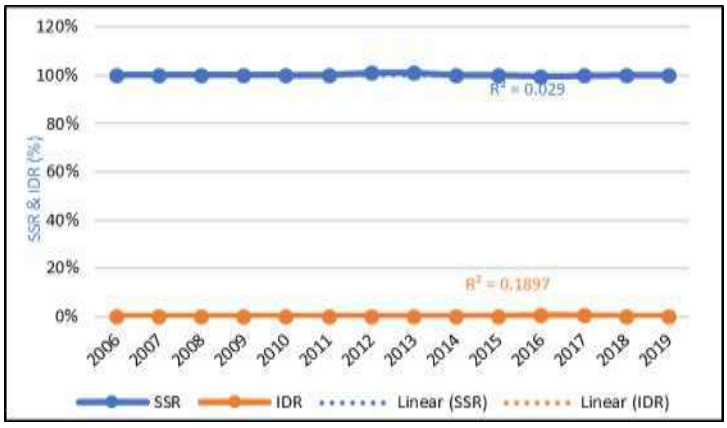

Figure 23. Trends of SSR and IDR of Mung bean from 2006 to 2019

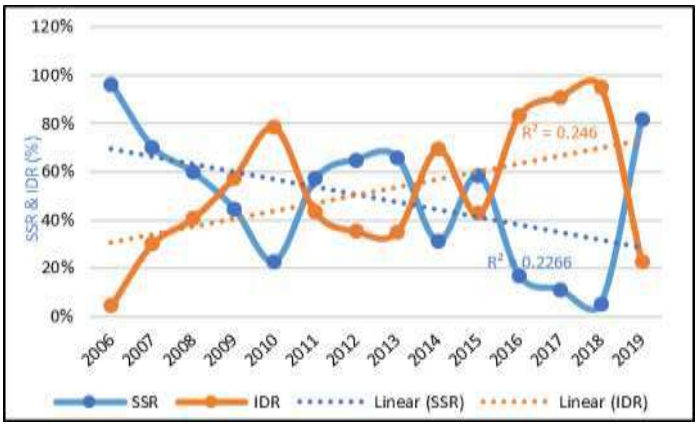

Figure 24. Trends of SSR and IDR of soya bean from 2006 to 2019

4.4 Vegetables

Vegetables are usually grouped according to the portion of the plant that is eaten, such as leaves, stems, roots, tubers, bulbs and flowers. Due to suitable agro-ecological zones, all types of vegetables can be cultivated in Bhutan. The annual vegetable production for 2019 was 47,080 MT with a total harvested area of 16,150 acres (RSD, 2020).

The average SSR of 18 major vegetables considering the data for the last 14 years from 2006 to 2019 is estimated at 84% and the corresponding IDR at 23% (Table 10). The highest SSR was observed for carrot at 147% and the lowest for bulb onion at 18%, followed by tomato at 22%. The average per capita vegetables available for consumption is estimated at 73.5 kg /year which works out to be 201.3 g/day per adult against the WHO recommended quantity of 240 g/day per adult. This quantity of 201.3 g/day of vegetables supplies a total of 53.5 kcal energy, 2.7 g protein and 0.4 g fat in terms of dietary composition (Table 10).

Table 10. SSR (%), IDR (%), per capita consumption (kg/year) and per capita dietary composition of vegetables, 2006-2019

Sl	Commodity	SSR (%)	IDR (%)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capital dietary composition		
						Calories (kcal)	Protein (g/day)	Fat (g/day)
1	Bulb onion	18	82	4.60	12.60	3.47	0.18	0.02
2	Chilli	84	17	14.41	39.47	9.87	0.43	0.12
3	Cabbage	92	34	5.81	15.93	3.03	0.16	0.02
4	Cauliflower	62	38	2.54	6.95	0.63	0.06	0.01
5	Broccoli	96	4	0.81	2.22	0.75	0.06	0.01
6	Beans	95	6	3.93	10.77	3.30	0.20	0.02
7	Tomato	22	78	3.99	10.94	1.86	0.09	0.02
8	Green leaves	100	0	3.44	9.41	1.51	0.20	0.03
9	Peas	91	22	1.20	3.28	6.20	0.40	0.03
10	Brinjal	63	37	1.17	3.21	0.67	0.03	0.00
11	Asparagus	101	0	0.32	0.89	0.11	0.01	0.00
12	Carrot	147	32	0.62	1.71	0.65	0.02	0.00
13	Turnip	100	0	11.97	32.79	9.20	0.30	0.03
14	Radish	101	0	7.48	20.48	6.35	0.33	0.06
15	Pumpkin, squash & gourd	99	1	7.27	19.91	3.78	0.18	0.02
16	Mushroom	61	42	0.17	0.48	0.77	0.03	0.00
17	Lady finger	100	0	0.03	0.07	0.02	0.00	0.00
18	Cucumber	86	14	3.74	10.23	1.33	0.01	0.05
	Vegetables	**84**	**23**	**73.49**	**201.33**	**53.48**	**2.68**	**0.45**

In 2018, the per capita consumption of vegetables in the world was recorded at 107.9 kg/year and for South Asia, it was a mere 55.11 kg/year (Table 11). The per capital consumption for India was 61.12 kg/day which is close to the average figure for Bhutan at 73.5 kg/year. Nepal recorded a much higher figure at 130.8 kg/day. However, the per capita consumption in Bangladesh and Sri Lanka were much lower at just 20.54 kg/day and 31.59 kg/day, respectively. This is further substantiated by the fact that low-income and lower middle-income countries rely heavily on staple foods like cereals, roots, tubers and plantains, and that the upper middle-income countries and high-income countries have sufficient vegetables to meet the WHO recommendation (FAO, 2021a).

Table 11. Vegetable food supply quantity in 2018

Country/region	Per capita consumption (kg/year)	Calories (kcal/capita/day)	Protein (g/capita/day)	Fat (g/capita/day)
World	107.9	75	4.05	0.63
South Asia	55.11	37	2.06	0.29
India	61.12	41	2.41	0.34
Nepal	130.8	87	5.25	0.74
Bangladesh	20.54	19	0.9	0.12
Sri Lanka	31.59	24	1.1	0.18

Source: FAO (2021a)

4.4.1 Chilli

Chilli is a commercial crop and one of the important vegetables. Chilli is the most valuable spice crop in the country and is cultivated in all the districts. The annual production of chilli between the years 2006 and 2019 averaged at 8664 MT. Most of the chilli produced are consumed domestically. Imports in the form of fresh, dry and crush chillies, mostly from India help meet the growing demand for the spice particularly during the lean season.

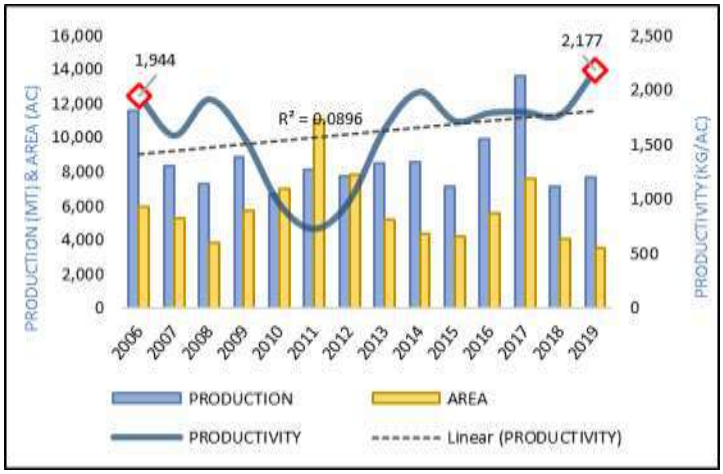

Figure 25. Chilli production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

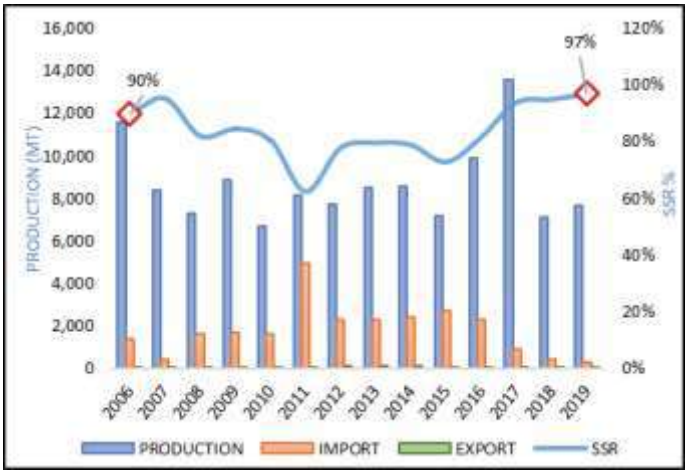

Figure 26. Chilli production (MT), import (MT), export (MT) and SSR from 2006 to 2019

Figure 27. Trends of SSR and IDR of chilli from 2006 to 2019

The average SSR of chilli for the reference period is estimated at 84% and the corresponding IDR at 17%. The SSR of chilli shows a positive trend starting from 2015 to 2019 due to an increase in the production as a result of the initiative to meet local demand following import restriction from India due to high pesticides content. The average per capita chilli available for consumption is calculated at 39.5 g/day. This quantity supplies a total of 9.9 kcal energy, 0.4 g protein and 0.12 g fat per day in terms of dietary composition (Table 10). Amongst the vegetables, chilli is found to contribute the highest in terms of dietary composition. As compared to 90 % in 2006, the SSR have increased to 97 % in 2019. The productivity has increased from 1944 kg/ac in 2006 to 2177 kg/ac in 2019. For more details, see Figure 25, 26 & 27; Annex D.2.

4.4.2 Bulb onion and tomato

Both bulb onion and tomato are used as salad, pickle or cooked in various ways in the Bhutanese dish. The demand for bulb onion and tomato is worldwide. The local demand cannot be met through production and hence major portion of tomatoes and onions are imported from India. The average production of bulb onion between the years 2006 to 2019 stood at 533 MT, while for tomato it was 607 MT. The productivity of bulb onion has increased from 786 kg/ac in 2006 to 1099 kg/ac in 2019 (Figure 28). The productivity of tomato has also increased from 1333 kg/ac in 2006 to 1574 kg/ac in 2019 (Figure 29).

The SSR for both bulb onion and tomato show negative trends. The SSR for the bulb onion is estimated at 18% with a corresponding IDR of 82% (Figure 30 & 32), while for tomato it is estimated at 22% and the corresponding IDR at 78% (Figure 31 & 33). The low production of bulb onion is associated with cheaply available import from India and poor adoption of postharvest curing and management practices. Similarly, low production of tomato is associated with its highly perishable nature which is further exacerbated by lack of processing and value addition options that discourage farmers to grow in abundance.

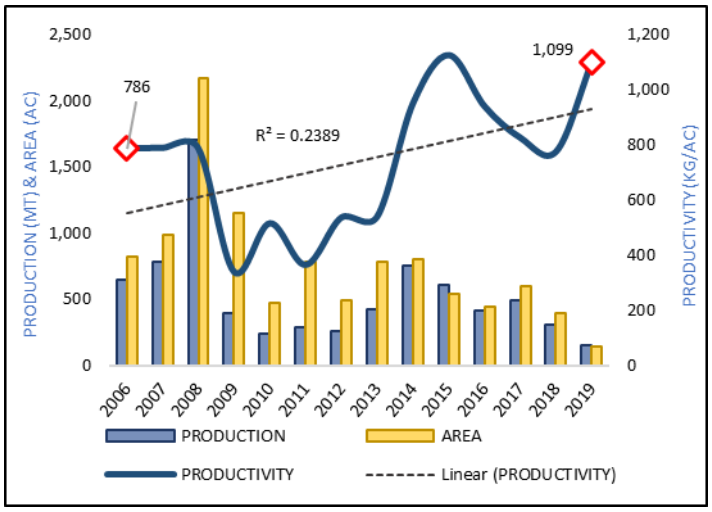

Figure 28. Bulb onion production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

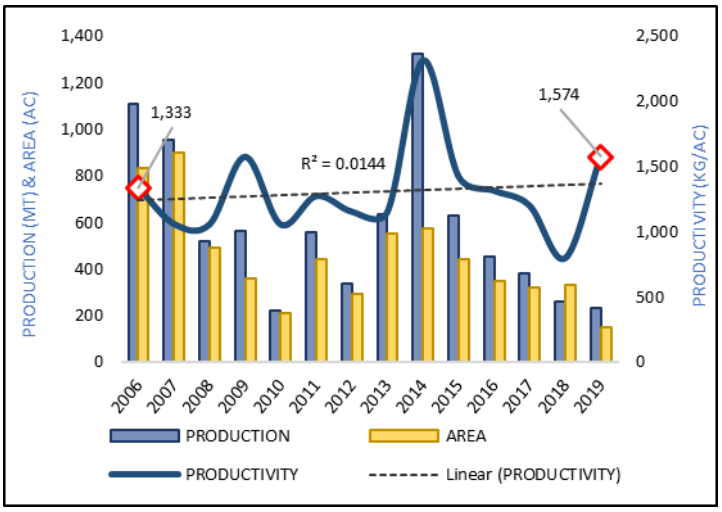

Figure 29. Tomato production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

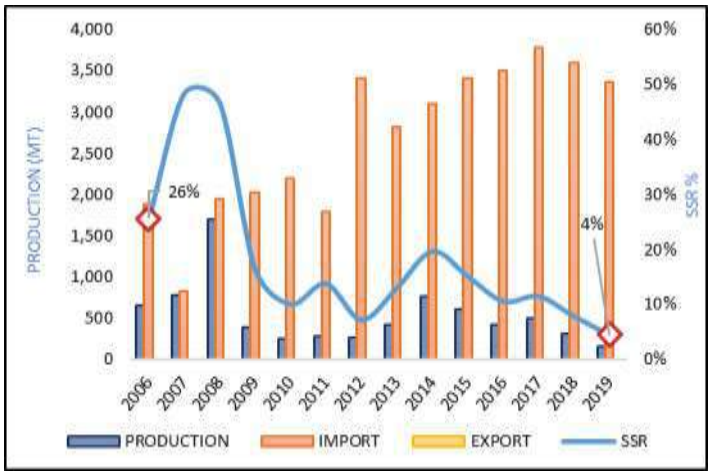

Figure 30. Bulb onion production (MT), import (MT), export (MT) and SSR from 2006 to 2019

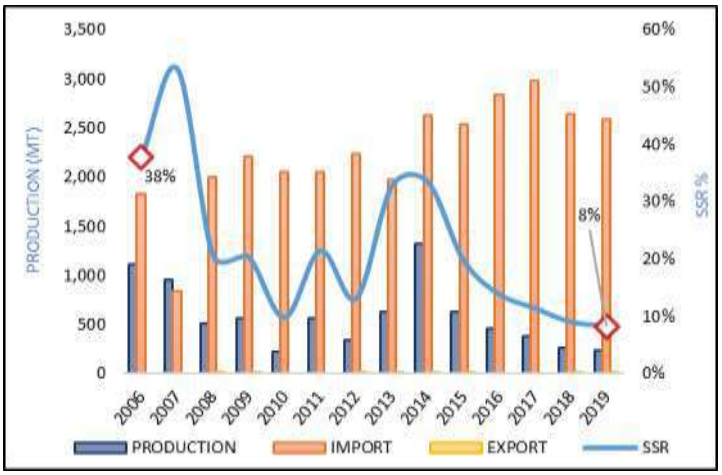

Figure 31. Tomato production (MT), import (MT), export (MT) and SSR from 2006 to 2019

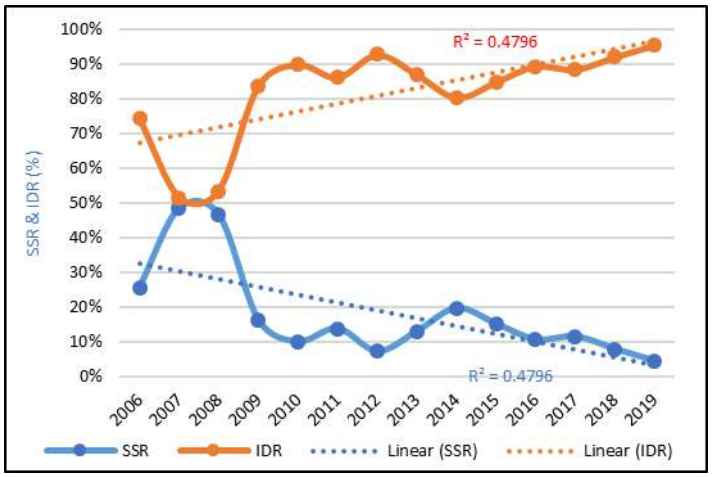

Figure 32. Trends of SSR and IDR of bulb onion from 2006 to 2019

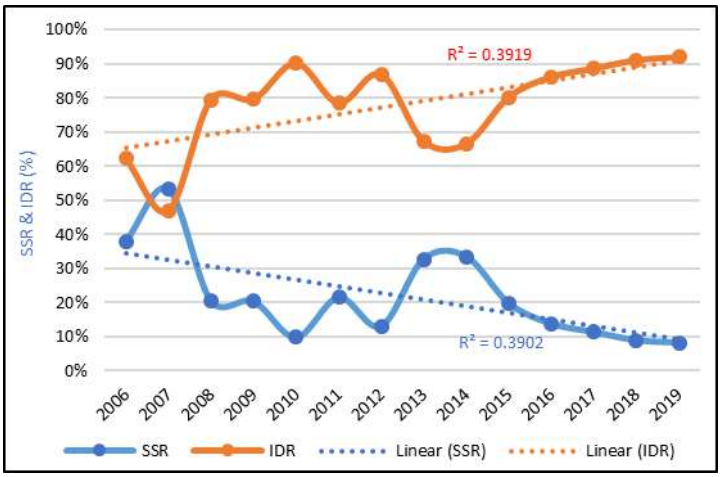

Figure 33. Trends of SSR and IDR of tomato from 2006 to 2019

The average per capita available for consumption of bulb onion is 12.6 g/day. This quantity (12.6 g/day) of bulb onion supplies a total of 3.5 kcal energy, 0.2 g protein and 0.02 g fat per day in terms of dietary composition (Table 10). The average per capita tomato available for consumption is 10.9 g/day. This quantity supplies a total of 1.9 kcal energy, 0.1 g protein and 0.022 g fat per day (see annex D.1 for onion and D.7 for tomato).

4.4.3 Cabbage and cauliflower

Cabbage and cauliflower (part of the cole crops group) were first introduced to Bhutan in 1966 (DoA, 2019). Both are consumed mostly as curry but cabbage is also used as salad. Cabbage and cauliflower production for the period spanning 2006 to 2019 averaged at 4273 MT and 1280 MT, respectively. The productivity of cabbage has increased from 2121 kg/ac in 2006 to 3494 kg/ac in 2019 (Figure 34). The productivity of cauliflower has also increased from 1330 kg/ac in 2006 to 1699 kg/ac in 2019 (Figure 35).

The SSR for the cabbage is estimated at 92% and corresponding IDR at 34% (Figure 36 & 38). For cauliflower it is 62% and 38%, respectively (Figure 37 & 39). The SSR for both the cabbage and cauliflower show positive trends. The analysis indicates that cabbage and cauliflower have high self-sufficiency ratios with a small degree of imports from India to meet seasonal and local demand.

The average per capita cabbage available for consumption is 15.9 g/day. This quantity supplies a total of 3 kcal energy, 0.2 g protein and 0.02 g fat per day in terms of dietary composition (Table 10). The average per capita available for consumption of cauliflower is 6.9 g/day. This quantity (6.9 g/day) of cauliflower supplies a total of 0.6 kcal energy, 0.1 g protein and 0.007 g fat per day. (See Annex D.3 for cabbage and D.4 for cauliflower).

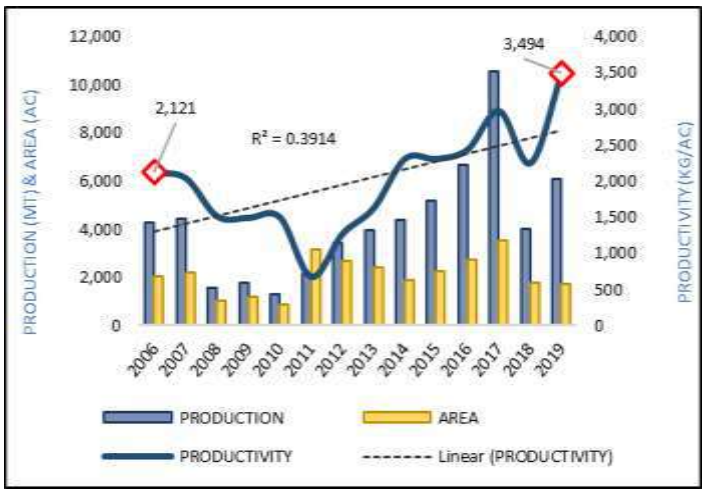

Figure 34. Cabbage production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

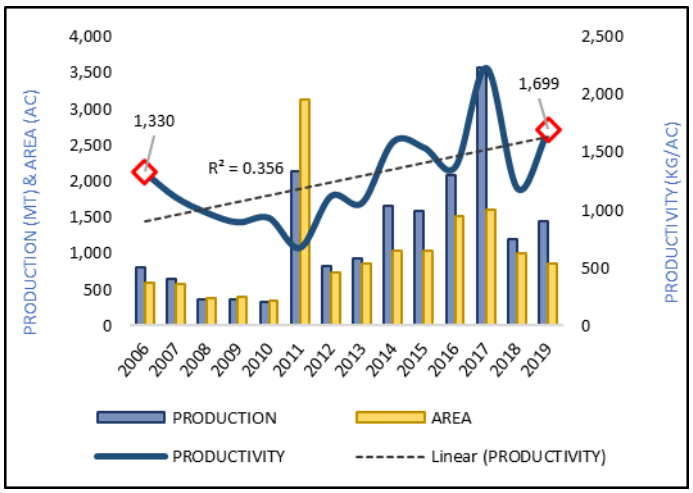

Figure 35. Cauliflower production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

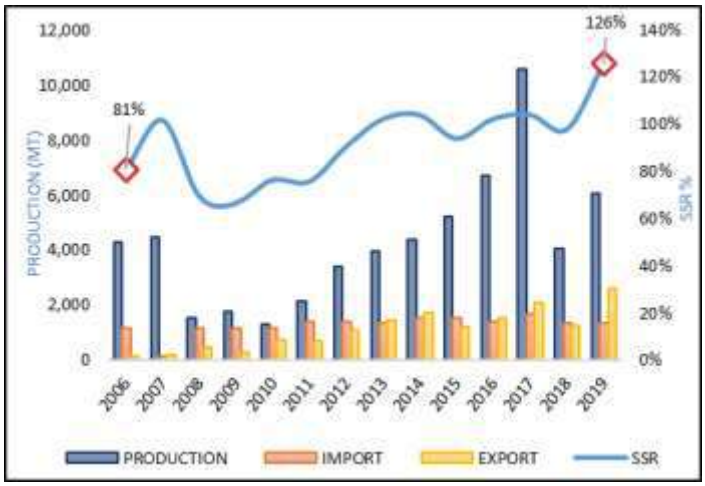

Figure 36. Cabbage production (MT), import (MT), export (MT) and SSR from 2006 to 2019

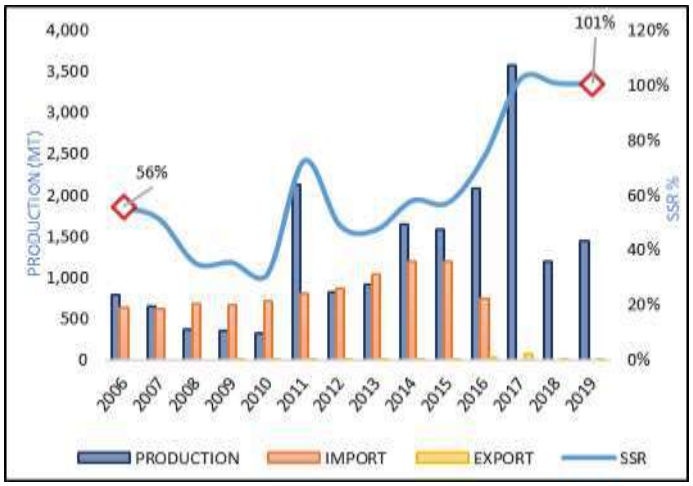

Figure 37. Cauliflower production (MT), import (MT), export (MT) and SSR from 2006 to 2019

Figure 38. Trends of SSR and IDR of cabbage from 2006 to 2019

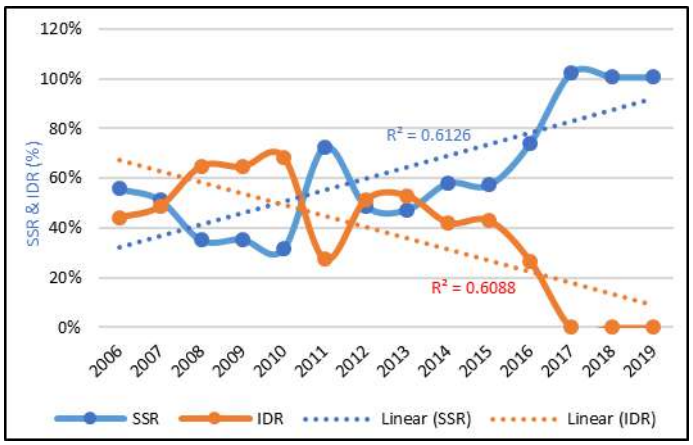

Figure 39. Trends of SSR and IDR of cauliflower from 2006 to 2019

4.4.4 Beans

Bean is one of the main leguminous crops grown as vegetable in the country. The average production of beans for the last 14 years (2006-2019) stood at 3132 MT (Figure 40). The productivity of beans has increased from 1029 kg/ac in 2006 to 1420 kg/ac in 2019. The average SSR for beans is estimated at 95% and corresponding IDR at 6%. The SSR for beans shows a positive trend, representing a very high self-sufficiency status in beans with very minimal dependency on imports.

The average per capita beans available for consumption is found to be 10.8 g/day. This quantity of 10.8 g/day of beans supplies a total of 3.3 kcal energy, 0.2 g protein and 0.02 g fat per day in terms of dietary composition (Table 10). As compared to 97% in 2006, the SSR have increased to 101% in 2019 (Figure 41 & 42). For more details, See annex D.6.

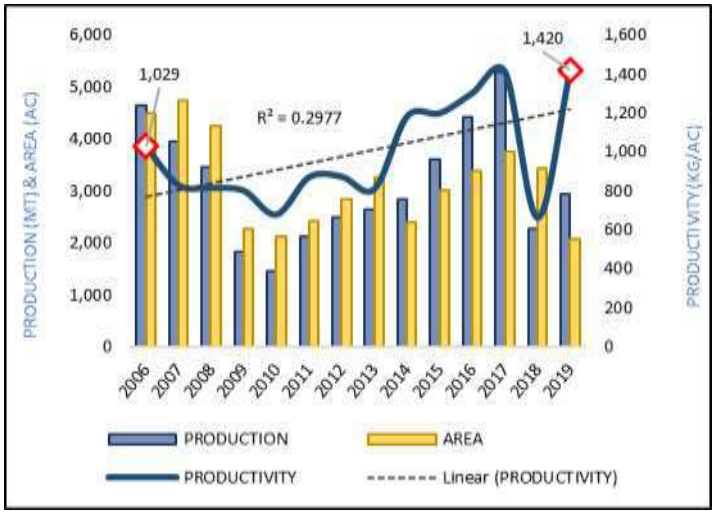

Figure 40. Beans production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

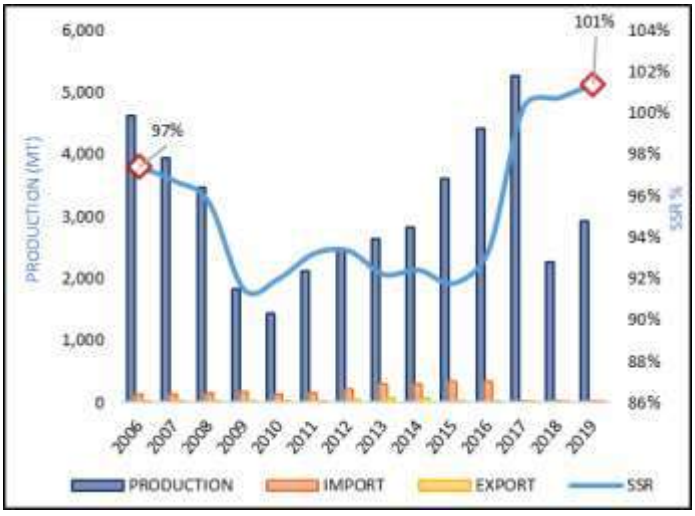

Figure 41. Beans production (MT), import (MT), export (MT) and SSR from 2006 to 2019

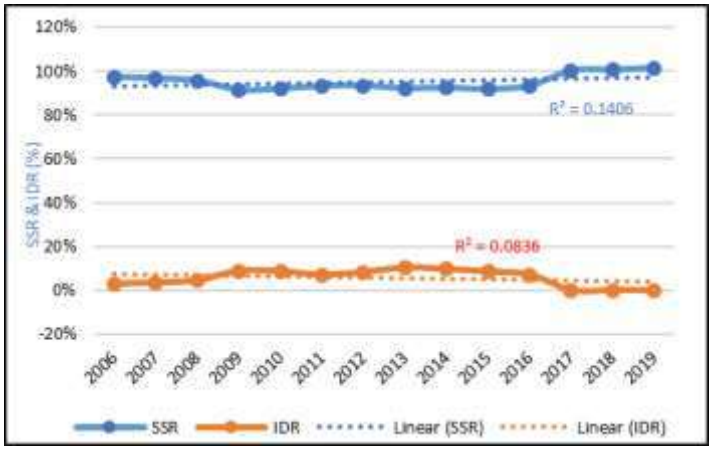

Figure 42. Trends of SSR and IDR of beans from 2006-2019

4.5 Fruits and nuts

Fruits are rich source of vitamins, minerals and fibers that are essential for healthy living. Due to the presence of antioxidants and flavonoids, consumption of fruits is believed to prevent number of health risks such as heart disease, cancer, inflammation, and diabetes. Hence, WHO and FAO recommends 400 grams of fruits and vegetables per day excluding potato and other starchy tubers (Agudo, 2005; WHO, 2005). As part of a healthy eating pattern, 400 grams is said to be apportioned into 2 portions of fruits and 3 portions of vegetables per day per adult with each portion constituting about 80 grams (Agudo & Joint, 2005) Thus, the daily recommended per capita intake of fruits comes to around 160 grams.

At least 25 different types of fruits are cultivated in the country with an overall production of 177,640 MT (RSD, 2020). This exercise only covers 17 selected fruits due to limitation in data. Overall, SSR of fruits stands at 115% and IDR at around 10% (Table 12). However, the IDR of pineapple, mango and papaya are quite high at 63%, 48% and 23%, respectively. See Annex E (1-17) for more details on all fruits.

Table 12. SSR (%), IDR (%), per capita consumption (kg/year) and per capita dietary composition of fruits, 2006-2019

Sl	Commodities	SSR (%)	IDR (%)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capital Dietary composition		
						Calories (kcal)	Protein (g/day)	Fat (g/day)
1	Apple	285.7	3.1	5.14	14.08	6.76	0.01	0.04
2	Areca nut	228.1	13.4	5.66	15.50	53.02	1.58	0.81
3	Banana	84.4	15.6	4.54	12.43	7.46	0.09	0.04
4	Guava	98.2	1.8	1.27	3.48	2.37	0.09	0.03
5	Jackfruit	100.0	0.0	0.75	2.05	1.95	0.03	0.01
6	Litchi	100.0	0.0	0.26	0.71	0.47	0.01	0.00
7	Mandarin orange	200.0	0.3	26.42	72.38	38.36	0.58	0.22
8	Mango	51.7	48.3	1.63	4.47	2.01	0.02	0.01
9	Papaya	77.5	22.5	0.29	0.80	0.21	0.00	0.00
10	Passion fruit	100.0	0.0	0.16	0.44	0.43	0.01	0.00
11	Peach	100.0	0.0	1.84	5.03	1.66	0.03	0.01
12	Pear	98.8	1.2	1.56	4.28	2.44	0.02	0.00
13	Persimmon	100.0	0.0	0.24	0.67	0.55	0.00	0.00
14	Pineapple	37.3	62.7	0.92	2.51	0.65	0.01	0.01
15	Plum	100.0	0.0	0.74	2.03	1.06	0.01	0.01
16	Pomegranate	100.0	0.0	0.14	0.38	0.32	0.01	0.00
17	Walnut	100.0	0.0	0.52	1.41	4.08	0.09	0.39
	Fruits	**115.4**	**9.9**	**52.08**	**142.67**	**123.79**	**2.58**	**1.59**

Though the overall self-sufficiency of fruits stands at 115%, the available per capita consumption of fruits is 143 g, and falls below the recommended intake of 160 g by about 17 g. However, the recommended intake could be met if all 25 fruits are considered. Among the 17 fruit crops considered, mandarin orange has the highest available per capita supply of 72.38 g. Overall, the available daily intake of fruits provides 123.79 kcal of energy, 2.58 g of protein and 1.59 g of fat. Among the SAARC countries, Bhutan ranks fourth as indicated in Table 13. Nevertheless, it must be noted that for Bhutan it is an available per capita consumption whereas for other countries, the figures represent actual per capita consumption.

Out of 17 fruit crops considered, majority of the crops (8) remained constant, 5 have decreased and 4 increased in terms of self-sufficiency ratio. As for import dependency ratio, 8 remained constant, 6 have increased and 3 decreased. In the case of available per capita consumption, it has decreased for most of the crops (13), and only 4 have shown an increase.

Table 13. Per capita fruits consumption of SAARC countries

Country	Per capita consumption (kg/year)	Per capita consumption (g/day)	Remarks (Average of)
Afghanistan	28.5	78.1	2006 to 2017
Bangladesh	24.3	66.6	2006 to 2017
Bhutan	52.1	142.7	2006 to 2019
India	52.5	143.8	2006 to 2017
Maldives	98.3	269.3	2006 to 2017
Nepal	54.2	148.5	2006 to 2017
Pakistan	29.6	81.1	2006 to 2017
Sri Lanka	35.7	97.8	2006 to 2017

Source: GCDL (2018)

4.5.1 Apple

Apple is one of most important fruit crops that has a well-established export market. On average from 2006 to 2019, 4336 MT of apples were exported, and 72 MT were imported in a year. The estimated self-sufficiency ratio stands at 286% and import dependency ratio at 3.1%. Overall, the self-sufficiency ratio has declined over the years while the import dependency saw an increasing trend. As compared to 357% in 2006, the SSR have decreased to 276% in 2019. The available per capita consumption is 14 grams per day. Similar to SSR, the available per capita consumption of apple has also seen a decrease in trend over the years.

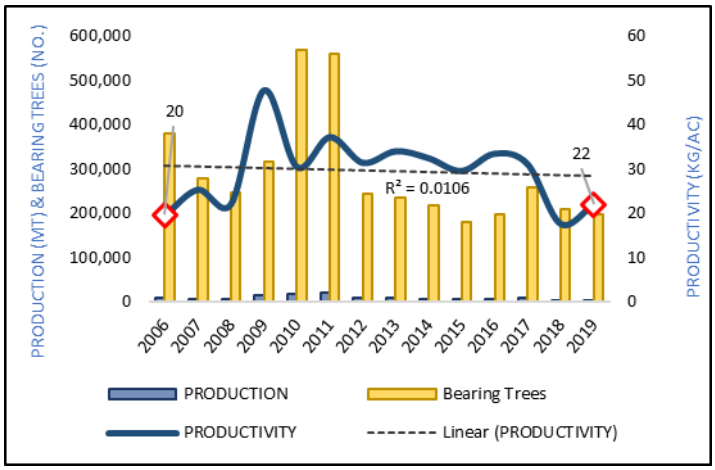

Figure 43. Apple production (MT), bearing trees (no.) and productivity (kg/ac) from 2006 to 2019

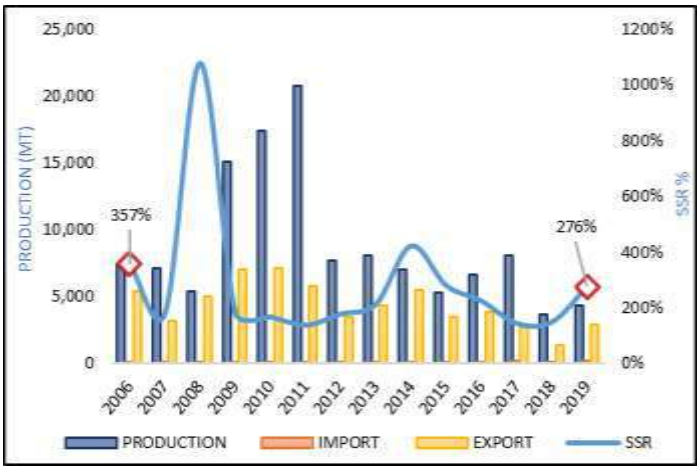

Figure 44. Apple production (MT), import (MT), export (MT) and SSR from 2006 to 2019

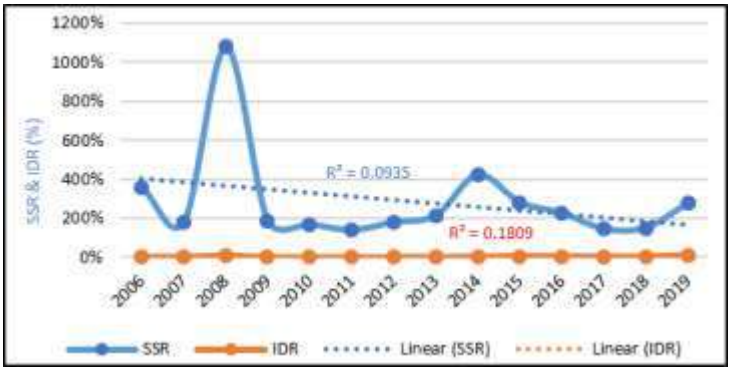

Figure 45. Trends of SSR and IDR of apple from 2006-2019

4.5.2 Areca nut

Areca nut is an important crop in sub-tropical regions of the country, and on average 8428 MT of nuts were produced, and 4322 MT exported in a year. The average self-sufficiency ratio is estimated at 228% with import dependency ratio of 13.4%. Self-sufficiency ratio for areca nut has increased over the years and concomitantly, import dependency ratio has decreased. The available per capita consumption is 15.5 grams per day, and per capita consumption has decreased over the years. As compared to 116% in 2006, the SSR have increased to 145% in 2019.

4.5.3 Mandarin orange

Among the fruit crops, mandarin orange is the most important export commodity. On average, 44,229 MT of fruits were produced in a year though production trend has decreased over the years. On average 19,259 MT of fruits were exported in a year making it one of the top annual export commodities. The estimated self-sufficiency ratio is 200% and import dependency is 0.3%. Self-sufficiency ratio for mandarin orange has increased over the years and import dependency has also followed similar trend. The available per capita consumption stands at 72.38 grams, which is the highest among the fruits. However,

the trend for available per capita consumption has seen a decline over the years. As compared to 142% in 2006, the SSR has however, increased to 220% in 2019.

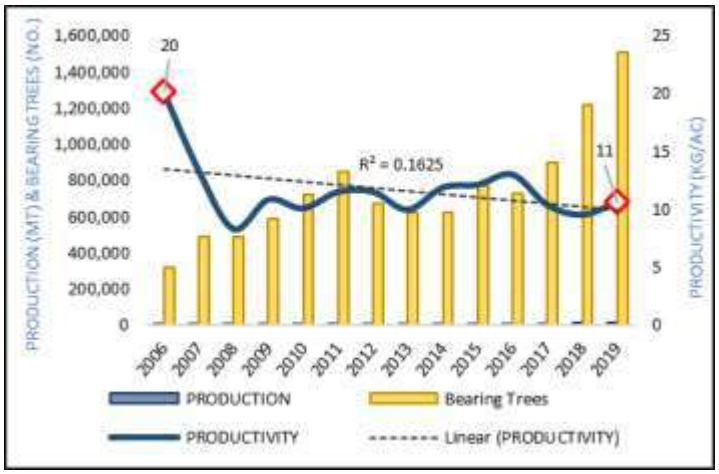

Figure 46. Areca nut production (MT), bearing trees (no.) and productivity (kg/ac) from 2006 to 2019

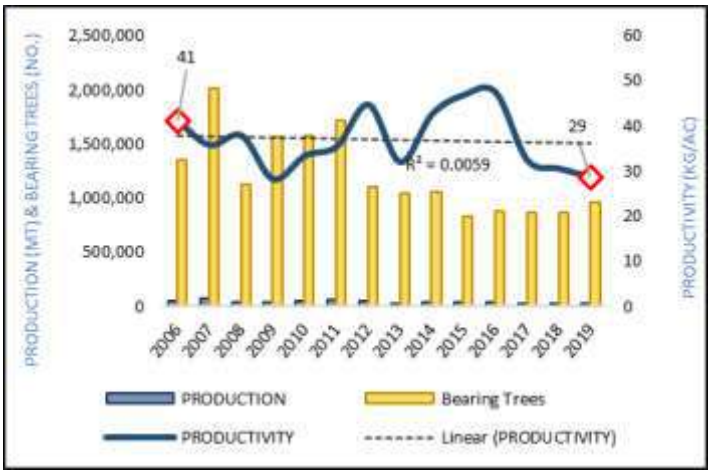

Figure 47. Mandarin production (MT), bearing trees (no.) and productivity (kg/ac) from 2006 to 2019

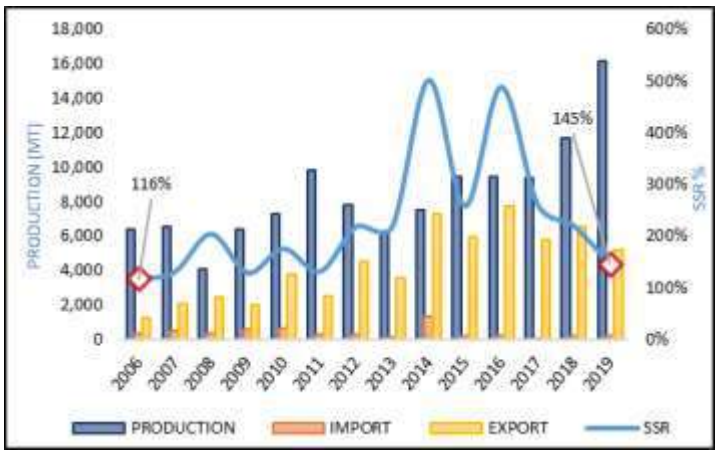

Figure 48. Areca nut production (MT), import (MT), export (MT) and SSR from 2006 to 2019

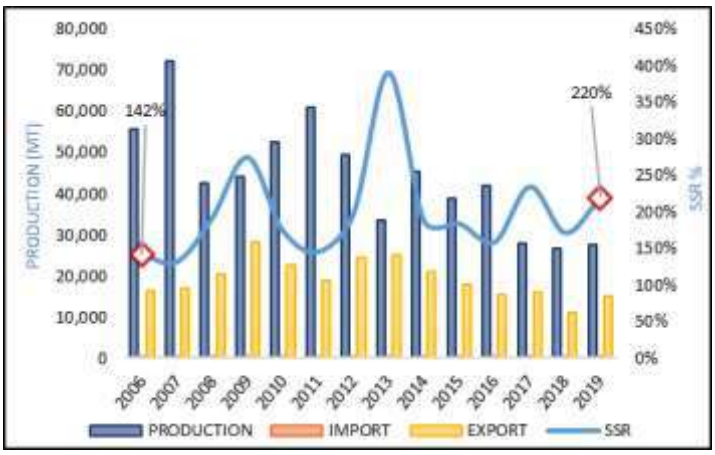

Figure 49. Mandarin production (MT), import (MT), export (MT) and SSR from 2006 to 2019

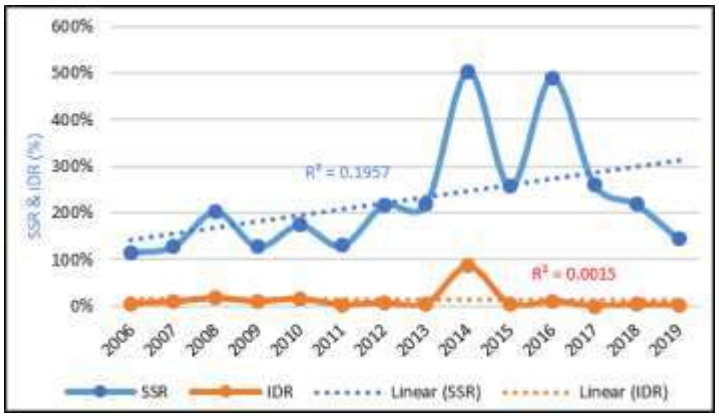

Figure 50. Trends of SSR and IDR of areca nut from 2006-2019

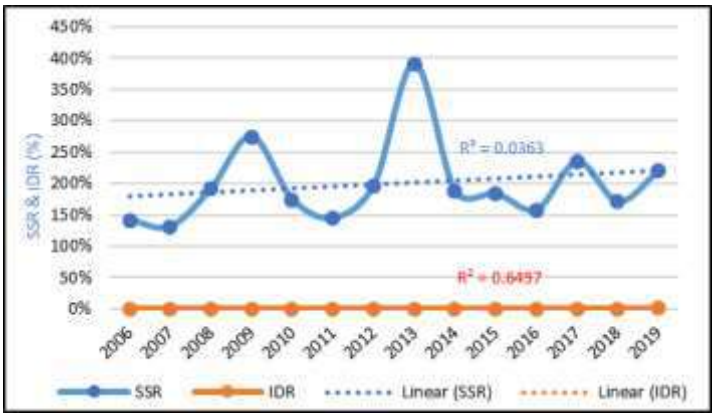

Figure 51. Trends of SSR and IDR of mandarin from 2006-2019

4.5.4 Mango

Mango is another important sub-tropical crop. On average 618 MT of fruits are being produced yearly. However, it is one of the most imported crops, and the average import stands at 565 MT per year. Thus, self-sufficiency ratio is just 52%, though it has increased over the years. The import dependency stands at 48.3%. The available per capita for consumption is low at 4.5 grams per day and has decreased over the years. As compared to 62% in 2006, the SSR have decreased to 60% in 2019.

4.5.5 Walnut

Among fruits and nuts, walnut is a potential commodity both in terms of health benefit and shelf life. Although the current production stands at 352 MT per year on average, it has huge potential and needs to be promoted since demand for the nuts is growing worldwide given its health benefits. As of today, the self-sufficiency ratio remains 100% and zero import dependency since there is no record of import and export data. The available per capita consumption is low at 1.4 grams per day and has decreased over the years. In the case of dietary consumption, in general, per capita calorie, protein and fat have decreased over the years. However, in recent years, it has started to pick up slightly.

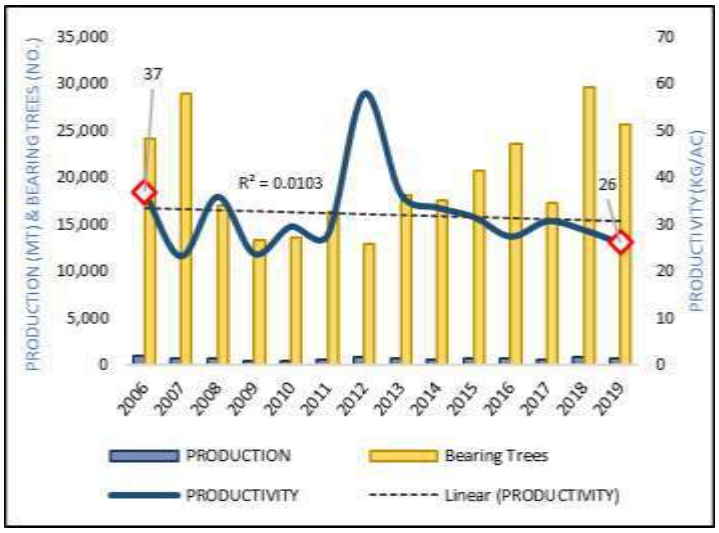

Figure 52. Mango production (MT), bearing trees (no.) and productivity (kg/ac) from 2006 to 2019

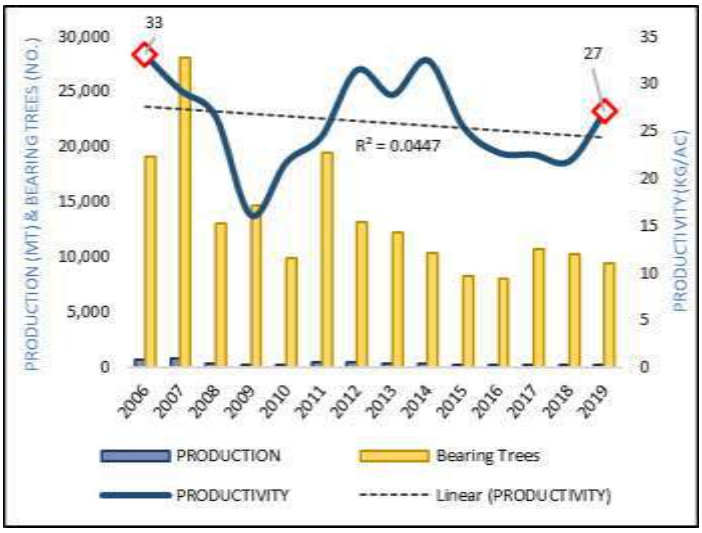

Figure 53. Walnut production (MT), bearing trees (no.) and productivity (kg/ac) from 2006 to 2019

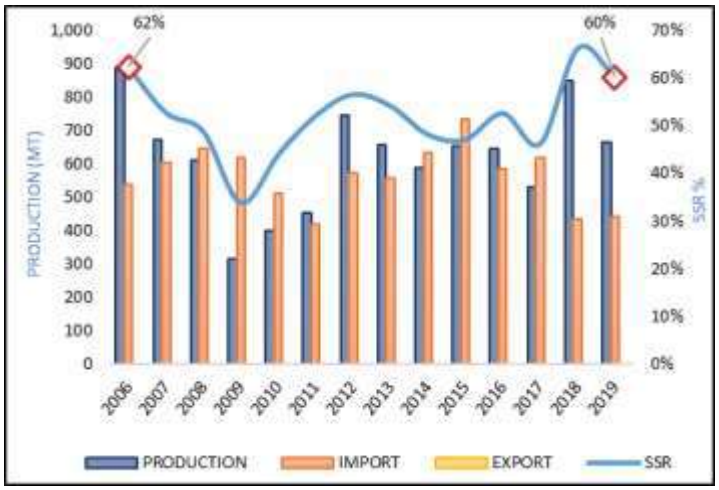

Figure 54. Mango production (MT), import (MT), export (MT) and SSR from 2006 to 2019

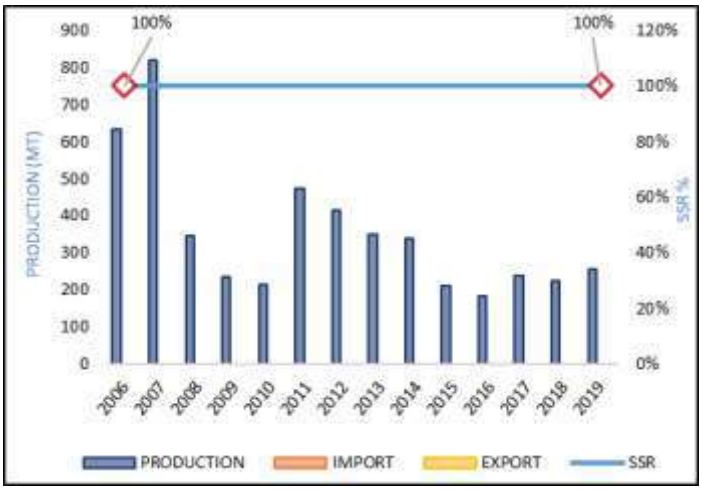

Figure 55. Walnut production (MT), import (MT), export (MT) and SSR from 2006 to 2019

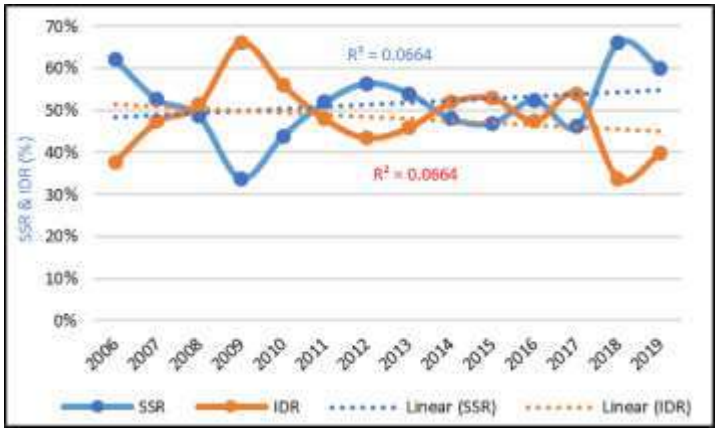

Figure 56. Trends of SSR and IDR of mango from 2006-2019

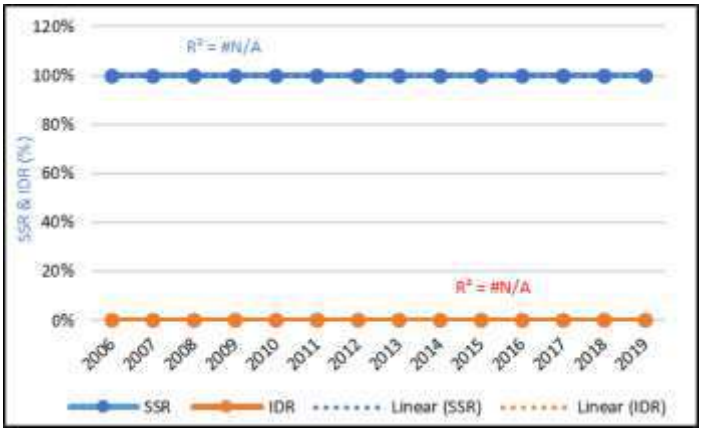

Figure 57. Trends of SSR and IDR of walnut from 2006-2019

4.6 Roots & tubers

Potato and tapioca are covered under roots and tubers. Potato is an important component of crop-based farming and has brought about indelible impacts in the lives of Bhutanese households since its introduction in the 1970s (Roder et al., 2008). Between 2006 and 2019, Bhutanese on average cultivated potato on around 13,041 acres of arable land, engaging about 21% of country's farming households who directly depend on potato for their livelihood. Potato is an emerging market-oriented crop in Bhutan, generating an average annual income of Nu. 358.63 million through export alone from 2006 to 2019 (Annex F.1). It is recognized as one of the main income-generators and livelihood supporting crops (Rai et al., 2021). The import and export data for tapioca is not available and thus, SSR and IDR are computed without these figures. Although economically important, the role of tapioca in nutrient supply to Bhutanese populace is low.

4.6.1 Potato

While the average quantity of potato exported is 21,306 MT from 2006 to 2019, the average import is much lower at 4378 MT during the same period (Annex F.1). The productivity has increased from 3860 kg/ac in 2006 to 4212 kg/ac in 2019. Relative to quantity imported, export figures are much higher resulting in the high average self-sufficiency ratio (SSR). Over the last 14 years, SSR averaged at 153.76%, indicating that the country is entirely self-sufficient through domestically produced potato (Table 14). Average IDR is 13.72% for the period, implying a very low dependency on imports.

A linear and positive trend (R^2=0.334) in potato SSR indicates an increasing production over the years. Specifically, the coefficient of determination of the data shows that there is an annual increase of SSR at 5.43%, on an average. However, future trend will be a function of level of farmer engagement and government support.

Table 14. SSR (%), IDR (%), per capita consumption (kg/year) and per capita dietary composition of potato and tapioca, 2006-2019

Commodity	SSR (%)	IDR (%)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
					Calories (kcal/day)	Protein (g/day)	Fat (g/day)
Potato	153.76	13.72	25.9	70.85	47.47	1.13	0.71
Tapioca	100.00	0.00	0.91	2.49	2.71	0.022	0.005

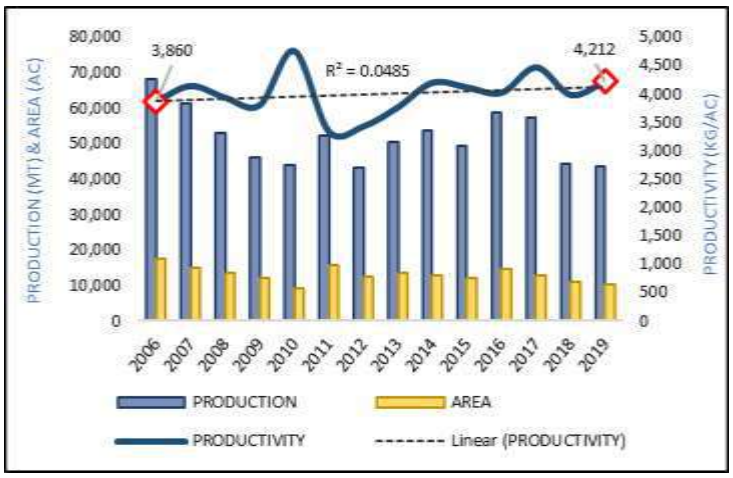

Figure 58. Potato production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

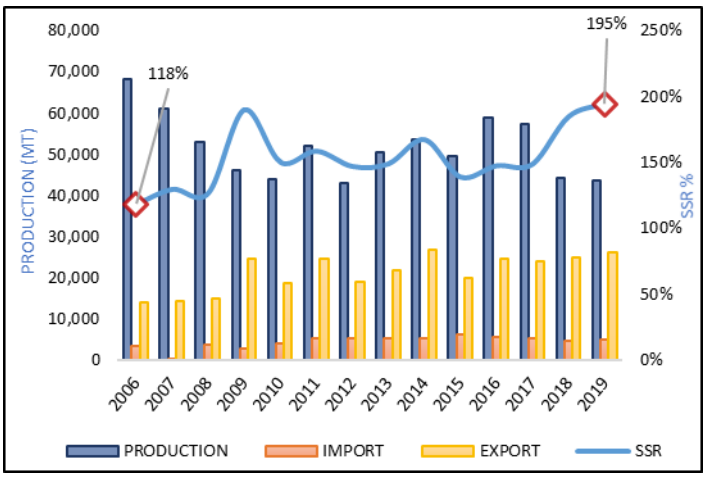

Figure 59. Potato production (MT), import (MT), export (MT) and SSR from 2006 to 2019

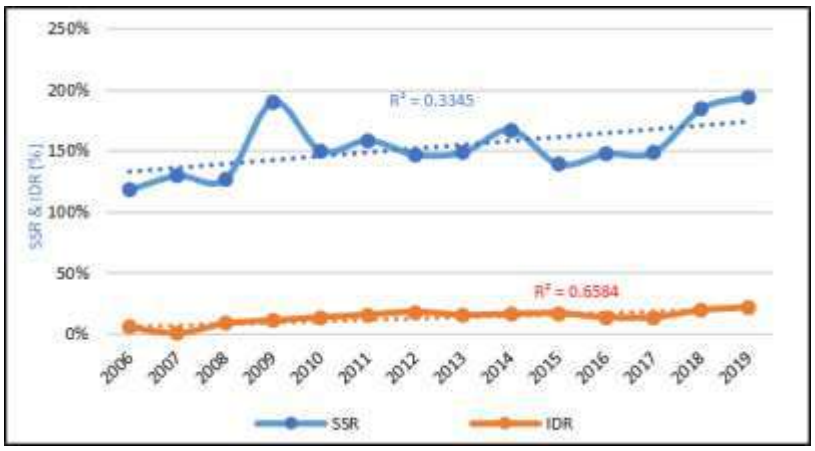

Figure 60. Trends of SSR and IDR of potato from 2006-2019

The per capita potato available for consumption differed from 12.8 to 52.6 kg/year over the last 14 years, depicting a huge range (Annex F.1). The average per capita available for consumption is estimated at 25.9 kg/year which works out to be 70.85 g/day over the years, meaning for every Bhutanese, 70.85 g is available for consumption every day throughout the year on an average. This quantity (70.85 g/day) supplies 47.47 kcal energy, 1.13 g protein and 0.71 g fat per day in terms of dietary composition (Table 14), making potato an important commodity in the food basket. In 2018, per capita consumption of potato in India was 26.04 kg/year which is close to the average figure for Bhutan (FAO, 2021b). However, in Bangladesh per capita consumption was much higher at 51.66 kg/year in 2018 than the calculated average per capita consumption in Bhutan.

At the global level, per capita consumption of potato stands at 32.93 kg/year according to 2018 figures (FAO 2021a). As compared to 118% in 2006, the SSR have increased to 195% in 2019.

4.6.2 Tapioca

Due to lack of import and export data for tapioca, SSR is simply worked out as 100% (Annex F.2), and the IDR as 0%. However, per capita available for consumption is calculated as 0.91 kg/year to fairly represent its small contribution to the food basket. The per capita supply is low as average net quantity available for supply from 2006 to 2019 is 591.8 MT (Annex F.2). Since the per capita supply is low, the resulting dietary nutrient supply is low with 2.71 kcal/day of energy, 0.022 g/day of protein and 0.005g/day of fat (Table 14). Hence, the role of tapioca in nutrient supply to Bhutanese populace is rather insignificant. The SSR have remained same throughout the 14-year period primarily due to lack of import and export.

4.7 Spices

Spices in this report includes cardamom, garlic and ginger. While consumption patterns of these commodities are low, cardamom and ginger in particular are major export commodities and have therefore been included in this study. The average SSR for spices for the 2006-2019 period is therefore estimated at 179.8% with an import dependency ratio of approximately 2%, contributed mainly by a relatively small import of garlic.

Table 15. SSR (%), IDR (%), per capita consumption (kg/year) and per capita dietary composition of spices, 2006-2019

Sl	Commodity	SSR (%)	IDR (%)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
						Calories (kcal)	Fat (g/day)	Protein (g/day)
1	Cardamom	272.8	1.1	1.1	2.9	9.1	0.3	0.2
2	Garlic	95.71	4.29	0.81	2.23	2.90	0.12	0.01
3	Ginger	170.81	0.12	4.51	12.35	42.87	1.12	0.74
	Spices	**179.8**	**1.9**	**6.4**	**17.5**	**54.9**	**1.6**	**0.9**

Spices available for per capita consumption is calculated at 6.4kg/year and about 17.5g/day. Among spices, the ginger per capita consumption availability is high at 4.51 kg/year. In terms of the dietary energy supply, spices contribute 54.9 kcal/day energy, 1.6 g/day fat and 0.9 g/day protein. On account of the high per capita consumption availability, ginger contributes the highest nutritional composition at 42.8 kcal, 1.12 g/day fat and 0.74 g/day protein. For more details, see Annex G (1-3).

4.7.1 Ginger

Similar to cardamom, ginger is also mostly grown as an export commodity. The average SSR for ginger stands at 170% with negligible import. The trends in the SSR for ginger

from 2006-2019 show a drastic increase in 2018, owing to the high export volume wherein almost about 80% of the domestic production was exported. As compared to 107% in 2006, the SSR have increased to 157% in 2019. See figure 64, 66 & 68.

4.7.2 Cardamom (large cardamom)

As major export commodities, cardamom and ginger have a very high SSR at 272.8% and 170.8%. Cardamom in particular is among the top 10 export commodities and the SSR trend analysis from 2006-2019 show a relatively stable trend with negative SSR in 2009, 2018 and 2019. However, the negative SSR here does not imply the nation's dependency on cardamom imports for consumption. Rather, it indicates low production as opposed to the export volumes reported in these years. The negative value of SSR % in some years was due to hoarding of previous year's production resulting from low price in the previous year. The total cardamom available for export is sum of current year's production and hoarded quantity from previous years.

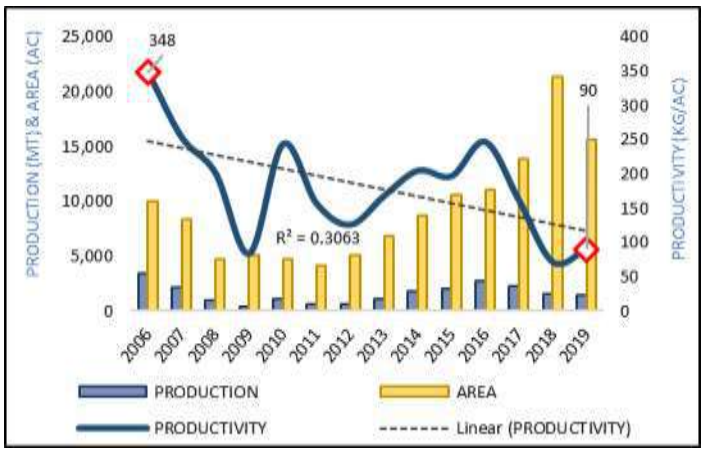

Figure 61. Cardamom production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

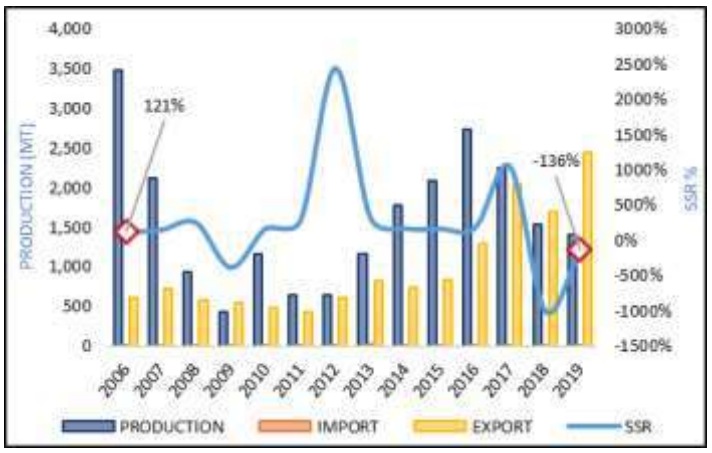

Figure 62. Cardamom production (MT), import (MT), export (MT) and SSR from 2006 to 2019

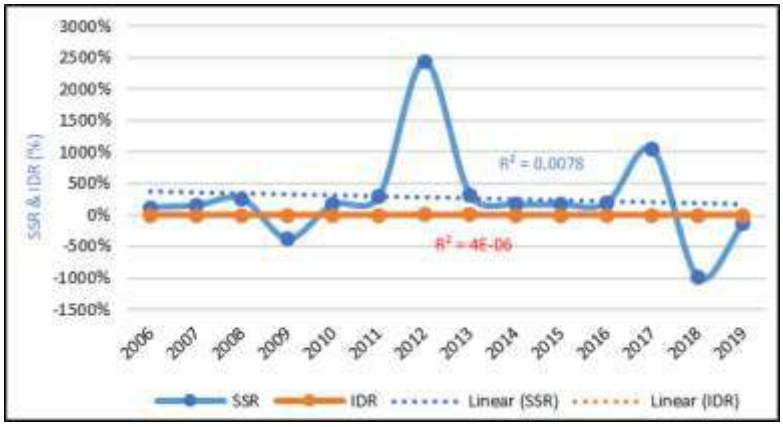

Figure 63. Trends of SSR and IDR of cardamom from 2006-2019

The Goods and Services Tax (GST) imposed and rolled out by India from July 2017 could have influenced production and trade in 2018 and 2019. Concerns amongst growers and exporters who faced difficulties in export of cardamom were reported following the complete halt of all exports – both formal and informal from November 2018 ("Cardamom trade", 2018). Further, the decline in cardamom prices by 16% in India with the ban imposed by Saudi Arabia (Krishnakumar, 2019) on import of Indian cardamoms since 2018 could have also indirectly influenced the price and trade. Market price of cardamom in Bhutan reportedly dropped down to as low as Nu. 450/kg in 2018 from as high as 1500/kg in 2015. The high spike in the SSR in 2012 was due to the increase in export volume.

4.7.3 Garlic

The average SSR for garlic is calculated to 95.71% with an import dependency ratio of 4%. The SSR trends over the period 2006-2019 show a linear declining pattern. As compared to 98 % in 2006, the SSR have decreased to 94 % in 2019. See figure 65, 67 & 69.

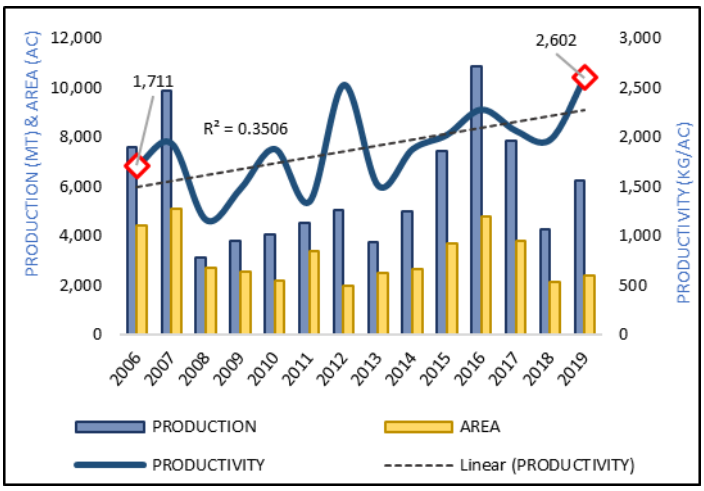

Figure 64. Ginger production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

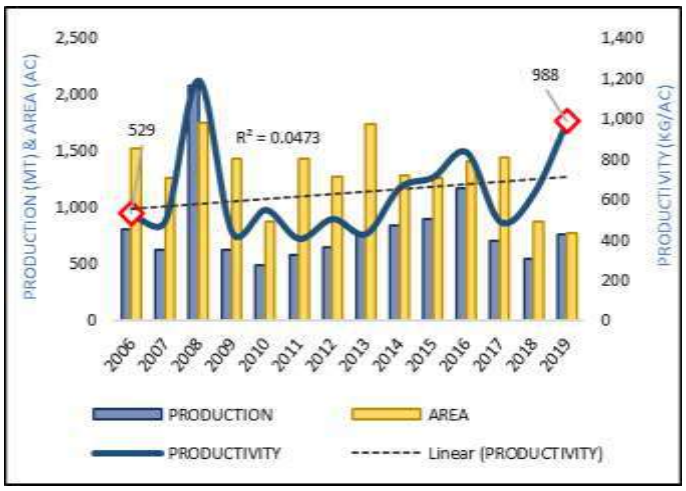

Figure 65. Garlic production (MT), area (ac) and productivity (kg/ac) from 2006 to 2019

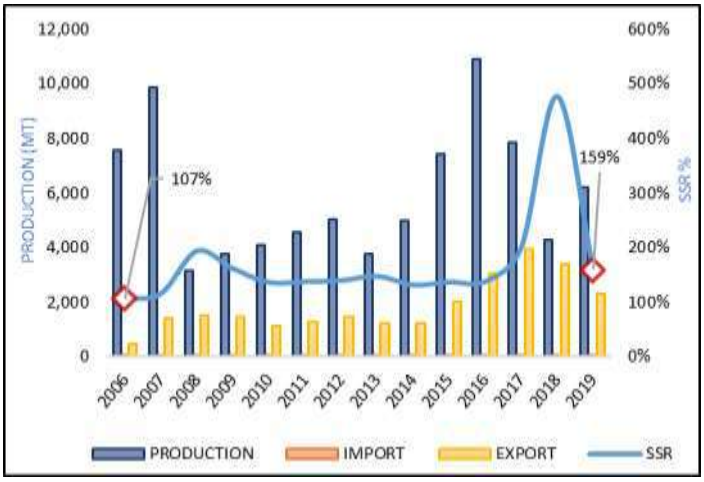

Figure 66. Ginger production (MT), import (MT), export (MT) and SSR from 2006 to 2019

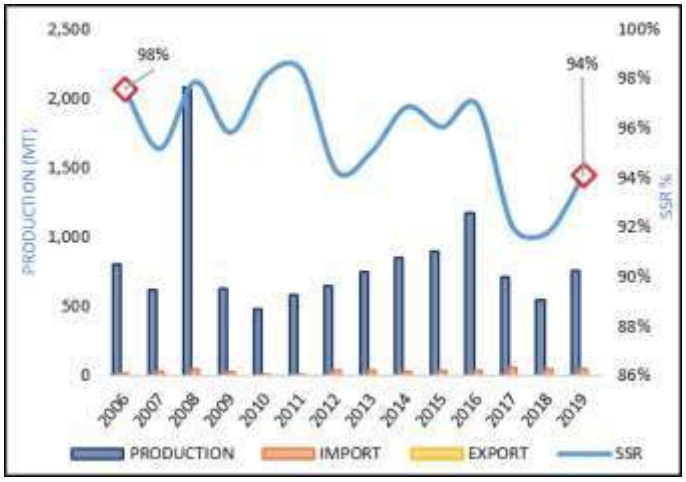

Figure 67. Garlic production (MT), import (MT), export (MT) and SSR from 2006 to 2019

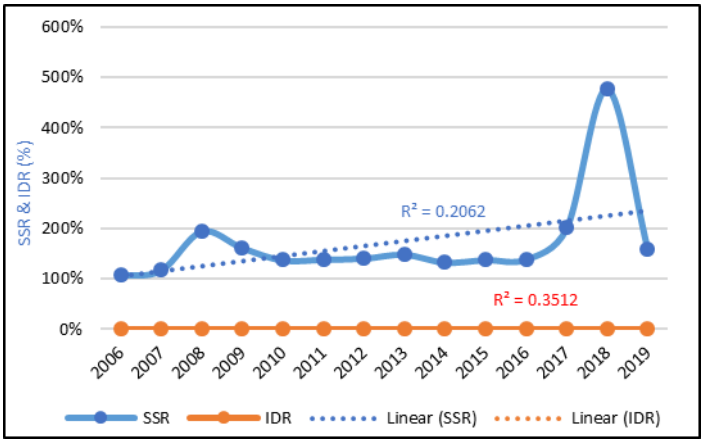

Figure 68. Trends of SSR and IDR of ginger from 2006 to 2019

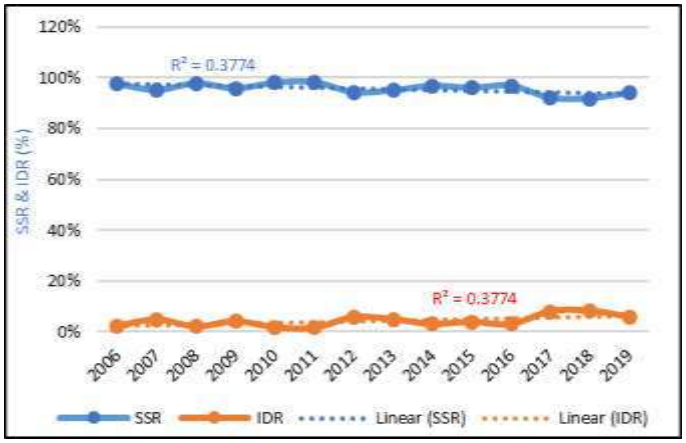

Figure 69. Trends of SSR and IDR of garlic from 2006 to 2019

4.8 Balance of Trade

Balance of trade is the difference between the total value of the country's export and the total value of the country's import.

Balance of Trade= Total Country's Export – Total Country's Import

4.8.1 Cereals

On an average, there is a trade deficit of Nu 322.48 million for rice, wheat, maize and buckwheat for the period 2006-2019, out of which rice contributed the highest to the deficit since Bhutan is a major rice consuming country. Further, as reflected in the statistics over the years, rice production in the country is decreasing. There is an ever-increasing negative trend. As of 2019 the estimated deficit for rice is valued at Nu 1663.23 million (Figure 70). Rice production is gradually decreasing and the country is losing its prime paddy wetland to urbanization. Additionally, more economically viable and less labor and resource intensive crops are taking over paddy cultivation. Despite major interventions in terms of technologies dedicated to increasing productivity, managing soil fertility, disease and pests, and towards effective postproduction, rice growers still face overwhelming constraints, thereby leading to the gradual decrease in paddy area.

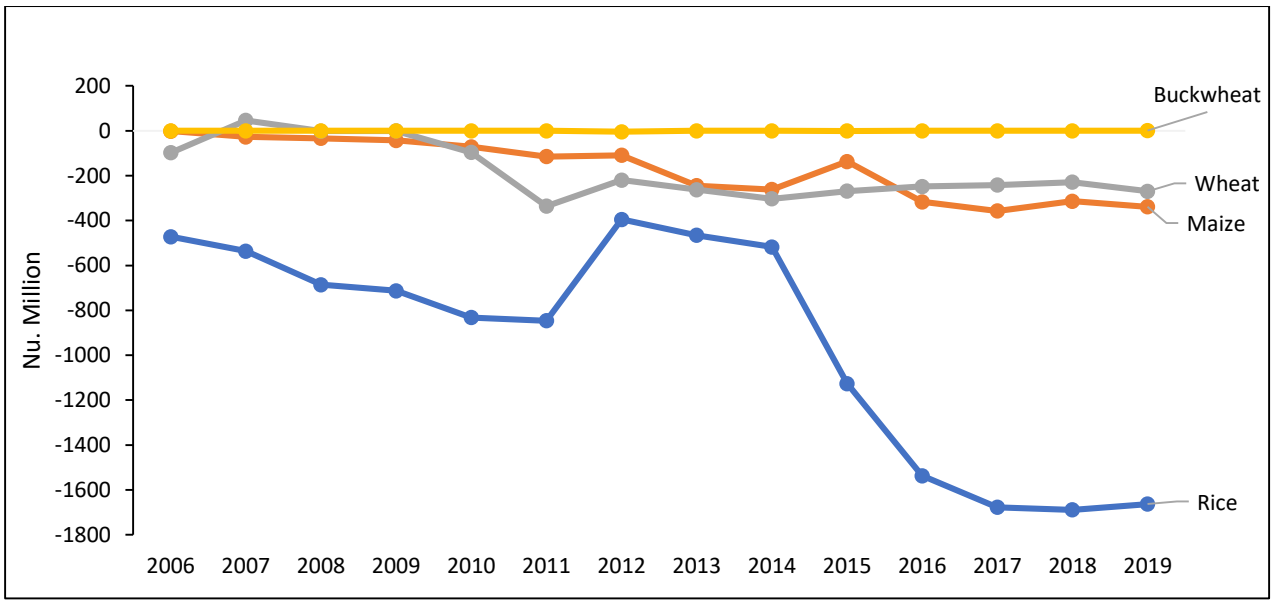

Figure 70. Balance of trade for major cereals

4.8.2 Oilseeds (mustard)

Bhutan imports more oilseeds (mustard) and hence, the commodity recorded a negative trade balance of Nu 83.77 million on average for the period spanning 2006 – 2019 (Figure 71). Balance of trade for all the years is negative, although it is observed that both the import and export quantities have decreased over the years.

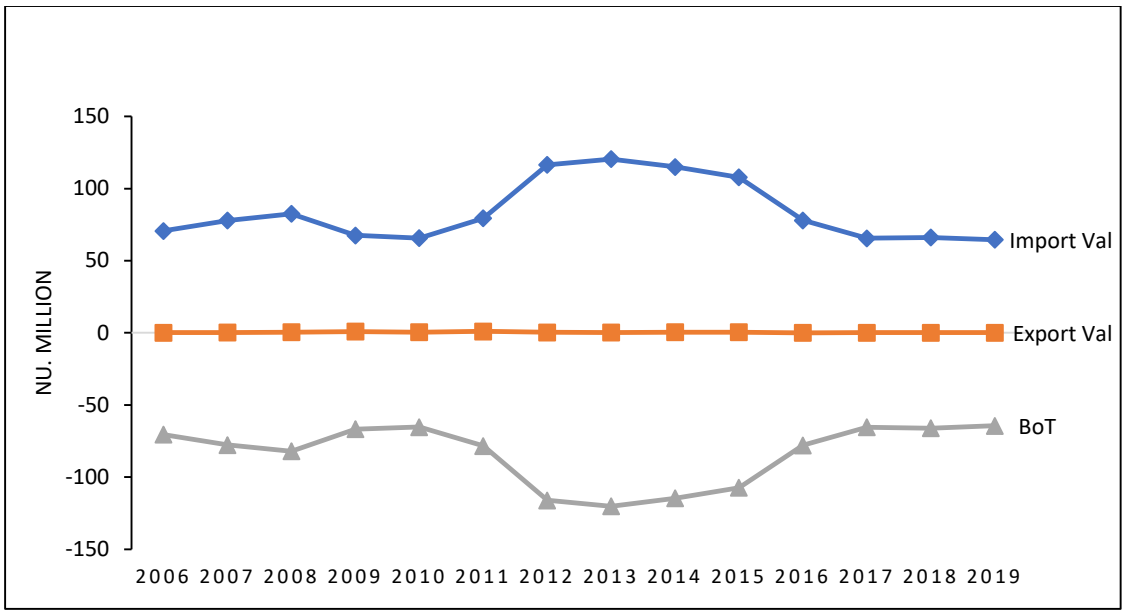

Figure 71. Balance of trade for mustard

4.8.3 Pulses

Overall, for pulses there is an average trade deficit of Nu 28.23 million estimated for the period 2006-2019. With an average deficit of Nu 93.37 million and Nu 20.40 million respectively, lentil and soya bean have always recorded higher imports while mung beans reported trade surpluses in the years 2012, 2013 and 2017 (Figure 72). Meanwhile, kidney beans recorded trade surplus in all the years except for 2019 where the commodity saw a trade deficit owing to a 10-fold increase in import compared to the previous years.

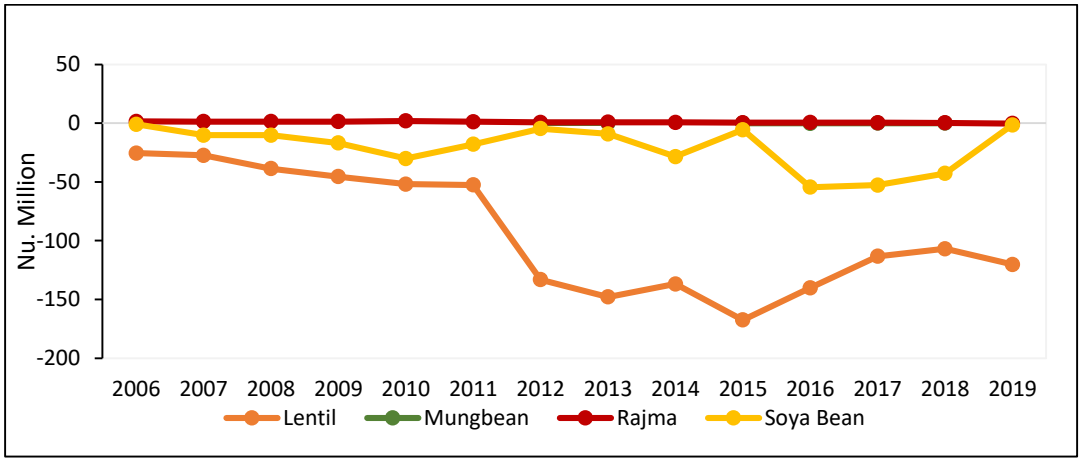

Figure 72. Balance of trade for pulses

4.8.4 Vegetables

Out of 17 vegetable commodities included in this study, green leaves, turnip, radish and lady finger have no record of import or export. Further, bulb onion, broccoli, chilli,

cucumber, tomato, peas, pumpkin, squash and gourd, and brinjal have trade deficits since there is no substantial export, and we are more import dependent for these commodities. While cabbage, cauliflower and beans had trade deficit in the initial years, the export has improved, and consequently these commodities have been recording trade surplus in recent years. Carrots and asparagus are always on the positive side of the trade balance, with no imports of fresh asparagus recorded ever.

Over the years (2006-2019) the overall trade balance for vegetable commodities is estimated at an average of Nu (-)11.86 million (negative trade balance). With an average value of Nu 7.79 million, carrot has the highest value of trade surplus recorded. On the other hand, chilli recorded the highest negative trade volume amongst the 17 listed vegetable commodities with an average deficit of Nu 53.57 million (Figure 73).

Cauliflower, beans and chilli are seeing an improvement in the trade balance since 2017, primarily following the import restriction on these three traded vegetables from India due to their high pesticide contents. Domestic chilli production has since then received huge government support and major interventions have been made by the Department of Agriculture in upscaling commercial production.

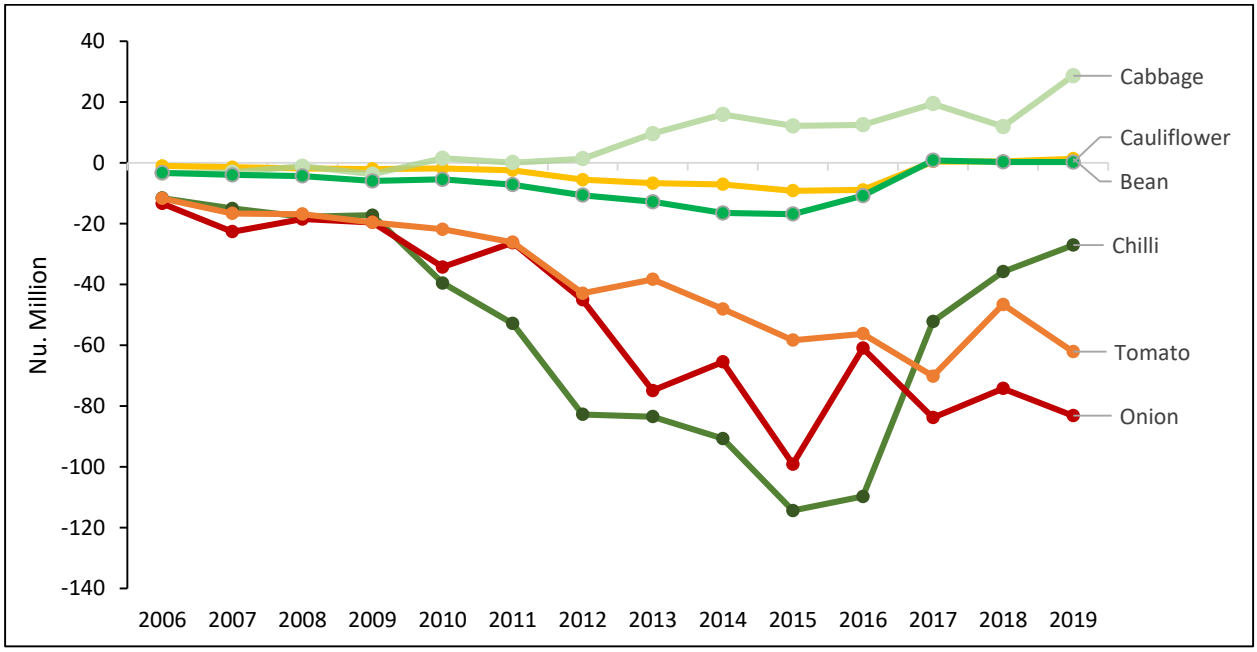

Figure 73. Balance of trade for major vegetables

4.8.5 Mushroom

An average trade surplus of Nu 4.85 million is recorded for the period 2006-2019 during which trade in mushroom steadily increased with record of trade surplus in all the years except for 2015 and 2017 which reported substantial imports (Figure 74). Export of matsutake mushrooms is one of the major contributing factors as the crop commands a

significantly higher price compared to the rest. All years reported the highest quantity of mastutake being exported to Japan.

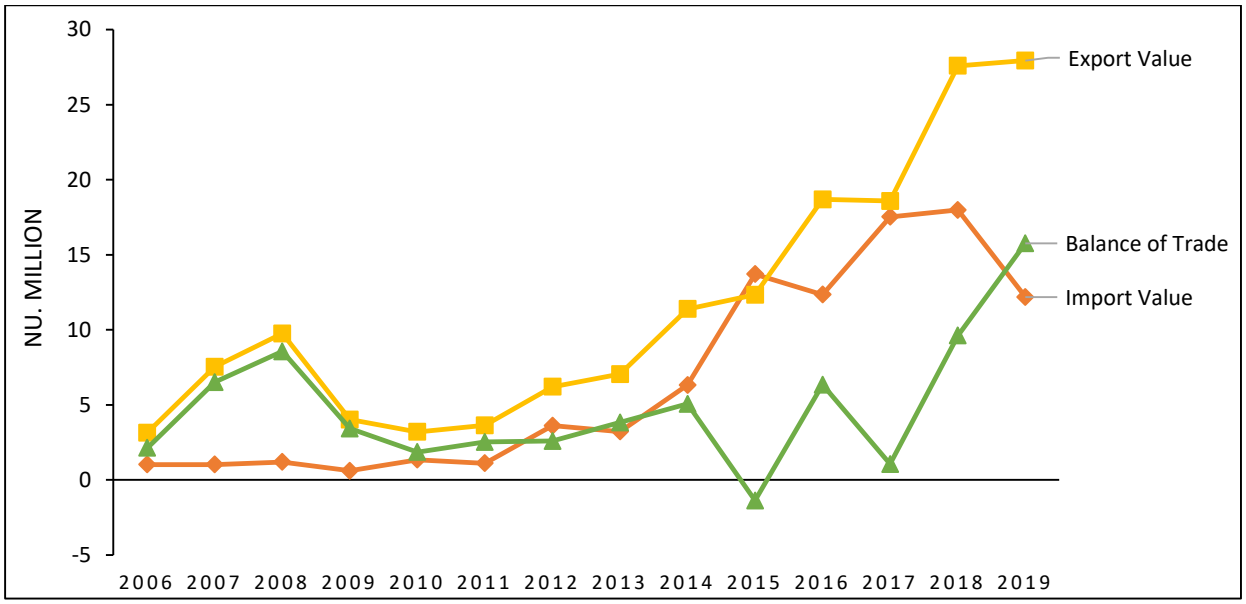

Figure 74. Balance of trade for mushroom

4.8.6 Potato

Over the study period, potato has recorded an average trade surplus of Nu 311.23 million (Figure 75). Potato is one of the major cash crops being exported from Bhutan, and hence it has always reported trade surplus. The year 2014 saw a major spike in the export value as India recorded a decrease in production that year, leading to higher demand for Bhutanese potatoes that eventually fetched higher prices.

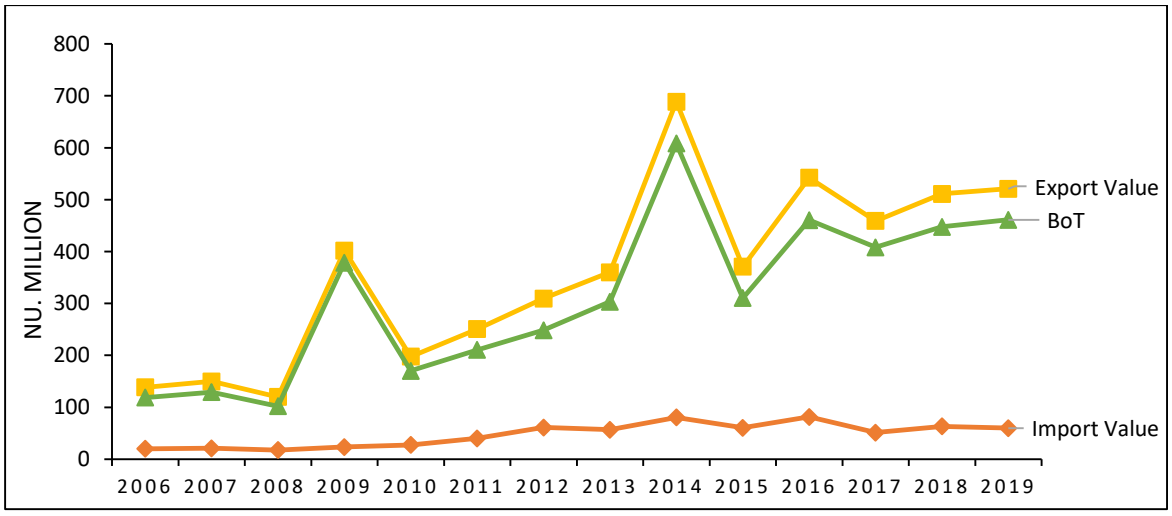

Figure 75. Balance of trade for potato

4.8.7 Spices

Overall, trade balance for spices viz. cardamom, garlic and ginger are positive with an average trade surplus of Nu 217.10 million over the 2006-2019 period (Figure 76). Cardamom and ginger are two major spices cash crops who saw an increasing market with an average trade surplus of Nu 610.18 million and Nu 41.9 million respectively recorded over the years. However, for the same period, garlic recorded an average negative trade balance of around Nu 2.02 million. While ginger has maintained a steady run in export volume, trade in cardamom has increased exponentially over the years although it took a dip in 2018 as a direct result of GST introduction in India. Notwithstanding the trade decline in 2018, farmers are increasingly taking to cardamom farming owing to its lucrative market. India and Bangladesh are the major export countries for these two spices fetching premium prices that rose as high as Nu. 1500 a kilo in 2015.

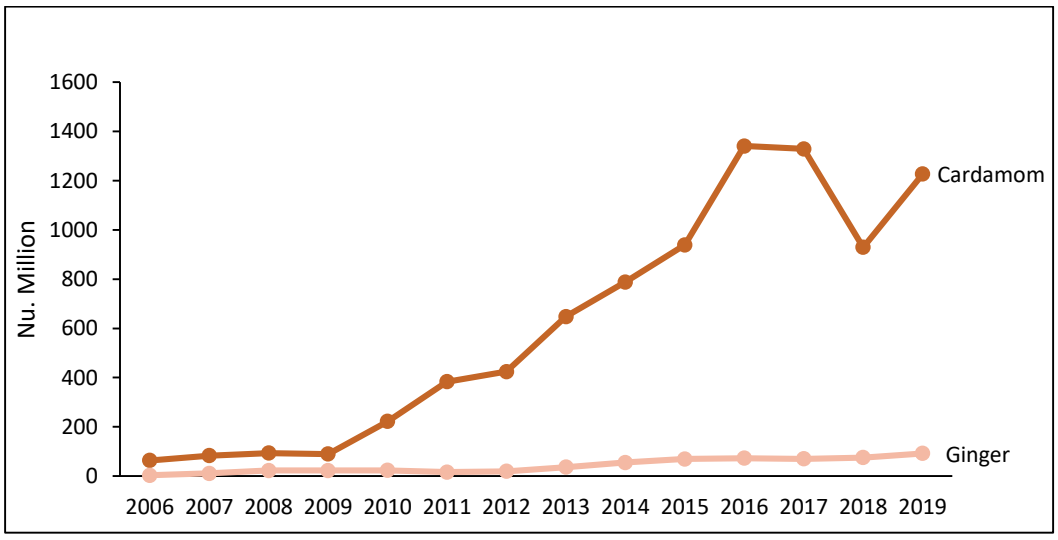

Figure 76. Balance of trade for major spices

4.8.8 Fruits

Of the 17 fruit commodities covered in the study jackfruit, litchi, passionfruit, peach, persimmon, plum, walnut and pomegranate do not have recorded trade data. The other remaining 9 fruits crops recorded an average trade surplus of Nu 168.57 million between the years 2006 and 2019, where mandarin returned the highest trade balance with an average estimated balance of Nu 387.29 million (Figure 77). Apple, mandarin and areca nut are amongst the major cash crops in Bhutan, and appropriately they have recorded trade surpluses in all the years. However, other fruit commodities like banana, pineapple, papaya, mango, pear, guava and cucumber are on the deficit side. Amongst food crops, mandarin has the highest balance of trade next only to cardamom. The dip recorded in 2018 reflects the reduction in the export volume that year.

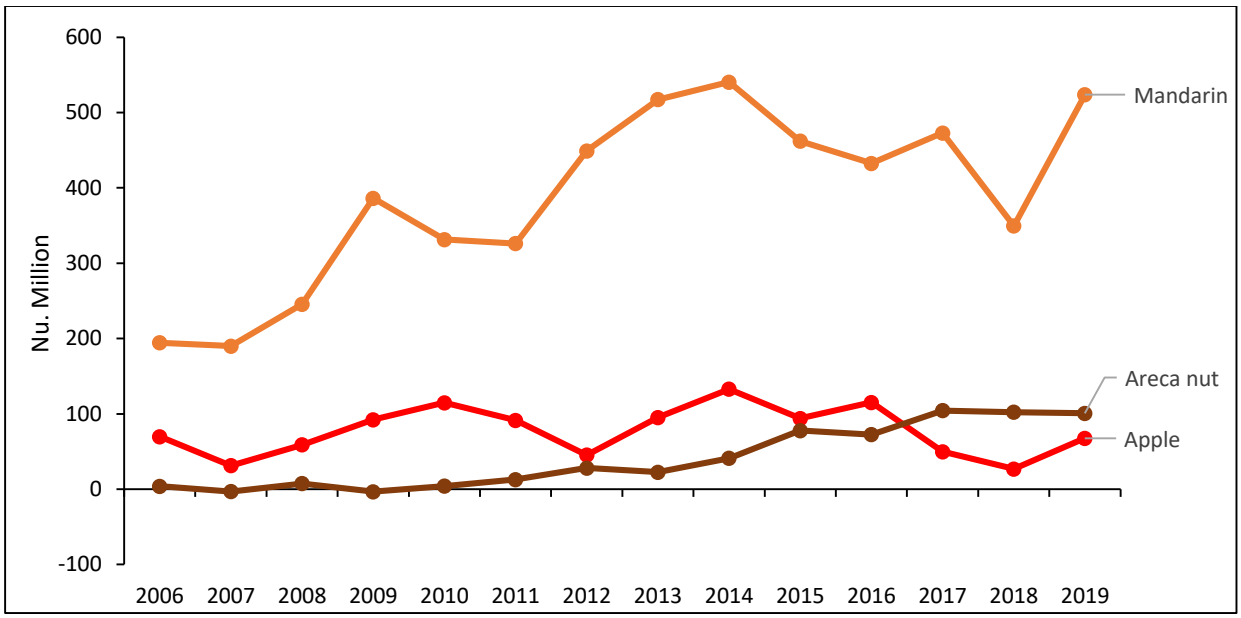

Figure 77. Balance of Trade for major fruits

5 Conclusion

This assessment analyzes the status of the country's domestic capacity for food production and its ability to meet its demand internally. In part it reflects the need to enhance policy tools as well as interventions into maximizing food self-sufficiency, and thereby mitigate risks associated with excessive reliance on external food imports.

Actual food availability is a function of access, affordability, and distribution amongst others. Nonetheless, the available per capita dietary energy supply (DES) and the per capita available for consumption for different commodities assessed in this report provide insights into trends and current status of food availability as an important dimension of food security.

5.1 Cereal

Over the period of 14 years (2006-2019), the average SSR for cereals including rice, maize, wheat, buckwheat, millet and barley is estimated at 77.30% and the corresponding IDR at 26.55% and the per capita available for consumption stands at 215.66 kg/year. Import and export data for rice exhibit a steady decline in the rice SSR over the years with an average SSR of 47.08%. Likewise, maize too showed a steadily declining trend in its SSR with an average of 84.28%. Further, SSR in wheat has also declined drastically over the same period. These declines in SSRs of rice, maize and wheat can be attributed to reductions in domestic production due to a decrease in cultivated area, crop losses to wild animals, declining soil fertility, scarcity of irrigation water, farm labour shortages and challenges associated with diseases and weed infestations. However, the productivity of rice and maize are increasing over the years. We are self-sufficient in other cereals like buckwheat, millet and barley with SSR of $\geq$ 94.64%, although these crops are cultivated on a relatively smaller scale.

5.2 Oilseeds

Bhutan is highly import-dependent in vegetable oils with an average SSR of only 28.86% and the per capita available for consumption averaged at 2.19 kg per year. The domestic production has sharply declined from 3706 MT in 2006 to 394 MT in 2019. Cheap imports of vegetable oil discourage farmers to produce oilseeds domestically.

5.3 Roots and tubers

Potato SSR averages at 153.76% and IDR averages at 13.72% for the assessment period (2006-2019), indicating that the country is entirely self-sufficient through domestic production with very low dependency on imports. There is an increasing trend of SSR over the years. The average per capita available for potato consumption is estimated at 25.9 kg/year. The productivity of potato is increasing over the years with 4212 kg/ac in 2019. Potato is one of the major cash crops being exported from Bhutan, and hence it has recorded

an average trade surplus of Nu 311.23 million a year. Due to the lack of import and export data for tapioca, SSR for the crop has been simply worked out as 100%.

5.4 Pulses

Amongst pulses for the period spanning 2006 and 2019, the average SSR of kidney beans is found to be the highest at 103.84% while IDR at 3.7%, the average SSR for lentil is assessed to be the lowest. The highest per capita supply of protein amongst pulses available for consumption is from soya bean with 1.86 g/day and the lowest from mung bean at 0.41 g/day. Although the SSR for kidney bean has decreased over the years owing to the decrease in production, it has maintained an SSR value greater than 100% for almost all the years except for 2019. Lentil is one of the leguminous crops that is widely consumed, especially in school meals, but the domestic production has been very low with the SSR and IDR over these 14 years averaging at 3.7% and 100.06%, respectively.

The SSR figure for all the years between 2006 and 2019 for mung bean stood at more than 99% owing to limited import and export. Evidently, its IDR for the same period is negligible. For soya beans, the figures are estimated at 49.02% (SSR) and 52.06% (IDR). There is a linear decrease in SSR over the period owing to a decrease in production and increase in import while export has fairly remained the same.

5.5 Vegetables

Analyses of available data from 2006 to 2019 indicate the average self-sufficiency ratio (SSR) for 18 major vegetables at 84%. The average per capita consumption of vegetables is estimated at 73.5 kg/year which is one of the highest among the South Asian countries. This amount (73.5 kg/day) of vegetables supplies a total of 53.5 kcal energy, 2.7 g protein and 0.4 g fat in terms of dietary composition.

Amongst vegetables, chilli, bulb onion and tomato are considered “priority crops” due to their high market demand. Their SSRs are computed at 84%, 18% and 22%, respectively. Most of the chilli produced are consumed domestically. Imports in the form of fresh, dry and crushed chillies, mostly from India, help meet the growing demand for chilli. Bulb onions and tomatoes which are mostly consumed as salad, pickle and cooked as spices are largely imported to meet the internal demand. There is linear increase in productivity in chilli, bulb onion, tomato, cabbage, cauliflower, and other vegetables.

5.6 Fruits

Although at least 25 different fruit crops are cultivated in the country with an overall production of 177,640 MT, this exercise only covers 17 selected fruits due to limitation in data. The overall SSR for fruits stands at 115% with an IDR of around 10%. IDR of pineapple, mango and papaya are quite high at 63%, 48% and 23%, respectively. Apple and mandarin are important export fruit commodities for Bhutan. However, over the years,

apple production has declined and consequently, its SSR has decreased from 357% in 2006 to 276% in 2019. The average SSR for mandarin for the 2006-2014 period stood at 200%. Although the overall trend in SSR has seen a decrease, the current SSR at 220% is an increase from the 2006 value of 142%.

Though the overall self-sufficiency of fruits stands at 115%, the available per capita consumption of fruits is calculated at 143 g which falls below the WHO recommended intake of 160 g. However, the recommended intake could be met if all 25 fruits are considered.

5.7 Spices

In this report, spices include cardamom, garlic and ginger. Cardamom and ginger in particular are major export commodities for Bhutan, and have therefore been included in this study. The average SSR for spices is estimated at 179.8% with an import dependency ratio (IDR) of approximately 2% for the study period (2006-2019). Spices contribute 54.9 kcal/day energy, 1.6 g/day fat and 0.9 g/day protein in terms of the dietary energy supply. The average SSRs of cardamom and ginger over this period of 14 years stand at 272.8% and 170.8%, respectively.

5.8 Balance of Trade

The overall trend in the balance of trade for the study period (2006-2019) is negative. The majority of commodities selected for the study has a negative trend in trade balance except for potato, cardamom, mandarin, apple, ginger, areca nut, carrot, cabbage, mushroom, kidney beans, asparagus and mung beans. Cardamom, mandarin and potato have the highest positive balance of trade. Conversely, rice with an average of Nu. (-) 939.79 million recorded the highest negative trade balance when compared to all the commodities over the years.

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7 Annexures

A SSR%, IDR% and per capita consumption of cereals

7.1.1 SSR%, IDR% and per capita consumption of rice

Year	Production (MT)	Harvest area (Acres)	Production Milled rice (MT)	Import (MT)	Export (MT)	SSR (%)	IDR (%)	Less (seed & industrial use) (MT)	Available for supply (MT)	Eligible Population	Per capita consumption kg/year	Per Capita Consumption g/day	Per capita dietary composition		
													Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	74380.00	67566.00	47249.05	34315.55	0.01	58.49	41.51	1689.15	81564.59	614301	132.78	363.77	1309.57	24.37	2.55
2007	74438.00	67564.00	47286.79	46540.65	109.00	51.03	49.09	1689.10	93718.44	624798	150.00	410.95	1479.43	27.53	2.88
2008	77314.00	47830.78	49476.85	52116.20	90.00	49.13	50.95	1195.77	101503.05	635167	159.81	437.82	1576.16	29.33	3.06
2009	65763.00	58609.00	41793.55	53461.15	119.00	44.49	55.64	1465.23	95135.70	645356	147.42	403.88	1453.97	27.06	2.83
2010	71637.00	56375.00	45647.96	51966.79	375.00	47.44	52.94	1409.38	97239.75	655291	148.39	406.55	1463.59	27.24	2.85
2011	78730.00	59609.00	50205.85	53964.08	80.20	48.71	51.37	1490.23	104089.73	667306	155.99	427.36	1538.48	28.63	2.99
2012	78013.98	52252.00	49859.99	53400.36	59.95	48.74	51.32	1306.30	103200.40	679400	151.90	416.16	1498.19	27.88	2.91
2013	75228.00	48361.00	48112.33	54360.98	118.00	47.41	52.71	1209.03	102355.32	691536	148.01	405.51	1459.84	27.17	2.84
2014	77038.00	48873.00	49280.51	53539.77	7.20	48.33	51.68	1221.83	102813.09	703653	146.11	400.31	1441.12	26.82	2.80
2015	80261.00	49325.00	51368.12	60643.28	6.00	46.25	53.76	1233.13	112005.39	715684	156.50	428.77	1543.57	28.73	3.00
2016	85090.00	53055.00	54446.36	64368.20	5.00	46.22	53.79	1326.38	118809.56	727557	163.30	447.40	1610.62	29.98	3.13
2017	86385.00	51368.00	55315.52	62444.67	6.00	47.35	52.66	1284.20	117754.19	698408	168.60	461.93	1662.94	30.95	3.23
2018	63890.00	37268.00	40922.90	60334.90	10.00	40.77	59.24	931.70	101247.79	705720	143.47	393.06	1415.02	26.34	2.75
2019	49948.00	30314.00	31973.60	61106.29	27.00	34.71	65.32	757.85	93052.89	712973	130.51	357.57	1287.26	23.96	2.50
Average	**74151.14**	**52026.41**	**47352.81**	**54468.78**	**72.31**	**47.08**	**53.00**	**1300.66**	**101749.28**	**676939**	**150.20**	**411.50**	**1481.41**	**27.57**	**2.88**

A.2 SSR%, IDR% and per capita consumption of maize

Year	Production (MT)	Harvest area (Acres)	Import (MT)	SSR %	IDR %	Available for Supply (MT)	Post-harvest losses (MT)	Less (seed and industrial use)	Net grain Available for Consumption	Available for consumption as grits after 45% recovery	Eligible Population	Per capita consumption kg/year	Per Capita Consumption g/day	Per capita dietary composition		
														Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	71062	75,413	575.59	99.20	0.80	71638	14328	6523	50787	22854	614301	37.20	101.93	362.86	9.68	4.38
2007	61789	71,002	2429.50	96.22	3.78	64218	12844	5915	45459	20457	624798	32.74	89.70	319.34	8.52	3.86
2008	66780	67,279	4575.11	93.59	6.41	71355	14271	6340	50744	22835	635167	35.95	98.49	350.64	9.36	4.24
2009	61161	70,603	4608.41	92.99	7.01	65769	13154	6016	46600	20970	645356	32.49	89.02	316.92	8.46	3.83
2010	57663	61,476	6658.02	89.65	10.35	64321	12864	5732	45725	20576	655291	31.40	86.03	306.26	8.17	3.70
2011	79827	70,312	9671.43	89.19	10.81	89498	17900	7671	63928	28767	667306	43.11	118.11	420.47	11.22	5.08
2012	73024	63,488	17966.93	80.25	19.75	90991	18198	7639	65154	29319	679400	43.15	118.23	420.90	11.23	5.08
2013	75715	58,338	19911.20	79.18	20.82	95626	19125	7861	68640	30888	691536	44.67	122.37	435.65	11.63	5.26
2014	77244	58,938	21788.35	78.00	22.00	99032	19806	8111	71115	32002	703653	45.48	124.60	443.58	11.84	5.36
2015	83714	56,805	10977.30	88.41	11.59	94691	18938	7764	67989	30595	715684	42.75	117.12	416.95	11.13	5.04
2016	82035	56,609	23302.75	77.88	22.12	105338	21068	8506	75764	34094	727557	46.86	128.39	457.05	12.20	5.52
2017	94052	66,042	31250.91	75.06	24.94	125303	25061	10092	90150	40568	698408	58.09	159.14	566.54	15.12	6.84
2018	55259	36,836	25908.82	68.08	31.92	81168	16234	6418	58516	26332	705720	37.31	102.23	363.92	9.71	4.40
2019	46235	32,485	17743.18	72.27	27.73	63978	12796	5128	46054	20724	712973	29.07	79.64	283.51	7.57	3.42
Average	**70397**	**60402**	**14097.68**	**84.28**	**15.72**	**84495**	**16899**	**7123**	**60473**	**27213**	**676939**	**40.02**	**109.64**	**390.33**	**10.42**	**4.71**

A.3 SSR%, IDR% and per capita consumption of wheat

Year	Production (MT)	Harvest area (Acres)	Wheat grain Import (MT)	Wheat grain Export (MT)	SSR %	IDR %	Available for supply (MT)	Postharvest loss (MT)	Less (seed & industrial use) (MT)	Wheat flour from total (MT)	Wheat flour import (MT)	Wheat flour export (MT)	Wheat flour available (MT)	Eligible Population	Per capita consumption kg/year	Per Capita Consumption g/day	Per capita dietary composition		
																	Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	9586	17515	457	51	104.25	46.14	9992	192	2699	6391	3407	4017	5781	614301	9.41	25.78	93.85	2.81	0.28
2007	8879	16982	224	0	64.44	35.56	9103	178	2500	5783	4209	0	9991	624798	15.99	43.81	159.48	4.78	0.48
2008	5647	7879	42	2	99.31	3.19	5690	113	1453	3711	125	123	3713	635167	5.85	16.02	58.30	1.75	0.18
2009	3679	7709	119	29	100.50	55.46	3798	74	1068	2391	1720	1756	2355	645356	3.65	10.00	36.39	1.09	0.11
2010	4873	5565	2572	8	40.00	64.37	7445	97	1712	5073	4743	469	9346	655291	14.26	39.08	142.24	4.26	0.43
2011	6266	5802	32204	124	18.20	105.90	38470	125	7926	27377	3824	7127	24073	667306	36.08	98.84	359.76	10.77	1.09
2012	5038	5540	15365	141	25.66	120.27	20403	101	4302	14400	7422	7822	14000	679400	20.61	56.46	205.50	6.15	0.62
2013	4286	5441	14632	138	22.54	118.63	18918	86	4001	13348	7131	6823	13655	691536	19.75	54.10	196.92	5.90	0.60
2014	3465	4910	14679	124	17.54	115.47	18144	69	3825	12824	7322	5731	14416	703653	20.49	56.13	204.31	6.12	0.62
2015	3730	4845	11748	89	20.77	106.46	15478	75	3289	10902	6633	4320	13215	715684	18.46	50.59	184.14	5.51	0.56
2016	2521	3717	5388	30	17.90	92.72	7909	50	1730	5515	6903	1342	11076	727557	15.22	41.71	151.82	4.55	0.46
2017	3833	5259	3510	11	25.52	78.26	7343	77	1679	5029	7420	511	11938	698408	17.09	46.83	170.47	5.10	0.52
2018	1445	2819	3230	22	12.40	95.79	4675	29	1048	3238	7140	858	9520	705720	13.49	36.96	134.52	4.03	0.41
2019	1319	2481	4893	40	10.70	102.99	6212	26	1342	4360	7020	1519	9860	712973	13.83	37.89	137.92	4.13	0.42
Average	**4612**	**6890**	**7790**	**58**	**41.41**	**81.51**	**12398**	**92**	**2755**	**8596**	**5358**	**3030**	**10924**	**676939**	**16.01**	**43.87**	**159.69**	**4.78**	**0.48**

A.4 SSR%, IDR% and per capita consumption of buckwheat

Year	Production (MT)	Harvest area (Acres)	Import (MT)	Export (MT)	SSR %	IDR %	Available for supply (MT)	Postharvest losses (MT)	Less (Seed & Industrial use) (MT)	Total flour available	Eligible Population	Per capita consumption kg/year	Per Capita Consumption g/day	Per capita dietary composition		
														Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	9353	21413	1	0	99.99	0.01	9354	1403	450	7501	614301	12.21	33.45	110.40	3.68	0.67
2007	8105	21700	2	0	99.98	0.02	8107	1216	456	6435	624798	10.30	28.22	93.12	3.10	0.56
2008	5138	8495	1	0	99.98	0.02	5139	771	178	4189	635167	6.60	18.07	59.63	1.99	0.36
2009	3859	9526	1	0	99.97	0.03	3860	579	200	3081	645356	4.77	13.08	43.16	1.44	0.26
2010	3950	7504	2	1	99.96	0.05	3952	593	158	3201	655291	4.89	13.38	44.17	1.47	0.27
2011	8377	10547	16	1	99.82	0.19	8392	1259	221	6912	667306	10.36	28.38	93.64	3.12	0.57
2012	4303	6851	352	2	92.48	7.56	4653	698	144	3811	679400	5.61	15.37	50.72	1.69	0.31
2013	3641	6591	11	1	99.73	0.30	3651	548	138	2965	691536	4.29	11.75	38.77	1.29	0.23
2014	2583	4762	6	1	99.81	0.23	2588	388	100	2100	703653	2.98	8.18	26.98	0.90	0.16
2015	3234	5147	400	2	89.05	11.01	3632	545	108	2979	715684	4.16	11.40	37.63	1.25	0.23
2016	3705	6897	310	6	92.41	7.73	4009	601	145	3263	727557	4.48	12.29	40.55	1.35	0.25
2017	3480	5817	124	0	96.56	3.44	3604	541	122	2941	698408	4.21	11.54	38.08	1.27	0.23
2018	1991	4647	119	4	94.53	5.65	2106	316	98	1693	705720	2.40	6.57	21.69	0.72	0.13
2019	2350	5116	121	21	95.90	4.94	2450	368	107	1975	712973	2.77	7.59	25.05	0.83	0.15
Average	**4576**	**8929**	**105**	**3**	**97.15**	**2.94**	**4678**	**702**	**188**	**3789**	**676939**	**5.72**	**15.66**	**51.68**	**1.72**	**0.31**

A.5 SSR%, IDR% and per capita consumption of millets

Year	Production (MT)	Harvest area (Acres)	Import (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest losses (MT)	Less (seed & industrial use)	Net available for consumption (MT)	Eligible Population	Per capita consumption kg/year	Per Capita Consumption g/day	Per capita dietary composition		
													Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	8785	20978	985	89.92	10.08	9770	977	4711	4082	614301	6.65	18.21	61.90	1.77	0.55
2007	8779	21486	874	90.95	9.05	9653	965	4655	4033	624798	6.45	17.68	60.12	1.72	0.53
2008	5024	8696	926	84.44	15.56	5950	595	2865	2490	635167	3.92	10.74	36.52	1.04	0.32
2009	4231	10121	835	83.52	16.48	5066	507	2442	2118	645356	3.28	8.99	30.57	0.87	0.27
2010	4066	8454	656	86.11	13.89	4722	472	2275	1975	655291	3.01	8.26	28.07	0.80	0.25
2011	7064	9194	784	90.01	9.99	7848	785	3776	3287	667306	4.93	13.50	45.88	1.31	0.40
2012	3965	6462	-	100.00	0.00	3965	397	1910	1659	679400	2.44	6.69	22.74	0.65	0.20
2013	2951	5053	-	100.00	0.00	2951	295	1422	1234	691536	1.78	4.89	16.63	0.47	0.15
2014	2362	4264	-	100.00	0.00	2362	236	1138	988	703653	1.40	3.85	13.08	0.37	0.12
2015	1811	3360	-	100.00	0.00	1811	181	873	757	715684	1.06	2.90	9.86	0.28	0.09
2016	1714	3245	-	100.00	0.00	1714	171	826	717	727557	0.98	2.70	9.18	0.26	0.08
2017	1739	3623	-	100.00	0.00	1739	174	838	727	698408	1.04	2.85	9.69	0.28	0.09
2018	1071	2760	-	100.00	0.00	1071	107	517	447	705720	0.63	1.74	5.90	0.17	0.05
2019	1241	2686	-	100.00	0.00	1241	124	598	519	712973	0.73	1.99	6.77	0.19	0.06
Average	**3915**	**7884**	**843**	**94.64**	**5.36**	**4276**	**428**	**2060**	**1788**	**676939**	**2.74**	**7.50**	**25.49**	**0.73**	**0.22**

A.6 SSR%, IDR% and per capita consumption of barley

Year	Production (MT)	Harvest area (Acres)	Import (MT)	SSR %	IDR %	Available for supply (MT)	Postharvest losses (MT)	Less (seed & industrial use) (MT)	Net Available for consumption (MT)	Eligible Population	Per capita consumption (kg/year)	Per Capita Consumption (g/day)	Per capita dietary composition		
													Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	4003	7494	5	99.88	0.12	4008	801	2103	1104	614301	1.80	4.92	16.35	0.54	0.09
2007	4835	9698	122	97.54	2.46	4957	967	2619	1371	624798	2.19	6.01	19.97	0.66	0.11
2008	2051	3248	41	98.04	1.96	2092	410	1071	610	635167	0.96	2.63	8.74	0.29	0.05
2009	2398	4956	49	98.00	2.00	2447	480	1299	668	645356	1.04	2.84	9.42	0.31	0.05
2010	1445	2654	12	99.18	0.82	1457	289	762	406	655291	0.62	1.70	5.64	0.19	0.03
2011	3110	3927	0	100.00	0.00	3110	622	1557	931	667306	1.40	3.82	12.70	0.42	0.07
2012	2356	3273	0	100.00	0.00	2356	471	1191	694	679400	1.02	2.80	9.29	0.31	0.05
2013	2009	2867	2	99.91	0.09	2011	402	1020	589	691536	0.85	2.34	7.75	0.26	0.04
2014	1753	2447	0	100.00	0.00	1753	351	887	516	703653	0.73	2.01	6.67	0.22	0.04
2015	1800	2520	61	96.70	3.30	1861	360	938	563	715684	0.79	2.16	7.15	0.24	0.04
2016	1702	2451	2	99.91	0.09	1704	340	865	498	727557	0.69	1.88	6.23	0.21	0.03
2017	2005	3421	0	100.00	0.00	2005	401	1039	565	698408	0.81	2.22	7.36	0.24	0.04
2018	929	1715	0	100.00	0.00	929	186	487	257	705720	0.36	1.00	3.31	0.11	0.02
2019	1026	1957	0	99.99	0.01	1026	205	540	281	712973	0.39	1.08	3.58	0.12	0.02
Average	**2244**	**3759**	**21**	**99.23**	**0.77**	**2265**	**449**	**1170**	**647**	**676939**	**0.97**	**2.67**	**8.87**	**0.29**	**0.05**

B SSR%, IDR% and per capita consumption of mustard

Year	Production (MT)	Harvest area (Acres)	Seed Import (MT)	Seed Export (MT)	SSR %	IDR %	Available for supply (MT)	Postharvest losses (MT)	Less (seed & industrial use) (MT)	33% oil recovery from seed (MT)	Oil Import (MT)	Oil Export (MT)	Net Available for Consumption (MT)	Eligible Population	Per capita consumption (kg/year)	Per Capita Consumption (g/day)	Per capita dietary composition		
																	Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	3706	13123	0	0	43.74	56.39	3706	371	66	1079	0	0	1079	614301	1.76	4.81	22.57	1.20	1.39
2007	3385	14305	64	13	67.23	33.04	3436	339	72	998	528	0	1526	624798	2.44	6.69	31.39	1.67	1.93
2008	3353	13714	79	20	45.36	54.91	3412	335	69	993	1313	0	2306	635167	3.63	9.95	46.65	2.48	2.86
2009	1741	5570	69	39	31.00	69.89	1771	174	28	518	1272	3	1787	645356	2.77	7.59	35.58	1.89	2.18
2010	1332	3106	13	17	27.51	72.93	1328	133	16	389	1161	1	1549	655291	2.36	6.48	30.37	1.61	1.87
2011	2344	3101	14	43	38.65	62.18	2314	234	16	681	1240	2	1919	667306	2.88	7.88	36.95	1.96	2.27
2012	790	2687	5	16	14.95	85.36	779	79	13	227	1487	0	1714	679400	2.52	6.91	32.41	1.72	1.99
2013	995	3148	21	9	18.78	81.45	1006	100	16	294	1417	1	1710	691536	2.47	6.78	31.78	1.69	1.95
2014	867	2783	18	20	17.59	82.81	866	87	14	252	1341	0	1593	703653	2.26	6.20	29.09	1.54	1.79
2015	925	2422	10	10	19.68	80.69	925	93	12	271	1248	3	1516	715684	2.12	5.80	27.22	1.45	1.67
2016	887	2395	20	2	24.77	75.29	905	89	12	265	883	0	1148	727557	1.58	4.32	20.28	1.08	1.25
2017	969	2697	9	3	29.23	70.95	975	97	13	285	773	1	1058	698408	1.51	4.15	19.46	1.03	1.19
2018	244	1103	2	3	9.83	90.29	243	24	6	70	739	0	809	705720	1.15	3.14	14.73	0.78	0.90
2019	394	1664	13	3	15.66	84.47	404	39	8	117	697	0	815	712973	1.14	3.13	14.68	0.78	0.90
Average	**1567**	**5130**	**24**	**14**	**28.86**	**71.47**	**1576**	**157**	**26**	**460**	**1007**	**1**	**1466**	**676939**	**2.19**	**5.99**	**28.08**	**1.49**	**1.72**

C SSR%, IDR% and per capita consumption of pulses

C.1 SSR%, IDR% and per capita consumption of kidney beans

Year	Production (MT)	Area (acre)	Import (MT)	Export (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Less (seed & industrial use) (MT)	Net available for consumption (MT)	Eligible Population	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary consumption		
														Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	1279	2908	0	69.53	105.75	0.00	1209	38.37	87.24	1,083.86	614301	1.764	4.834	16.484	1.068	0.082
2007	1988	4367	0.75	56.03	102.86	0.04	1933	59.64	131.01	1,742.07	624798	2.788	7.639	26.049	1.688	0.130
2008	706	1293	0	51.26	107.83	0.00	654	21.17	38.79	594.47	635167	0.936	2.564	8.744	0.567	0.044
2009	576	1393	1.8	48.26	108.77	0.34	530	17.28	41.79	470.47	645356	0.729	1.997	6.811	0.441	0.034
2010	471	1362	0	63.53	115.59	0.00	407	14.13	40.86	352.49	655291	0.538	1.474	5.025	0.326	0.025
2011	873	1124	0.519	41.39	104.91	0.06	832	26.19	33.72	772.22	667306	1.157	3.170	10.811	0.701	0.054
2012	514	1150	2.1	16.79	102.94	0.42	499	15.42	34.50	449.39	679400	0.661	1.812	6.180	0.400	0.031
2013	965	1724	0.71	13.83	101.38	0.07	952	28.95	51.72	871.21	691536	1.260	3.452	11.770	0.763	0.059
2014	991	1668	0	10.22	101.04	0.00	981	29.73	50.04	901.01	703653	1.280	3.508	11.963	0.775	0.060
2015	847	1357	2.18	8.66	100.77	0.26	841	25.41	40.71	774.40	715684	1.082	2.965	10.109	0.655	0.050
2016	994	1565	0	12.89	101.31	0.00	981	29.82	46.95	904.34	727557	1.243	3.405	11.613	0.753	0.058
2017	932	2236	0	6.30	100.68	0.00	926	27.96	67.08	830.66	698408	1.189	3.259	11.112	0.720	0.055
2018	99	1913	0.41	6.10	100.72	0.05	793	23.97	57.39	711.95	705720	1.009	2.764	9.425	0.611	0.047
2019	666	1590	10	4.23	99.14	1.49	672	19.98	47.70	604.09	712973	0.847	2.321	7.916	0.513	0.039
Average	**900.05**	**1832.14**	**1.32**	**29.21**	**103.84**	**0.20**	**872.15**	**27.00**	**54.96**	**790.19**	**676939**	**1.18**	**3.23**	**11.00**	**0.71**	**0.05**

C.2 SSR%, IDR% and per capita consumption of lentil

Year	Production (MT)	Area (acre)	Import (MT)	Export (MT)	SSR %	IDR %	Milling Recovery (MT)	Available for Supply (MT)	Postharvest loss (MT)	Less (seed & industrial use) (MT)	Net available for consumption (MT)	Eligible Population	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary consumption		
															Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	47.02	177.65	1186.05	17.27	3.87	97.55	35.27	1204.05	36.12	24.87	1143.06	614301	1.86	5.10	17.64	1.23	0.09
2007	42.35	204.84	446.29	16.10	8.96	94.44	31.76	461.95	13.86	28.68	419.42	624798	0.67	1.84	6.36	0.45	0.03
2008	38.96	214.00	1364.10	13.72	2.80	98.18	29.22	1379.60	41.39	29.96	1308.25	635167	2.06	5.64	19.52	1.37	0.10
2009	44.80	233.86	1221.70	20.26	3.59	98.03	33.60	1235.04	37.05	32.74	1165.25	645356	1.81	4.95	17.12	1.20	0.09
2010	51.00	252.17	1534.25	49.35	3.32	99.89	38.25	1523.15	45.69	35.30	1442.15	655291	2.20	6.03	20.86	1.46	0.11
2011	58.00	101.00	1600.74	86.45	3.69	101.81	43.50	1557.79	46.73	14.14	1496.92	667306	2.24	6.15	21.26	1.49	0.11
2012	19.00	60.00	2969.60	85.36	0.65	102.29	14.25	2898.49	86.95	8.40	2803.14	679400	4.13	11.30	39.11	2.74	0.20
2013	22.00	368.00	3037.36	110.11	0.75	102.99	16.50	2943.75	88.31	51.52	2803.92	691536	4.05	11.11	38.44	2.69	0.20
2014	74.00	269.00	2663.57	135.79	2.84	102.37	55.50	2583.28	77.50	37.66	2468.12	703653	3.51	9.61	33.25	2.33	0.17
2015	82.00	353.00	2647.75	118.28	3.14	101.39	61.50	2590.97	77.73	49.42	2463.82	715684	3.44	9.43	32.63	2.28	0.17
2016	59.33	362.00	2103.19	81.94	4.56	99.31	44.50	2065.75	61.97	50.68	1953.10	727557	2.68	7.35	25.45	1.78	0.13
2017	96.50	457.00	2141.25	94.79	4.50	99.92	72.38	2118.84	63.57	63.98	1991.29	698408	2.85	7.81	27.03	1.89	0.14
2018	138.00	617.00	2116.80	112.11	6.44	98.79	103.50	2108.19	63.25	86.38	1958.56	705720	2.78	7.60	26.31	1.84	0.14
2019	55.00	297.00	2141.26	133.50	2.67	103.81	41.25	2049.01	61.47	41.58	1945.96	712973	2.73	7.48	25.87	1.81	0.13
Average	**59.14**	**283.32**	**1940.99**	**76.79**	**3.70**	**100.06**	**44.36**	**1908.56**	**57.26**	**39.67**	**1811.64**	**676939**	**2.64**	**7.24**	**25.06**	**1.75**	**0.13**

C.3 SSR%, IDR% and per capita consumption of mung bean

Year	Production (MT)	Area (acre)	Import (MT)	Export (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Less (seed & industrial use) (MT)	Net available for consumption (MT)	Eligible Population	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary consumption		
														Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	549.00	1336.00	0.00	0.00	100.00	0.00	549.00	16.47	4.94	527.59	614301	0.86	2.35	8.05	0.55	0.04
2007	1153.00	2024.00	0.00	0.00	100.00	0.00	1153.00	34.59	10.38	1108.03	624798	1.77	4.86	16.62	1.14	0.09
2008	251.22	807.78	0.00	0.00	100.00	0.00	251.22	7.54	2.26	241.42	635167	0.38	1.04	3.56	0.24	0.02
2009	253.00	942.00	0.00	0.00	100.00	0.00	253.00	7.59	2.28	243.13	645356	0.38	1.03	3.53	0.24	0.02
2010	319.00	654.00	0.00	0.00	100.00	0.00	319.00	9.57	2.87	306.56	655291	0.47	1.28	4.38	0.30	0.02
2011	579.00	718.00	0.00	0.00	100.00	0.00	579.00	17.37	5.21	556.42	667306	0.83	2.28	7.81	0.53	0.04
2012	165.00	365.00	0.00	1.60	100.98	0.00	163.40	4.95	1.49	156.97	679400	0.23	0.63	2.16	0.15	0.01
2013	315.00	625.00	0.17	3.20	100.97	0.05	311.97	9.45	2.84	299.69	691536	0.43	1.19	4.06	0.28	0.02
2014	577.00	1171.00	0.00	0.00	100.00	0.00	577.00	17.31	5.19	554.50	703653	0.79	2.16	7.38	0.51	0.04
2015	466.00	921.00	0.21	0.00	99.95	0.05	466.21	13.98	4.19	448.04	715684	0.63	1.72	5.87	0.40	0.03
2016	482.00	952.00	2.66	0.00	99.45	0.55	484.66	14.46	4.34	465.86	727557	0.64	1.75	6.00	0.41	0.03
2017	298.00	922.00	1.03	0.00	99.66	0.34	299.03	8.94	2.68	287.41	698408	0.41	1.13	3.86	0.26	0.02
2018	381.00	1114.50	0.19	0.00	99.95	0.05	381.19	11.43	3.43	366.33	705720	0.52	1.42	4.86	0.33	0.03
2019	464.00	1307.00	0.00	0.00	100.00	0.00	464.00	13.92	4.18	445.90	712973	0.63	1.71	5.86	0.40	0.03
Average	**446.59**	**989.95**	**0.30**	**0.34**	**100.07**	**0.07**	**446.55**	**13.40**	**4.02**	**429.13**	**676939**	**0.64**	**1.75**	**6.00**	**0.41**	**0.03**

C.4 SSR%, IDR% and per capita consumption of soya bean

Year	Production (MT)	Area (acre)	Import (MT)	Export (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Less (seed & industrial use) (MT)	Net available for consumption (MT)	Eligible Population	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary consumption		
														Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	1419	3196	66.41	10.69	96.22	4.50	1474.72	42.57	42.57	1389.58	614301	2.26	6.20	20.76	2.36	1.12
2007	1413	4589	603.04	6.30	70.31	30.01	2009.74	42.39	42.39	1924.96	624798	3.08	8.44	28.28	3.21	1.52
2008	729	1441	496.20	4.44	59.72	40.65	1220.80	21.87	21.87	1177.06	635167	1.85	5.08	17.01	1.93	0.91
2009	546	1667	702.62	27.83	44.72	57.55	1220.79	16.38	16.38	1188.03	645356	1.84	5.04	16.90	1.92	0.91
2010	402	1354	1383.83	19.33	22.76	78.34	1766.50	12.06	12.06	1742.38	655291	2.66	7.28	24.40	2.77	1.31
2011	826	1302	625.69	4.70	57.08	43.24	1447.00	24.78	24.78	1397.44	667306	2.09	5.74	19.22	2.18	1.03
2012	294	979	159.62	1.33	65.00	35.29	452.29	8.82	8.82	434.65	679400	0.64	1.75	5.87	0.67	0.32
2013	424	1195	226.10	6.50	65.88	35.13	643.60	12.72	12.72	618.16	691536	0.89	2.45	8.20	0.93	0.44
2014	301	710	669.25	4.18	31.16	69.28	966.07	9.03	9.03	948.01	703653	1.35	3.69	12.37	1.40	0.66
2015	220	527	160.93	4.8	58.49	42.79	376.13	6.60	6.60	362.93	715684	0.51	1.39	4.65	0.53	0.25
2016	254	544	1268.35	1.75	16.70	83.41	1520.60	7.62	7.62	1505.36	727557	2.07	5.67	18.99	2.15	1.02
2017	204	867	1667.23	40.84	11.15	91.09	1830.39	6.12	6.12	1818.15	698408	2.60	7.13	23.89	2.71	1.28
2018	107	377	1926.34	7.40	5.28	95.08	2025.94	3.21	3.21	2019.52	705720	2.86	7.84	26.26	2.98	1.41
2019	171	621	47.12	9.00	81.77	22.53	209.12	5.13	5.13	198.86	712973	0.28	0.76	2.56	0.29	0.14
Average	**522.15**	**1383.50**	**714.48**	**10.65**	**49.02**	**52.06**	**1225.98**	**15.66**	**15.66**	**1194.65**	**676939**	**1.79**	**4.89**	**16.38**	**1.86**	**0.88**

D SSR%, IDR% and per capita consumption of vegetables

D.1 SSR%, IDR% and per capita consumption of bulb onion

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	646	1881	0	2527	97	26	74	614301	2430	4.0	10.8	2.98	0.15	0.02
2007	779	830	0	1609	117	48	52	624798	1492	2.4	6.5	1.80	0.09	0.01
2008	1702	1948	0	3650	255	47	53	635167	3395	5.3	14.6	4.03	0.21	0.02
2009	392	2016	0	2408	59	16	84	645356	2349	3.6	10.0	2.74	0.14	0.01
2010	243	2186	0	2429	36	10	90	655291	2392	3.7	10.0	2.75	0.14	0.02
2011	285	1786	0	2071	43	14	86	667306	2028	3.0	8.3	2.29	0.12	0.01
2012	264	3409	0	3673	40	7	93	679400	3634	5.3	14.7	4.03	0.21	0.02
2013	420	2815	0	3235	63	13	87	691536	3172	4.6	12.6	3.46	0.18	0.02
2014	757	3100	0	3857	114	20	80	703653	3744	5.3	14.6	4.01	0.20	0.02
2015	608	3412	0	4020	91	15	85	715684	3929	5.5	15.0	4.14	0.21	0.02
2016	414	3502	0	3916	62	11	89	727557	3854	5.3	14.5	3.99	0.20	0.02
2017	489	3776	0	4265	73	11	89	698408	4192	6.0	16.4	4.52	0.23	0.02
2018	305	3588	0	3893	46	8	92	705720	3847	5.5	14.9	4.11	0.21	0.02
2019	155	3354	0	3509	23	4	96	712973	3486	4.9	13.4	3.68	0.19	0.02
Average	**533**	**2686**	**0**	**3219**	**80**	**18**	**82**	**676939**	**3139**	**4.6**	**12.6**	**3.47**	**0.18**	**0.02**

D.2 SSR%, IDR% and per capita consumption of chilli

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	11606	1357	24	12939	928	90	10	614301	12011	19.6	53.6	13.39	0.59	0.16
2007	8368	428	21	8775	669	95	5	624798	8105	13.0	35.5	8.89	0.39	0.11
2008	7312	1631	26	8917	585	82	18	635167	8332	13.1	35.9	8.99	0.40	0.11
2009	8887	1648	22	10513	711	85	16	645356	9802	15.2	41.6	10.40	0.46	0.12
2010	6696	1613	8	8301	536	81	19	655291	7765	11.9	32.5	8.12	0.36	0.10
2011	8121	4905	14	13012	650	62	38	667306	12362	18.5	50.8	12.69	0.56	0.15
2012	7726	2287	90	9923	618	78	23	679400	9305	13.7	37.5	9.38	0.41	0.11
2013	8508	2279	103	10684	681	80	21	691536	10003	14.5	39.6	9.91	0.44	0.12
2014	8586	2401	105	10883	687	79	22	703653	10196	14.5	39.7	9.92	0.44	0.12
2015	7173	2690	16	9847	574	73	27	715684	9273	13.0	35.5	8.87	0.39	0.11
2016	9907	2253	17	12143	793	82	19	727557	11350	15.6	42.7	10.69	0.47	0.13
2017	13606	910	18	14498	1088	94	6	698408	13409	19.2	52.6	13.15	0.58	0.16
2018	7133	401	21	7514	571	95	5	705720	6943	9.8	27.0	6.74	0.30	0.08
2019	7673	258	11	7920	614	97	3	712973	7306	10.2	28.1	7.02	0.31	0.08
Average	**8664**	**1790**	**35**	**10419**	**693**	**84**	**17**	**676939**	**9726**	**14.4**	**39.5**	**9.87**	**0.43**	**0.12**

D.3 SSR%, IDR% and per capita consumption of cabbage

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	4298	1150	126	5322	473	81	22	614301	4849	7.9	21.6	4.11	0.22	0.02
2007	4462	116	200	4378	491	102	3	624798	3887	6.2	17.0	3.24	0.17	0.02
2008	1553	1150	474	2229	171	70	52	635167	2058	3.2	8.9	1.69	0.09	0.01
2009	1776	1175	283	2668	195	67	44	645356	2473	3.8	10.5	1.99	0.10	0.01
2010	1299	1150	752	1697	143	77	68	655291	1554	2.4	6.5	1.23	0.06	0.01
2011	2130	1380	705	2805	234	76	49	667306	2571	3.9	10.6	2.01	0.11	0.01
2012	3413	1404	1057	3760	375	91	37	679400	3384	5.0	13.6	2.59	0.14	0.01
2013	3961	1331	1426	3866	436	102	34	691536	3430	5.0	13.6	2.58	0.14	0.01
2014	4364	1544	1717	4191	480	104	37	703653	3711	5.3	14.4	2.75	0.14	0.01
2015	5209	1518	1194	5533	573	94	27	715684	4960	6.9	19.0	3.61	0.19	0.02
2016	6685	1382	1545	6522	735	103	21	727557	5786	8.0	21.8	4.14	0.22	0.02
2017	10562	1663	2096	10129	1162	104	16	698408	8967	12.8	35.2	6.68	0.35	0.04
2018	4036	1329	1247	4117	444	98	32	705720	3673	5.2	14.3	2.71	0.14	0.01
2019	6069	1368	2608	4829	668	126	28	712973	4161	5.8	16.0	3.04	0.16	0.02
Average	**4273**	**1261**	**1102**	**4432**	**470**	**92**	**34**	**676939**	**3962**	**5.8**	**15.9**	**3.03**	**0.16**	**0.02**

D.4 SSR%, IDR% and per capita consumption of cauliflower

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	798	634	0	1432	120	56	44	614301	1312	2.1	5.9	0.53	0.05	0.01
2007	649	618	0	1267	97	51	49	624798	1170	1.9	5.1	0.46	0.04	0.01
2008	371	686	0	1057	56	35	65	635167	1001	1.6	4.3	0.39	0.03	0.004
2009	364	663	1	1027	55	35	65	645356	972	1.5	4.1	0.37	0.03	0.004
2010	329	716	1	1044	49	32	69	655291	995	1.5	4.2	0.37	0.03	0.004
2011	2130	811	3	2938	320	72	28	667306	2619	3.9	10.8	0.97	0.09	0.01
2012	829	873	4	1698	124	49	51	679400	1573	2.3	6.3	0.57	0.05	0.01
2013	922	1035	7	1950	138	47	53	691536	1811	2.6	7.2	0.65	0.06	0.01
2014	1650	1200	5	2845	248	58	42	703653	2597	3.7	10.1	0.91	0.08	0.01
2015	1586	1193	8	2771	238	57	43	715684	2533	3.5	9.7	0.87	0.08	0.01
2016	2082	751	24	2809	312	74	27	727557	2496	3.4	9.4	0.85	0.08	0.01
2017	3575	0	82	3493	536	102	0	698408	2957	4.2	11.6	1.04	0.09	0.01
2018	1191	0	9	1182	179	101	0	705720	1004	1.4	3.9	0.35	0.03	0.004
2019	1446	0	8	1438	217	101	0	712973	1221	1.7	4.7	0.42	0.04	0.005
Average	**1280**	**656**	**11**	**1925**	**192**	**62**	**38**	**676939**	**1733**	**2.5**	**6.9**	**0.63**	**0.06**	**0.01**

D.5 SSR%, IDR% and per capita consumption of broccoli

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	335	14	0	349	50	96	4	614301	299	0.5	1.3	0.45	0.04	0.01
2007	473	14	0	487	71	97	3	624798	416	0.7	1.8	0.62	0.05	0.01
2008	400	15	0	415	60	96	4	635167	355	0.6	1.5	0.52	0.04	0.01
2009	176	15	0	191	26	92	8	645356	164	0.3	0.7	0.24	0.02	0.003
2010	124	16	0	140	19	89	11	655291	121	0.2	0.5	0.17	0.01	0.002
2011	270	18	0	288	41	94	6	667306	247	0.4	1.0	0.35	0.03	0.004
2012	363	19	0	382	54	95	5	679400	328	0.5	1.3	0.45	0.04	0.01
2013	814	23	0	837	122	97	3	691536	715	1.0	2.8	0.96	0.08	0.01
2014	1010	26	0	1036	152	97	3	703653	885	1.3	3.4	1.17	0.10	0.01
2015	831	26	0	857	125	97	3	715684	733	1.0	2.8	0.95	0.08	0.01
2016	1004	17	0	1021	151	98	2	727557	870	1.2	3.3	1.11	0.09	0.01
2017	1371	14	0	1385	206	99	1	698408	1179	1.7	4.6	1.57	0.13	0.02
2018	846	19	0	865	127	98	2	705720	738	1.0	2.9	0.97	0.08	0.01
2019	864	37	0	901	130	96	4	712973	771	1.1	3.0	1.01	0.08	0.01
Average	**634**	**19**	**0**	**654**	**95**	**96**	**4**	**676939**	**559**	**0.8**	**2.2**	**0.8**	**0.1**	**0.01**

D.6 SSR%, IDR% and per capita consumption of beans

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	4632	136	12	4756	926	97	3	614301	3830	6.2	17.1	5.29	0.31	0.04
2007	3946	143	9	4080	789	97	4	624798	3291	5.3	14.4	4.47	0.26	0.03
2008	3459	163	7	3615	692	96	5	635167	2923	4.6	12.6	3.91	0.23	0.03
2009	1823	174	4	1993	365	91	9	645356	1628	2.5	6.9	2.14	0.13	0.02
2010	1443	136	10	1569	289	92	9	655291	1280	2.0	5.4	1.66	0.10	0.01
2011	2111	158	4	2265	422	93	7	667306	1843	2.8	7.6	2.35	0.14	0.02
2012	2479	220	43	2656	496	93	8	679400	2160	3.2	8.7	2.70	0.16	0.02
2013	2636	294	71	2860	527	92	10	691536	2332	3.4	9.2	2.86	0.17	0.02
2014	2830	296	63	3063	566	92	10	703653	2497	3.5	9.7	3.01	0.18	0.02
2015	3612	331	7	3936	722	92	8	715684	3214	4.5	12.3	3.81	0.23	0.03
2016	4409	336	20	4724	882	93	7	727557	3843	5.3	14.5	4.49	0.26	0.03
2017	5273	1	15	5259	1055	100	0	698408	4204	6.0	16.5	5.11	0.30	0.04
2018	2274	1	17	2258	455	101	0	705720	1803	2.6	7.0	2.17	0.13	0.02
2019	2923	0	40	2883	585	101	0	712973	2298	3.2	8.8	2.74	0.16	0.02
Average	**3132**	**171**	**23**	**3280**	**626**	**95**	**6**	**676939**	**2653**	**3.9**	**10.8**	**5.38**	**0.32**	**0.04**

D.7 SSR%, IDR% and per capita consumption of tomato

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	1108	1823	0	2931	244	38	62	614301	2687	4.4	12.0	2.04	0.10	0.02
2007	951	839	0	1790	209	53	47	624798	1581	2.5	6.9	1.18	0.06	0.01
2008	517	1999	0	2516	114	21	79	635167	2402	3.8	10.4	1.76	0.08	0.02
2009	564	2201	0	2765	124	20	80	645356	2641	4.1	11.2	1.91	0.09	0.02
2010	223	2055	0	2278	49	10	90	655291	2229	3.4	9.3	1.58	0.07	0.02
2011	559	2044	0	2603	123	21	79	667306	2480	3.7	10.2	1.73	0.08	0.02
2012	337	2239	1	2575	74	13	87	679400	2501	3.7	10.1	1.71	0.08	0.02
2013	961	1976	0	2937	211	33	67	691536	2725	3.9	10.8	1.84	0.09	0.02
2014	1323	2628	1	3950	291	33	67	703653	3659	5.2	14.2	2.42	0.11	0.03
2015	627	2539	0	3166	138	20	80	715684	3028	4.2	11.6	1.97	0.09	0.02
2016	455	2832	0	3287	100	14	86	727557	3187	4.4	12.0	2.04	0.10	0.02
2017	383	2978	0	3361	84	11	89	698408	3277	4.7	12.9	2.19	0.10	0.03
2018	261	2637	2	2896	57	9	91	705720	2838	4.0	11.0	1.87	0.09	0.02
2019	233	2591	6	2818	51	8	92	712973	2766	3.9	10.6	1.81	0.09	0.02
Average	**607**	**2241**	**1**	**2848**	**134**	**22**	**78**	**676939**	**2714**	**4**	**10.9**	**1.86**	**0.09**	**0.02**

D.8 SSR%, IDR% and per capita consumption of green leaves

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	4385	4.0	0	4389	789	100	0.1	614301	3600	5.9	16.1	2.57	0.34	0.05
2007	3694	0.0	0	3694	665	100	0.0	624798	3029	4.8	13.3	2.13	0.28	0.04
2008	5144	0.5	0	5144	926	100	0.0	635167	4219	6.6	18.2	2.91	0.38	0.05
2009	2224	0.0	0	2224	400	100	0.0	645356	1824	2.8	7.7	1.24	0.16	0.02
2010	1708	7.9	0	1716	307	100	0.5	655291	1408	2.1	5.9	0.94	0.12	0.02
2011	2510	0.0	0	2510	452	100	0.0	667306	2058	3.1	8.5	1.35	0.18	0.03
2012	2414	0.0	0	2414	435	100	0.0	679400	1979	2.9	8.0	1.28	0.17	0.02
2013	2063	0.0	0	2063	371	100	0.0	691536	1692	2.4	6.7	1.07	0.14	0.02
2014	1938	0.0	0	1938	349	100	0.0	703653	1589	2.3	6.2	0.99	0.13	0.02
2015	2871	0.0	0	2871	517	100	0.0	715684	2354	3.3	9.0	1.44	0.19	0.03
2016	1937	0.0	0	1937	349	100	0.0	727557	1588	2.2	6.0	0.96	0.13	0.02
2017	4153	0.0	0	4153	748	100	0.0	698408	3405	4.9	13.4	2.14	0.28	0.04
2018	2049	0.0	0	2049	369	100	0.0	705720	1680	2.4	6.5	1.04	0.14	0.02
2019	2040	0.0	0	2040	367	100	0.0	712973	1673	2.3	6.4	1.03	0.13	0.02
Average	**2795**	**1**	**0**	**2796**	**503**	**100**	**0**	**676939**	**2293**	**3.4**	**9.4**	**1.51**	**0.20**	**0.03**

D.9 SSR%, IDR% and per capita consumption of peas

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	2899	86	133	2852	870	102	3	614301	1982	3.2	8.8	16.71	1.09	0.09
2007	1714	49	71	1692	514	101	3	624798	1178	1.9	5.2	9.76	0.64	0.05
2008	753	151	96	808	226	93	19	635167	582	0.9	2.5	4.74	0.31	0.03
2009	676	128	73	731	203	92	18	645356	528	0.8	2.2	4.24	0.28	0.02
2010	355	270	65	560	107	63	48	655291	454	0.7	1.9	3.58	0.23	0.02
2011	770	201	86	885	231	87	23	667306	654	1.0	2.7	5.07	0.33	0.03
2012	779	260	269	770	234	101	34	679400	536	0.8	2.2	4.09	0.27	0.02
2013	1180	341	405	1116	354	106	31	691536	762	1.1	3.0	5.71	0.37	0.03
2014	970	124	249	846	291	115	15	703653	555	0.8	2.2	4.08	0.27	0.02
2015	1218	254	115	1357	365	90	19	715684	992	1.4	3.8	7.18	0.47	0.04
2016	1014	400	69	1344	304	75	30	727557	1040	1.4	3.9	7.40	0.48	0.04
2017	859	348	94	1113	258	77	31	698408	855	1.2	3.4	6.34	0.41	0.03
2018	567	138	47	659	170	86	21	705720	489	0.7	1.9	3.59	0.23	0.02
2019	685	159	55	789	206	87	20	712973	583	0.8	2.2	4.24	0.28	0.02
Average	**1031**	**208**	**130**	**1109**	**309**	**91**	**22**	**676939**	**799**	**1.196**	**3.278**	**6.195**	**0.403**	**0.033**

D.10 SSR%, IDR% and per capita consumption of brinjal

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	1577	68	0	1645	158	96	4	614301	1488	2.4	6.6	1.39	0.06	0.01
2007	644	47	0	691	64	93	7	624798	626	1.0	2.7	0.58	0.02	0.003
2008	319	81	0	400	32	80	20	635167	368	0.6	1.6	0.33	0.01	0.002
2009	406	47	0	453	41	90	10	645356	412	0.6	1.7	0.37	0.02	0.002
2010	296	56	0	352	30	84	16	655291	322	0.5	1.3	0.28	0.01	0.001
2011	255	120	0	375	26	68	32	667306	350	0.5	1.4	0.30	0.01	0.001
2012	374	117	0	491	37	76	24	679400	454	0.7	1.8	0.38	0.02	0.002
2013	362	559	0	921	36	39	61	691536	885	1.3	3.5	0.74	0.03	0.004
2014	485	653	0	1138	49	43	57	703653	1090	1.5	4.2	0.89	0.04	0.004
2015	694	571	0	1265	69	55	45	715684	1196	1.7	4.6	0.96	0.04	0.005
2016	585	572	0	1157	59	51	49	727557	1099	1.5	4.1	0.87	0.04	0.004
2017	643	713	0	1356	64	47	53	698408	1292	1.8	5.1	1.06	0.05	0.01
2018	245	491	0	736	25	33	67	705720	712	1.0	2.8	0.58	0.02	0.003
2019	300	587	0	887	30	34	66	712973	857	1.2	3.3	0.69	0.03	0.003
Average	**530**	**315**	**0**	**845**	**53**	**63**	**37**	**676939**	**792**	**1.171**	**3.208**	**0.674**	**0.029**	**0.003**

D.11 SSR%, IDR% and per capita consumption of asparagus

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	981	0	2	979	304	100	0	614301	675	1.1	3.0	0.36	0.05	0.003
2007	1110	1	4	1107	344	100	0	624798	763	1.2	3.3	0.40	0.05	0.003
2008	177	0	5	172	55	103	0	635167	117	0.2	0.5	0.06	0.01	0.001
2009	325	0	2	323	101	101	0	645356	222	0.3	0.9	0.11	0.02	0.001
2010	76	0	3	73	24	104	0	655291	50	0.1	0.2	0.02	0.00	0.0002
2011	231	0	1	230	72	100	0	667306	159	0.2	0.7	0.08	0.01	0.001
2012	149	0	2	147	46	101	0	679400	101	0.1	0.4	0.05	0.01	0.0004
2013	283	0	0	283	88	100	0	691536	195	0.3	0.8	0.09	0.01	0.001
2014	205	0	0	205	64	100	0	703653	141	0.2	0.6	0.07	0.01	0.001
2015	200	0	0	200	62	100	0	715684	138	0.2	0.5	0.06	0.01	0.001
2016	239	0	0	239	74	100	0	727557	165	0.2	0.6	0.07	0.01	0.001
2017	79	0	0	79	24	100	0	698408	54	0.1	0.2	0.03	0.003	0.0002
2018	160	0	0	160	50	100	0	705720	110	0.2	0.4	0.05	0.01	0.0004
2019	79	0	0	79	24	100	0	712973	55	0.1	0.2	0.03	0.003	0.0002
Average	**324**	**0**	**1**	**323**	**101**	**101**	**0**	**676939**	**222**	**0.3**	**0.885**	**0.106**	**0.014**	**0.001**

D.12 SSR%, IDR% and per capita consumption of carrot

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	997	72	78	991	120	101	7	614301	871	1.4	3.9	1.48	0.03	0.008
2007	668	49	131	586	80	114	8	624798	506	0.8	2.2	0.84	0.02	0.004
2008	363	62	122	303	44	120	20	635167	259	0.4	1.1	0.43	0.01	0.002
2009	277	75	139	213	33	130	35	645356	180	0.3	0.8	0.29	0.01	0.002
2010	205	56	130	131	25	157	43	655291	106	0.2	0.4	0.17	0.00	0.001
2011	387	78	158	307	46	126	25	667306	261	0.4	1.1	0.41	0.01	0.002
2012	585	110	352	343	70	171	32	679400	272	0.4	1.1	0.42	0.01	0.002
2013	755	193	417	531	91	142	36	691536	440	0.6	1.7	0.66	0.02	0.003
2014	746	219	474	491	90	152	45	703653	401	0.6	1.6	0.59	0.01	0.003
2015	1094	166	486	774	131	141	21	715684	643	0.9	2.5	0.94	0.02	0.005
2016	1276	172	784	664	153	192	26	727557	511	0.7	1.9	0.73	0.02	0.004
2017	787	266	696	357	94	220	75	698408	263	0.4	1.0	0.39	0.01	0.002
2018	782	256	312	726	94	108	35	705720	633	0.9	2.5	0.93	0.02	0.005
2019	1374	313	957	730	165	188	43	712973	565	0.8	2.2	0.83	0.02	0.004
Average	**735**	**149**	**374**	**510**	**88**	**147**	**32**	**676939**	**422**	**0.6**	**1.7**	**0.65**	**0.02**	**0.003**

D.13 SSR%, IDR% and per capita consumption of turnip

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	12914	0	0	12914	1937	100	0	614301	10977	17.9	49.0	13.71	0.44	0.05
2007	15104	0	0	15104	2266	100	0	624798	12838	20.5	56.3	15.76	0.51	0.06
2008	5080	0	0	5080	762	100	0	635167	4318	6.8	18.6	5.22	0.17	0.02
2009	9368	0	0	9368	1405	100	0	645356	7963	12.3	33.8	9.47	0.30	0.03
2010	2638	0	0	2638	396	100	0	655291	2242	3.4	9.4	2.62	0.08	0.01
2011	7823	0	0	7823	1173	100	0	667306	6650	10.0	27.3	7.64	0.25	0.03
2012	7994	0	0	7994	1199	100	0	679400	6795	10.0	27.4	7.67	0.25	0.03
2013	9757	0	0	9757	1464	100	0	691536	8293	12.0	32.9	9.20	0.30	0.03
2014	9967	0	0	9967	1495	100	0	703653	8472	12.0	33.0	9.24	0.30	0.03
2015	10423	0	0	10423	1563	100	0	715684	8860	12.4	33.9	9.50	0.31	0.03
2016	10499	0	0	10499	1575	100	0	727557	8924	12.3	33.6	9.41	0.30	0.03
2017	13051	0	0	13051	1958	100	0	698408	11093	15.9	43.5	12.18	0.39	0.04
2018	9097	0	0	9097	1365	100	0	705720	7732	11.0	30.0	8.41	0.27	0.03
2019	9293	0	0	9293	1394	100	0	712973	7899	11.1	30.4	8.50	0.27	0.03
Average	**9501**	**0**	**0**	**9501**	**1425**	**100**	**0**	**676939**	**8075**	**12**	**32.8**	**9.2**	**0.3**	**0.03**

D.14 SSR%, IDR% and per capita consumption of radish

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	10218	0	0	10218	1533	100	0	614301	8685	14.1	38.7	12.01	0.62	0.12
2007	10539	0	0	10539	1581	100	0	624798	8958	14.3	39.3	12.18	0.63	0.12
2008	5977	0	0	5977	897	100	0	635167	5080	8.0	21.9	6.79	0.35	0.07
2009	5672	0	0	5672	851	100	0	645356	4821	7.5	20.5	6.34	0.33	0.06
2010	3882	0	0	3882	582	100	0	655291	3300	5.0	13.8	4.28	0.22	0.04
2011	4865	0	0	4865	730	100	0	667306	4135	6.2	17.0	5.26	0.27	0.05
2012	5245	0	255	4990	787	105	0	679400	4203	6.2	17.0	5.25	0.27	0.05
2013	4534	0	175	4359	680	104	0	691536	3679	5.3	14.6	4.52	0.23	0.04
2014	5021	0	214	4807	753	104	0	703653	4054	5.8	15.8	4.89	0.25	0.05
2015	5840	0	0	5840	876	100	0	715684	4964	6.9	19.0	5.89	0.30	0.06
2016	6490	0	0	6490	974	100	0	727557	5517	7.6	20.8	6.44	0.33	0.06
2017	6307	0	0	6307	946	100	0	698408	5361	7.7	21.0	6.52	0.34	0.06
2018	3649	0	0	3649	547	100	0	705720	3102	4.4	12.0	3.73	0.19	0.04
2019	4721	0	0	4721	708	100	0	712973	4013	5.6	15.4	4.78	0.25	0.05
Average	**5926**	**0**	**46**	**5880**	**889**	**101**	**0**	**676939**	**4991**	**7.5**	**20.5**	**6.35**	**0.33**	**0.06**

D.15 SSR%, IDR% and per capita consumption of pumpkin, squash & gourds

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	6071	0	0	6071	911	100	0	614301	5160	8.4	23.0	4.37	0.21	0.02
2007	6972	0	0	6972	1046	100	0	624798	5926	9.5	26.0	4.94	0.23	0.03
2008	2524	0	0	2524	379	100	0	635167	2145	3.4	9.3	1.76	0.08	0.01
2009	8717	0	0	8717	1308	100	0	645356	7409	11.5	31.5	5.98	0.28	0.03
2010	6160	0	0	6160	924	100	0	655291	5236	8.0	21.9	4.16	0.20	0.02
2011	5695	0	0	5695	854	100	0	667306	4841	7.3	19.9	3.78	0.18	0.02
2012	6892	40	12	6920	1034	100	1	679400	5886	8.7	23.7	4.51	0.21	0.02
2013	6461	75	4	6532	969	99	1	691536	5563	8.0	22.0	4.19	0.20	0.02
2014	6469	71	3	6537	970	99	1	703653	5567	7.9	21.7	4.12	0.20	0.02
2015	6696	124	1	6819	1004	98	2	715684	5815	8.1	22.3	4.23	0.20	0.02
2016	3671	112	0	3783	551	97	3	727557	3232	4.4	12.2	2.31	0.11	0.01
2017	3171	147	0	3318	476	96	4	698408	2842	4.1	11.2	2.12	0.10	0.01
2018	3870	213	0	4083	581	95	5	705720	3503	5.0	13.6	2.58	0.12	0.01
2019	6043	217	0	6260	906	97	3	712973	5354	7.5	20.6	3.91	0.19	0.02
Average	**5672**	**71**	**1**	**5742**	**851**	**99**	**1**	**676939**	**4891**	**7.3**	**19.9**	**3.78**	**0.18**	**0.02**

D.16 SSR%, IDR% and per capita consumption of mushroom

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss(MT)	SSR(%)	IDR(%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	35	20	1	54	5	66	37	614301	49	0.1	0.2	0.35	0.01	0.002
2007	58	14	5	67	8	87	21	624798	59	0.1	0.3	0.41	0.02	0.002
2008	61	32	8	84	8	72	38	635167	76	0.1	0.3	0.53	0.02	0.002
2009	36	6	2	40	5	91	15	645356	35	0.1	0.1	0.24	0.01	0.001
2010	77	11	1	86	10	89	12	655291	76	0.1	0.3	0.51	0.02	0.002
2011	63	12	2	73	8	86	16	667306	65	0.1	0.3	0.43	0.02	0.002
2012	77	26	2	101	10	76	26	679400	91	0.1	0.4	0.59	0.02	0.003
2013	77	23	2	98	10	78	24	691536	88	0.1	0.3	0.56	0.02	0.002
2014	89	50	3	136	12	65	37	703653	125	0.2	0.5	0.78	0.03	0.003
2015	22	101	3	120	3	18	84	715684	118	0.2	0.4	0.72	0.03	0.003
2016	86	107	4	189	11	45	57	727557	178	0.2	0.7	1.07	0.04	0.005
2017	126	205	4	327	16	39	63	698408	311	0.4	1.2	1.95	0.07	0.009
2018	39	219	5	253	5	15	87	705720	248	0.4	1.0	1.54	0.06	0.007
2019	49	136	5	180	6	27	76	712973	173	0.2	0.7	1.07	0.04	0.005
Average	**64**	**69**	**4**	**129**	**8**	**61**	**42**	**676939**	**121**	**0.175**	**0.479**	**0.767**	**0.028**	**0.003**

D.17 SSR%, IDR% and per capita consumption of lady finger

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	24	0	0	24	7	100	0	614301	17	0.03	0.1	0.02	0.001	0.0002
2007	24	0	0	24	7	100	0	624798	17	0.03	0.1	0.02	0.001	0.0002
2008	24	0	0	24	7	100	0	635167	17	0.03	0.1	0.02	0.001	0.0002
2009	24	0	0	24	7	100	0	645356	17	0.03	0.1	0.02	0.001	0.0002
2010	24	0	0	24	7	100	0	655291	17	0.03	0.1	0.02	0.001	0.0002
2011	27	0	0	27	8	100	0	667306	19	0.03	0.1	0.02	0.001	0.0002
2012	13	0	0	13	4	100	0	679400	9	0.01	0.0	0.01	0.001	0.0001
2013	31	0	0	31	10	100	0	691536	21	0.03	0.1	0.03	0.001	0.0003
2014	28	0	0	28	9	100	0	703653	19	0.03	0.1	0.02	0.001	0.0002
2015	53	0	0	53	16	100	0	715684	37	0.05	0.1	0.04	0.002	0.0004
2016	42	0	0	42	13	100	0	727557	29	0.04	0.1	0.03	0.002	0.0003
2017	26	0	0	26	8	100	0	698408	18	0.03	0.1	0.02	0.001	0.0002
2018	9	0	0	9	3	100	0	705720	6	0.01	0.0	0.01	0.000	0.0001
2019	23	0	0	23	7	100	0	712973	16	0.02	0.1	0.02	0.001	0.0002
Average	**27**	**0**	**0**	**27**	**8**	**100**	**0**	**676939**	**18**	**0.03**	**0.1**	**0.02**	**0.001**	**0.0002**

D.18 SSR%, IDR% and per capita consumption of cucumber

Year	Production (MT)	Import (MT)	Export (MT)	Net available for supply (MT)	Post-harvest loss (MT)	SSR (%)	IDR (%)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	2588	272	0	2859	129	90	10	614301	2730	4.4	12.2	1.58	0.01	0.06
2007	2570	275	0	2845	129	90	10	624798	2717	4.3	11.9	1.55	0.01	0.06
2008	2627	270	0	2897	131	91	9	635167	2765	4.4	11.9	1.55	0.01	0.06
2009	2566	271	0	2836	128	90	10	645356	2708	4.2	11.5	1.49	0.01	0.06
2010	2519	283	0	2802	126	90	10	655291	2676	4.1	11.2	1.45	0.01	0.06
2011	2796	256	0	3052	140	92	8	667306	2912	4.4	12.0	1.55	0.01	0.06
2012	2382	273	0	2655	119	90	10	679400	2536	3.7	10.2	1.33	0.01	0.05
2013	2378	321	0	2699	119	88	12	691536	2581	3.7	10.2	1.33	0.01	0.05
2014	2484	419	0	2903	124	86	14	703653	2779	3.9	10.8	1.41	0.01	0.05
2015	1697	391	0	2088	85	81	19	715684	2004	2.8	7.7	1.00	0.01	0.04
2016	1194	435	0	1629	60	73	27	727557	1570	2.2	5.9	0.77	0.01	0.03
2017	1948	492	0	2440	97	80	20	698408	2343	3.4	9.2	1.19	0.01	0.05
2018	1541	386	0	1927	77	80	20	705720	1850	2.6	7.2	0.93	0.01	0.04
2019	2691	410	0	3101	135	87	13	712973	2966	4.2	11.4	1.48	0.01	0.06
Average	**2284**	**340**	**0**	**2624**	**114**	**86**	**14**	**676939**	**2510**	**3.7**	**10.2**	**1.3**	**0.01**	**0.1**

E SSR%, IDR% and per capita consumption of fruits

E.1 SSR%, IDR% and per capita consumption of apple

Year	Production (MT)	Import (MT)	Export (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	7406	58	5389	357	3	2075	963	614301	1112	1.8	5.0	2.4	0.005	0.015
2007	7076	36	3211	181	1	3900	920	624798	2981	4.8	13.1	6.3	0.013	0.039
2008	5410	39	4947	1079	8	501	703	635167	0	0.0	0.0	0.0	0.000	0.000
2009	15086	39	7016	186	0	8110	1961	645356	6148	9.5	26.1	12.5	0.026	0.078
2010	17337	51	7061	168	0	10328	2254	655291	8074	12.3	33.8	16.2	0.034	0.101
2011	20752	24	5764	138	0	15012	2698	667306	12314	18.5	50.6	24.3	0.051	0.152
2012	7666	43	3410	178	1	4299	997	679400	3302	4.9	13.3	6.4	0.013	0.040
2013	8032	44	4314	214	1	3761	1044	691536	2717	3.9	10.8	5.2	0.011	0.032
2014	7051	53	5437	423	3	1667	917	703653	750	1.1	2.9	1.4	0.003	0.009
2015	5308	73	3488	280	4	1893	690	715684	1203	1.7	4.6	2.2	0.005	0.014
2016	6587	123	3790	226	4	2920	856	727557	2064	2.8	7.8	3.7	0.008	0.023
2017	8039	186	2659	144	3	5565	1045	698408	4520	6.5	17.7	8.5	0.018	0.053
2018	3684	74	1293	149	3	2465	479	705720	1986	2.8	7.7	3.7	0.008	0.023
2019	4321	166	2922	276	11	1565	562	712973	1003	1.4	3.9	1.9	0.004	0.012
Average	**8840**	**72**	**4336**	**286**	**3**	**4576**	**1149**	**676939**	**3441**	**5.1**	**14.1**	**6.8**	**0.014**	**0.042**

E.2 SSR%, IDR% and per capita consumption of areca nut

Year	Production (MT)	Import (MT)	Export (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	6400	336	1223	116	6.1	5514	512	614301	5002	8.1	22.3	76.3	2.275	1.160
2007	6569	532	2031	130	10.5	5070	526	624798	4545	7.3	19.9	68.2	2.033	1.036
2008	4082	350	2425	203	17.4	2006	327	635167	1680	2.6	7.2	24.8	0.739	0.377
2009	6375	550	1978	129	11.1	4947	510	645356	4437	6.9	18.8	64.4	1.921	0.979
2010	7280	679	3795	175	16.3	4165	582	655291	3582	5.5	15.0	51.2	1.528	0.779
2011	9781	271	2541	130	3.6	7510	782	667306	6728	10.1	27.6	94.5	2.817	1.436
2012	7788	279	4494	218	7.8	3574	623	679400	2951	4.3	11.9	40.7	1.214	0.619
2013	6249	150	3536	218	5.2	2863	500	691536	2363	3.4	9.4	32.0	0.955	0.487
2014	7468	1288	7270	503	86.7	1486	597	703653	888	1.3	3.5	11.8	0.353	0.180
2015	9406	167	5922	258	4.6	3651	752	715684	2898	4.0	11.1	37.9	1.132	0.577
2016	9467	219	7751	489	11.3	1935	757	727557	1178	1.6	4.4	15.2	0.452	0.231
2017	9342	28	5792	261	0.8	3578	747	698408	2831	4.1	11.1	38.0	1.133	0.577
2018	11681	206	6556	219	3.9	5331	934	705720	4397	6.2	17.1	58.4	1.741	0.888
2019	16107	189	5192	145	1.7	11103	1289	712973	9815	13.8	37.7	129.0	3.847	1.961
Average	**8428**	**375**	**4322**	**228**	**13.4**	**4481**	**674**	**676939**	**3807**	**5.7**	**15.5**	**53.0**	**1.581**	**0.806**

E.3 SSR%, IDR% and per capita consumption of banana

Year	Production (MT)	Import (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
											Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	3413	366	90	9.7	3779	239	614301	3540	5.8	15.8	9.5	0.111	0.047
2007	3974	365	92	8.4	4339	278	624798	4061	6.5	17.8	10.7	0.125	0.053
2008	3694	322	92	8.0	4015	259	635167	3757	5.9	16.2	9.7	0.113	0.049
2009	2183	352	86	13.9	2535	153	645356	2382	3.7	10.1	6.1	0.071	0.030
2010	2208	432	84	16.4	2640	155	655291	2486	3.8	10.4	6.2	0.073	0.031
2011	2439	438	85	15.2	2877	171	667306	2707	4.1	11.1	6.7	0.078	0.033
2012	2324	249	90	9.7	2572	163	679400	2410	3.5	9.7	5.8	0.068	0.029
2013	1489	449	77	23.1	1938	104	691536	1833	2.7	7.3	4.4	0.051	0.022
2014	1631	534	75	24.7	2165	114	703653	2051	2.9	8.0	4.8	0.056	0.024
2015	2636	682	79	20.6	3318	185	715684	3134	4.4	12.0	7.2	0.084	0.036
2016	3076	537	85	14.9	3613	215	727557	3398	4.7	12.8	7.7	0.090	0.038
2017	3113	596	84	16.1	3709	218	698408	3491	5.0	13.7	8.2	0.096	0.041
2018	2762	649	81	19.0	3411	193	705720	3218	4.6	12.5	7.5	0.087	0.037
2019	3754	856	81	18.6	4610	263	712973	4347	6.1	16.7	10.0	0.117	0.050
Average	**2764**	**488**	**84**	**15.6**	**3252**	**193**	**676939**	**3058**	**4.5**	**12.4**	**7.5**	**0.087**	**0.037**

E.4 SSR%, IDR% and per capita consumption of guava

Year	Production (MT)	Import (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
											Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	1667	20	99	1.2	1687	300	614301	1387	2.3	6.2	4.2	0.161	0.062
2007	2213	13	99	0.6	2226	398	624798	1828	2.9	8.0	5.5	0.208	0.080
2008	792	64	93	7.5	856	143	635167	714	1.1	3.1	2.1	0.080	0.031
2009	955	1	100	0.1	956	172	645356	784	1.2	3.3	2.3	0.087	0.033
2010	864	89	91	9.3	953	156	655291	797	1.2	3.3	2.3	0.087	0.033
2011	950	2	100	0.2	952	171	667306	781	1.2	3.2	2.2	0.083	0.032
2012	732	15	98	2.0	747	132	679400	615	0.9	2.5	1.7	0.065	0.025
2013	592	2	100	0.4	594	107	691536	488	0.7	1.9	1.3	0.050	0.019
2014	787	18	98	2.2	805	142	703653	663	0.9	2.6	1.8	0.067	0.026
2015	588	2	100	0.4	590	106	715684	484	0.7	1.9	1.3	0.048	0.019
2016	665	2	100	0.2	667	120	727557	547	0.8	2.1	1.4	0.054	0.021
2017	1084	2	100	0.2	1086	195	698408	891	1.3	3.5	2.4	0.091	0.035
2018	895	2	100	0.2	897	161	705720	736	1.0	2.9	1.9	0.074	0.029
2019	1369	2	100	0.2	1371	246	712973	1125	1.6	4.3	2.9	0.112	0.043
Average	**1011**	**17**	**98**	**1.8**	**1028**	**182**	**676939**	**846**	**1.3**	**3.5**	**2.4**	**0.091**	**0.035**

E.5 SSR%, IDR% and per capita consumption of jackfruit

Year	Production (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
										Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	336	100	0	336	24	614301	312	0.5	1.4	1.3	0.021	0.004
2007	357	100	0	357	25	624798	332	0.5	1.5	1.4	0.022	0.004
2008	329	100	0	329	23	635167	306	0.5	1.3	1.3	0.020	0.004
2009	321	100	0	321	22	645356	299	0.5	1.3	1.2	0.019	0.004
2010	422	100	0	422	30	655291	392	0.6	1.6	1.6	0.025	0.005
2011	245	100	0	245	17	667306	228	0.3	0.9	0.9	0.014	0.003
2012	296	100	0	296	21	679400	276	0.4	1.1	1.1	0.017	0.003
2013	773	100	0	773	54	691536	719	1.0	2.8	2.7	0.043	0.009
2014	1102	100	0	1102	77	703653	1025	1.5	4.0	3.8	0.060	0.012
2015	1227	100	0	1227	86	715684	1141	1.6	4.4	4.1	0.066	0.013
2016	775	100	0	775	54	727557	721	1.0	2.7	2.6	0.041	0.008
2017	528	100	0	528	37	698408	491	0.7	1.9	1.8	0.029	0.006
2018	566	100	0	566	40	705720	526	0.7	2.0	1.9	0.031	0.006
2019	469	100	0	469	33	712973	436	0.6	1.7	1.6	0.025	0.005
Average	**553**	**100**	**0**	**553**	**39**	**676939**	**515**	**0.7**	**2.0**	**1.9**	**0.031**	**0.006**

E.6 SSR%, IDR% and per capita consumption of litchi

Year	Production (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
										Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	141	100	0	141	8	614301	133	0.2	0.6	0.4	0.005	0.002
2007	143	100	0	143	9	624798	135	0.2	0.6	0.4	0.005	0.002
2008	137	100	0	137	8	635167	129	0.2	0.6	0.4	0.004	0.002
2009	143	100	0	143	9	645356	134	0.2	0.6	0.4	0.005	0.002
2010	149	100	0	149	9	655291	140	0.2	0.6	0.4	0.005	0.002
2011	120	100	0	120	7	667306	113	0.2	0.5	0.3	0.004	0.002
2012	159	100	0	159	10	679400	150	0.2	0.6	0.4	0.005	0.002
2013	169	100	0	169	10	691536	159	0.2	0.6	0.4	0.005	0.003
2014	172	100	0	172	10	703653	162	0.2	0.6	0.4	0.005	0.003
2015	160	100	0	160	10	715684	150	0.2	0.6	0.4	0.005	0.002
2016	134	100	0	134	8	727557	126	0.2	0.5	0.3	0.004	0.002
2017	313	100	0	313	19	698408	294	0.4	1.2	0.8	0.009	0.005
2018	303	100	0	303	18	705720	285	0.4	1.1	0.7	0.009	0.004
2019	385	100	0	385	23	712973	362	0.5	1.4	0.9	0.011	0.006
Average	**188**	**100**	**0**	**188**	**11**	**676939**	**177**	**0.3**	**0.7**	**0.5**	**0.006**	**0.003**

E.7 SSR%, IDR% and per capita consumption of mandarin orange

Year	Production (MT)	Import (MT)	Export (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	55558	30	16391	142	0.1	39197	9445	614301	29753	48.4	132.7	70.3	1.062	0.398
2007	72071	26	17093	131	0.0	55004	12252	624798	42752	68.4	187.5	99.4	1.500	0.562
2008	42590	19	20346	191	0.1	22262	7240	635167	15022	23.7	64.8	34.3	0.518	0.194
2009	44177	33	28125	275	0.2	16086	7510	645356	8575	13.3	36.4	19.3	0.291	0.109
2010	52621	31	22484	174	0.1	30168	8946	655291	21223	32.4	88.7	47.0	0.710	0.266
2011	60993	50	18928	145	0.1	42114	10369	667306	31745	47.6	130.3	69.1	1.043	0.391
2012	49501	82	24432	197	0.3	25151	8415	679400	16735	24.6	67.5	35.8	0.540	0.202
2013	33469	67	24975	391	0.8	8561	5690	691536	2871	4.2	11.4	6.0	0.091	0.034
2014	45226	39	21148	188	0.2	24116	7688	703653	16428	23.3	64.0	33.9	0.512	0.192
2015	38919	94	17820	184	0.4	21193	6616	715684	14577	20.4	55.8	29.6	0.446	0.167
2016	42003	101	15546	158	0.4	26558	7141	727557	19417	26.7	73.1	38.8	0.585	0.219
2017	28017	87	16141	234	0.7	11963	4763	698408	7200	10.3	28.2	15.0	0.226	0.085
2018	26527	86	11087	171	0.6	15526	4510	705720	11017	15.6	42.8	22.7	0.342	0.128
2019	27529	112	15111	220	0.9	12531	4680	712973	7851	11.0	30.2	16.0	0.241	0.091
Average	**44229**	**61**	**19259**	**200**	**0.3**	**25031**	**7519**	**676939**	**17512**	**26.4**	**74.4**	**38.4**	**0.579**	**0.217**

E.8 SSR%, IDR% and per capita consumption of mango

Year	Production (MT)	Import (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
											Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	886	538	62	37.8	1424	115	614301	1309	2.1	5.8	2.6	0.023	0.012
2007	670	603	53	47.4	1273	87	624798	1186	1.9	5.2	2.3	0.021	0.010
2008	610	643	49	51.3	1253	79	635167	1174	1.8	5.1	2.3	0.020	0.010
2009	315	619	34	66.3	934	41	645356	893	1.4	3.8	1.7	0.015	0.008
2010	398	510	44	56.2	908	52	655291	856	1.3	3.6	1.6	0.014	0.007
2011	451	417	52	48.0	868	59	667306	809	1.2	3.3	1.5	0.013	0.007
2012	743	573	56	43.5	1316	97	679400	1219	1.8	4.9	2.2	0.020	0.010
2013	656	558	54	45.9	1214	85	691536	1128	1.6	4.5	2.0	0.018	0.009
2014	586	634	48	52.0	1220	76	703653	1144	1.6	4.5	2.0	0.018	0.009
2015	651	734	47	53.0	1385	85	715684	1301	1.8	5.0	2.2	0.020	0.010
2016	644	583	52	47.5	1227	84	727557	1143	1.6	4.3	1.9	0.017	0.009
2017	530	619	46	53.9	1149	69	698408	1080	1.5	4.2	1.9	0.017	0.008
2018	850	435	66	33.8	1285	111	705720	1174	1.7	4.6	2.1	0.018	0.009
2019	666	442	60	39.9	1108	87	712973	1021	1.4	3.9	1.8	0.016	0.008
Average	**618**	**565**	**52**	**48.3**	**1183**	**80**	**676939**	**1103**	**1.6**	**4.5**	**2.0**	**0.018**	**0.009**

E.9 SSR%, IDR% and per capita consumption of papaya

Year	Production (MT)	Import (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
											Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	126	25	84	16.5	150	9	614301	142	0.2	0.6	0.2	0.003	0.001
2007	121	24	83	16.7	145	8	624798	136	0.2	0.6	0.2	0.002	0.001
2008	129	24	84	15.6	153	9	635167	144	0.2	0.6	0.2	0.002	0.001
2009	127	26	83	17.2	153	9	645356	144	0.2	0.6	0.2	0.002	0.001
2010	106	23	82	17.6	129	7	655291	121	0.2	0.5	0.1	0.002	0.001
2011	155	23	87	12.8	178	11	667306	167	0.3	0.7	0.2	0.003	0.001
2012	119	34	78	22.0	153	8	679400	145	0.2	0.6	0.2	0.002	0.001
2013	106	54	66	33.9	160	7	691536	153	0.2	0.6	0.2	0.002	0.001
2014	126	55	70	30.5	181	9	703653	172	0.2	0.7	0.2	0.003	0.001
2015	214	86	71	28.6	300	15	715684	285	0.4	1.1	0.3	0.004	0.001
2016	282	74	79	20.7	356	20	727557	336	0.5	1.3	0.3	0.005	0.001
2017	278	80	78	22.3	358	19	698408	338	0.5	1.3	0.3	0.005	0.001
2018	161	78	67	32.7	239	11	705720	228	0.3	0.9	0.2	0.004	0.001
2019	216	84	72	28.1	300	15	712973	285	0.4	1.1	0.3	0.004	0.001
Average	**162**	**49**	**77**	**22.5**	**211**	**11**	**676939**	**200**	**0.3**	**0.8**	**0.2**	**0.003**	**0.001**

E.10 SSR%, IDR% and per capita consumption of passion fruit

Year	Production (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
										Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	142	100	0	142	10	614301	132	0.2	0.6	0.6	0.013	0.004
2007	134	100	0	134	9	624798	124	0.2	0.5	0.5	0.012	0.004
2008	117	100	0	117	8	635167	109	0.2	0.5	0.5	0.010	0.003
2009	174	100	0	174	12	645356	162	0.3	0.7	0.7	0.015	0.005
2010	111	100	0	111	8	655291	103	0.2	0.4	0.4	0.009	0.003
2011	66	100	0	66	5	667306	61	0.1	0.3	0.2	0.006	0.002
2012	141	100	0	141	10	679400	131	0.2	0.5	0.5	0.012	0.004
2013	125	100	0	125	9	691536	116	0.2	0.5	0.4	0.010	0.003
2014	135	100	0	135	9	703653	126	0.2	0.5	0.5	0.011	0.003
2015	66	100	0	66	5	715684	61	0.1	0.2	0.2	0.005	0.002
2016	120	100	0	120	8	727557	112	0.2	0.4	0.4	0.009	0.003
2017	94	100	0	94	7	698408	87	0.1	0.3	0.3	0.008	0.002
2018	93	100	0	93	7	705720	87	0.1	0.3	0.3	0.007	0.002
2019	102	100	0	102	7	712973	95	0.1	0.4	0.4	0.008	0.003
Average	**116**	**100**	**0**	**116**	**8**	**676939**	**108**	**0.2**	**0.4**	**0.4**	**0.010**	**0.003**

E.11 SSR%, IDR% and per capita consumption of peach

Year	Production (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
										Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	2421	100	0	2421	436	614301	1985	3.2	8.9	2.9	0.044	0.009
2007	3136	100	0	3136	564	624798	2572	4.1	11.3	3.7	0.056	0.011
2008	2134	100	0	2134	384	635167	1750	2.8	7.5	2.5	0.038	0.008
2009	1234	100	0	1234	222	645356	1012	1.6	4.3	1.4	0.021	0.004
2010	779	100	0	779	140	655291	639	1.0	2.7	0.9	0.013	0.003
2011	1649	100	0	1649	297	667306	1352	2.0	5.6	1.8	0.028	0.006
2012	1614	100	0	1614	291	679400	1323	1.9	5.3	1.8	0.027	0.005
2013	1148	100	0	1148	207	691536	941	1.4	3.7	1.2	0.019	0.004
2014	1435	100	0	1435	258	703653	1177	1.7	4.6	1.5	0.023	0.005
2015	783	100	0	783	141	715684	642	0.9	2.5	0.8	0.012	0.002
2016	972	100	0	972	175	727557	797	1.1	3.0	1.0	0.015	0.003
2017	1124	100	0	1124	202	698408	922	1.3	3.6	1.2	0.018	0.004
2018	1135	100	0	1135	204	705720	931	1.3	3.6	1.2	0.018	0.004
2019	1246	100	0	1246	224	712973	1022	1.4	3.9	1.3	0.020	0.004
Average	**1486**	**100**	**0**	**1486**	**268**	**676939**	**1219**	**1.8**	**5.0**	**1.7**	**0.025**	**0.005**

E.12 SSR%, IDR% and per capita consumption of pear

Year	Production (MT)	Import (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
											Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	1424	8	99	0.6	1432	356	614301	1076	1.8	4.8	2.7	0.019	0.005
2007	2203	8	100	0.4	2211	551	624798	1660	2.7	7.3	4.1	0.029	0.007
2008	1205	15	99	1.3	1220	301	635167	919	1.4	4.0	2.3	0.016	0.004
2009	1109	20	98	1.8	1129	277	645356	852	1.3	3.6	2.1	0.014	0.004
2010	758	19	98	2.5	777	190	655291	588	0.9	2.5	1.4	0.010	0.002
2011	1354	6	100	0.4	1360	339	667306	1021	1.5	4.2	2.4	0.017	0.004
2012	2166	8	100	0.4	2174	542	679400	1633	2.4	6.6	3.8	0.026	0.007
2013	1697	12	99	0.7	1709	424	691536	1285	1.9	5.1	2.9	0.020	0.005
2014	1137	13	99	1.1	1150	284	703653	866	1.2	3.4	1.9	0.013	0.003
2015	867	18	98	2.0	885	217	715684	668	0.9	2.6	1.5	0.010	0.003
2016	963	24	98	2.4	987	241	727557	746	1.0	2.8	1.6	0.011	0.003
2017	1510	41	97	2.7	1551	378	698408	1174	1.7	4.6	2.6	0.018	0.005
2018	1372	6	100	0.4	1378	343	705720	1035	1.5	4.0	2.3	0.016	0.004
2019	1584	9	99	0.6	1593	396	712973	1197	1.7	4.6	2.6	0.018	0.005
Average	**1382**	**15**	**99**	**1.2**	**1397**	**346**	**676939**	**1051**	**1.6**	**4.3**	**2.4**	**0.017**	**0.004**

E.13 SSR%, IDR% and per capita consumption of persimmon

Year	Production (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
										Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	163	100	0	163	8	614301	155	0.3	0.7	0.6	0.004	0.002
2007	154	100	0	154	8	624798	146	0.2	0.6	0.5	0.004	0.002
2008	169	100	0	169	8	635167	160	0.3	0.7	0.6	0.004	0.002
2009	166	100	0	166	8	645356	158	0.2	0.7	0.5	0.004	0.002
2010	127	100	0	127	6	655291	121	0.2	0.5	0.4	0.003	0.002
2011	213	100	0	213	11	667306	202	0.3	0.8	0.7	0.005	0.002
2012	204	100	0	204	10	679400	194	0.3	0.8	0.6	0.005	0.002
2013	225	100	0	225	11	691536	214	0.3	0.8	0.7	0.005	0.003
2014	227	100	0	227	11	703653	216	0.3	0.8	0.7	0.005	0.003
2015	137	100	0	137	7	715684	130	0.2	0.5	0.4	0.003	0.001
2016	49	100	0	49	2	727557	47	0.1	0.2	0.1	0.001	0.001
2017	152	100	0	152	8	698408	144	0.2	0.6	0.5	0.003	0.002
2018	207	100	0	207	10	705720	197	0.3	0.8	0.6	0.005	0.002
2019	235	100	0	235	12	712973	223	0.3	0.9	0.7	0.005	0.003
Average	**173**	**100**	**0**	**173**	**9**	**676939**	**165**	**0.2**	**0.7**	**0.5**	**0.004**	**0.002**

E.14 SSR%, IDR% and per capita consumption of pineapple

Year	Production (MT)	Import (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
											Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	500	355	58	42	856	140	614301	716	1.2	3.2	0.8	0.006	0.006
2007	464	347	57	43	811	130	624798	681	1.1	3.0	0.8	0.006	0.006
2008	585	354	62	38	939	164	635167	775	1.2	3.3	0.9	0.007	0.007
2009	452	365	55	45	817	127	645356	690	1.1	2.9	0.8	0.006	0.006
2010	353	324	52	48	677	99	655291	578	0.9	2.4	0.6	0.005	0.005
2011	950	372	72	28	1322	266	667306	1056	1.6	4.3	1.1	0.009	0.009
2012	53	398	12	88	452	15	679400	437	0.6	1.8	0.5	0.004	0.004
2013	57	201	22	78	258	16	691536	242	0.3	1.0	0.2	0.002	0.002
2014	54	225	19	81	279	15	703653	264	0.4	1.0	0.3	0.002	0.002
2015	64	706	8	92	770	18	715684	752	1.1	2.9	0.7	0.006	0.006
2016	67	960	7	93	1027	19	727557	1008	1.4	3.8	1.0	0.008	0.008
2017	72	519	12	88	591	20	698408	571	0.8	2.2	0.6	0.004	0.004
2018	279	277	50	50	556	78	705720	478	0.7	1.9	0.5	0.004	0.004
2019	149	277	35	65	426	42	712973	384	0.5	1.5	0.4	0.003	0.003
Average	**292.8**	**405.7**	**37.3**	**62.7**	**698.6**	**82.0**	**676939**	**616.6**	**0.9**	**2.5**	**0.7**	**0.005**	**0.005**

E.15 SSR%, IDR% and per capita consumption of plum

Year	Production (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
										Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	1086	100	0	1086	195	614301	891	1.4	4.0	2.1	0.028	0.024
2007	1039	100	0	1039	187	624798	852	1.4	3.7	1.9	0.026	0.022
2008	405	100	0	405	73	635167	332	0.5	1.4	0.7	0.010	0.009
2009	434	100	0	434	78	645356	356	0.6	1.5	0.8	0.011	0.009
2010	357	100	0	357	64	655291	293	0.4	1.2	0.6	0.009	0.007
2011	565	100	0	565	102	667306	463	0.7	1.9	1.0	0.013	0.011
2012	695	100	0	695	125	679400	570	0.8	2.3	1.2	0.016	0.014
2013	744	100	0	744	134	691536	610	0.9	2.4	1.3	0.017	0.015
2014	783	100	0	783	141	703653	642	0.9	2.5	1.3	0.017	0.015
2015	385	100	0	385	69	715684	316	0.4	1.2	0.6	0.008	0.007
2016	376	100	0	376	68	727557	308	0.4	1.2	0.6	0.008	0.007
2017	482	100	0	482	87	698408	395	0.6	1.6	0.8	0.011	0.009
2018	532	100	0	532	96	705720	436	0.6	1.7	0.9	0.012	0.010
2019	585	100	0	585	105	712973	480	0.7	1.8	1.0	0.013	0.011
Average	**605**	**100**	**0**	**605**	**109**	**676939**	**496**	**0.7**	**2.0**	**1.1**	**0.014**	**0.012**

E.16 SSR%, IDR% and per capita consumption of pomegranate

Year	Production (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
										Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	126	100	0	126	14	614301	112	0.2	0.5	0.4	0.009	0.006
2007	108	100	0	108	12	624798	96	0.2	0.4	0.3	0.007	0.005
2008	142	100	0	142	16	635167	127	0.2	0.5	0.5	0.009	0.007
2009	128	100	0	128	14	645356	114	0.2	0.5	0.4	0.008	0.006
2010	54	100	0	54	6	655291	48	0.1	0.2	0.2	0.003	0.002
2011	245	100	0	245	27	667306	218	0.3	0.9	0.7	0.015	0.011
2012	84	100	0	84	9	679400	75	0.1	0.3	0.3	0.005	0.004
2013	101	100	0	101	11	691536	90	0.1	0.4	0.3	0.006	0.004
2014	111	100	0	111	12	703653	99	0.1	0.4	0.3	0.007	0.005
2015	63	100	0	63	7	715684	56	0.1	0.2	0.2	0.004	0.003
2016	83	100	0	83	9	727557	74	0.1	0.3	0.2	0.005	0.003
2017	74	100	0	74	8	698408	66	0.1	0.3	0.2	0.004	0.003
2018	59	100	0	59	6	705720	53	0.1	0.2	0.2	0.003	0.002
2019	79	100	0	79	9	712973	70	0.1	0.3	0.2	0.005	0.003
Average	**104**	**100**	**0**	**104**	**11**	**676939**	**92.6**	**0.1**	**0.4**	**0.3**	**0.006**	**0.005**

E.17 SSR%, IDR% and per capita consumption of walnut

Year	Production (MT)	SSR %	IDR %	Available for Supply (MT)	Postharvest loss (MT)	Eligible Population	Net available for consumption (MT)	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
										Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	631	100	0	631	19	614301	612	1.0	2.7	7.9	0.175	0.759
2007	820	100	0	820	25	624798	795	1.3	3.5	10.1	0.223	0.970
2008	345	100	0	345	10	635167	335	0.5	1.4	4.2	0.092	0.401
2009	236	100	0	236	7	645356	229	0.4	1.0	2.8	0.062	0.270
2010	213	100	0	213	6	655291	207	0.3	0.9	2.5	0.055	0.240
2011	474	100	0	474	14	667306	460	0.7	1.9	5.5	0.121	0.525
2012	414	100	0	414	12	679400	402	0.6	1.6	4.7	0.104	0.450
2013	350	100	0	350	11	691536	340	0.5	1.3	3.9	0.086	0.374
2014	337	100	0	337	10	703653	327	0.5	1.3	3.7	0.081	0.354
2015	211	100	0	211	6	715684	205	0.3	0.8	2.3	0.050	0.218
2016	181	100	0	181	5	727557	176	0.2	0.7	1.9	0.042	0.184
2017	239	100	0	239	7	698408	232	0.3	0.9	2.6	0.058	0.253
2018	223	100	0	223	7	705720	216	0.3	0.8	2.4	0.054	0.233
2019	256	100	0	256	8	712973	248	0.3	1.0	2.8	0.061	0.265
Average	**352**	**100**	**0**	**352**	**11**	**676939**	**341.6**	**0.5**	**1.4**	**4.1**	**0.090**	**0.393**

F SSR%, IDR% and per capita consumption of roots & tubers

F.1 SSR%, IDR% and per capita consumption of potato

Year	Production (MT)	Import (MT)	Export (MT)	SSR %	IDR %	Available for supply (MT)	Postharvest loss (MT)	Less seed (MT)	Net available for consumption (MT)	Eligible population	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
													Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	68048	3266	13883	118.49	5.69	57431.0	7466.0	17628	32337.0	614301	52.6	144.22	96.63	2.31	1.44
2007	61133	335	14397	129.87	0.71	47071.1	6119.2	14782	26169.9	624798	41.9	114.75	76.89	1.84	1.15
2008	52959	3665	14950	127.08	8.79	41673.5	5417.6	13469	22787.0	635167	35.9	98.29	65.85	1.57	0.98
2009	46161	2718	24584	190.00	11.19	24294.9	3158.3	12156	8980.6	645356	13.9	38.13	25.54	0.61	0.38
2010	44014	4019	18745	150.28	13.72	29287.8	3807.4	9266	16214.4	655291	24.7	67.79	45.42	1.08	0.68
2011	52116	5206	24485	158.71	15.85	32837.3	4268.8	15609	12959.4	667306	19.4	53.21	35.65	0.85	0.53
2012	43000	5284	19059	147.13	18.08	29225.0	3799.3	12548	12877.8	679400	19.0	51.93	34.79	0.83	0.52
2013	50390	5283	21871	149.08	15.63	33801.4	4394.2	13391	16016.2	691536	23.2	63.45	42.51	1.02	0.63
2014	53612	5272	26849	167.36	16.46	32034.4	4164.5	12785	15084.9	703653	21.4	58.73	39.35	0.94	0.59
2015	49359	6010	19908	139.19	16.95	35461.0	4609.9	12008	18843.1	715684	26.3	72.13	48.33	1.15	0.72
2016	58820	5469	24443	147.62	13.73	39845.9	5180.0	14638	20028.0	727557	27.5	75.42	50.53	1.21	0.75
2017	57223	5282	24045	148.79	13.73	38459.6	4999.7	12824	20635.9	698408	29.5	80.95	54.24	1.30	0.81
2018	44278	4698	24983	184.55	19.58	23992.3	3119.0	11131	9742.3	705720	13.8	37.82	25.34	0.61	0.38
2019	43560	4910	26076	194.51	21.93	22394.5	2911.3	10342	9141.2	712973	12.8	35.13	23.53	0.56	0.35
Average	**51762**	**4387**	**21306**	**153.76**	**13.72**	**34843.55**	**4529.7**	**13041**	**17272.7**	**676939**	**25.9**	**70.85**	**47.47**	**1.13**	**0.709**

F.2 SSR%, IDR% and per capita consumption of tapioca

Year	Production (MT)	Import (MT)	Export (MT)	SSR %	IDR %	Available for supply (MT)	Postharvest loss (MT)	Net available for consumption (MT)	Eligible Population	Per capita consumption (kg/year)	Per capita consumption (g/day)	Per capita dietary composition		
												Calories (kcal/day)	Protein (g/day)	Fat (g/day)
2006	1703	0	0	100	0	1702.7	221.3	1481.3	614301	2.41	6.61	7.20	0.059	0.013
2007	2106	0	0	100	0	2106.0	273.8	1832.2	624798	2.93	8.03	8.76	0.072	0.016
2008	1299	0	0	100	0	1299.4	168.9	1130.5	635167	1.78	4.88	5.31	0.044	0.010
2009	493	0	0	100	0	492.8	64.1	428.7	645356	0.66	1.82	1.98	0.016	0.004
2010	537	0	0	100	0	537.0	69.8	467.2	655291	0.71	1.95	2.13	0.018	0.004
2011	449	0	0	100	0	448.5	58.3	390.2	667306	0.58	1.60	1.75	0.014	0.003
2012	360	0	0	100	0	360.0	46.8	313.2	679400	0.46	1.26	1.38	0.011	0.003
2013	355	0	0	100	0	355.0	46.2	308.9	691536	0.45	1.22	1.33	0.011	0.002
2014	148	0	0	100	0	148.0	19.2	128.8	703653	0.18	0.50	0.55	0.005	0.001
2015	437	0	0	100	0	437.0	56.8	380.2	715684	0.53	1.46	1.59	0.013	0.003
2016	415	0	0	100	0	415.0	54.0	361.1	727557	0.50	1.36	1.48	0.012	0.003
2017	306	0	0	100	0	306.0	39.8	266.2	698408	0.38	1.04	1.14	0.009	0.002
2018	448	0	0	100	0	448.0	58.2	389.8	705720	0.55	1.51	1.65	0.014	0.003
2019	484	0	0	100	0	484.0	62.9	421.1	712973	0.59	1.62	1.76	0.015	0.003
Average	**681**	**0**	**0**	**100**	**0**	**681**	**88.6**	**592.8**	**676939**	**0.91**	**2.49**	**2.71**	**0.022**	**0.005**

G SSR%, IDR% and per capita consumption of spices

G.1 SSR%, IDR% and per capita consumption of cardamom

Year	Production (MT)	Area (acres)	Import (MT)	Export (MT)	SSR (%)	IDR (%)	Available for supply (MT)	Post-Harvest loss (MT)	Less (Seed & Industrial use)	Net available for consumption (MT)	Eligible Population	Per capita Consumption Kg /year	Per capita Consumption g/day	Per Capita Dietary Composition		
														Calories (Kcal/day)	Protein (g /day)	Fat (g/day)
2006	3477.00	9991.00	0.98	615.20	121.46	0.03	2862.79	0.00	0.00	2862.79	614301	4.66	12.77	39.71	1.37	0.86
2007	2121.00	8379.00	0.35	731.27	152.58	0.03	1390.09	0.00	0.00	1390.09	624798	2.22	6.10	18.96	0.66	0.41
2008	942.26	4682.67	0.41	576.00	256.98	0.11	366.67	0.00	0.00	366.67	635167	0.58	1.58	4.92	0.17	0.11
2009	433.00	5133.00	0.44	547.93	-378.20	-0.39	-114.49	0.00	0.00	-114.49	645356	0.00	0.00	0.00	0.00	0.00
2010	1163.00	4771.00	0.16	476.22	169.30	0.02	686.94	0.00	0.00	686.94	655291	1.05	2.87	8.93	0.31	0.19
2011	650.00	4144.00	1.36	427.00	289.71	0.61	224.36	0.00	0.00	224.36	667306	0.34	0.92	2.86	0.10	0.06
2012	643.00	5084.00	2.31	618.96	2440.23	8.77	26.35	0.00	0.00	26.35	679400	0.04	0.11	0.33	0.01	0.01
2013	1162.00	6904.00	22.36	822.68	321.28	6.18	361.67	0.00	0.00	361.67	691536	0.52	1.43	4.46	0.15	0.10
2014	1781.00	8683.00	1.54	746.38	171.89	0.15	1036.16	0.00	0.00	1036.16	703653	1.47	4.03	12.55	0.43	0.27
2015	2091.00	10610.00	3.40	845.74	167.46	0.27	1248.66	0.00	0.00	1248.66	715684	1.74	4.78	14.87	0.51	0.32
2016	2736.00	11086.00	2.08	1289.01	188.81	0.14	1449.07	0.00	0.00	1449.07	727557	1.99	5.46	16.97	0.59	0.37
2017	2245.00	13880.00	0.99	2031.31	1045.74	0.46	214.68	0.00	0.00	214.68	698408	0.31	0.84	2.62	0.09	0.06
2018	1542.00	21395.00	0.49	1698.03	-991.38	-0.31	-155.54	0.00	0.00	-155.54	705720	0.00	0.00	0.00	0.00	0.00
2019	1413.00	15615.00	0.42	2451.08	-136.17	-0.04	-1037.66	0.00	0.00	-1037.66	712973	0.00	0.00	0.00	0.00	0.00
Average	**1599.95**	**9311.26**	**2.66**	**991.20**	**272.84**	**1.15**	**611.41**	**0.00**	**0.00**	**611.41**	**676939**	**1.07**	**2.92**	**9.08**	**0.31**	**0.20**

G.2 SSR%, IDR% and per capita consumption of ginger

Year	Production (MT)	Area (acres)	Import (MT)	Export (MT)	SSR (%)	IDR (%)	Available for supply (MT)	Post-Harvest loss (MT)	Less (Seed & Industrial use)	Net available for consumption (MT)	Eligible Population	Per capita Consumption Kg /year	Per capita Consumption g/day	Per Capita Dietary Composition		
														Calories (Kcal/day)	Protein g /day	Fat g/day
2006	7571.00	4425.00	18.63	488.70	106.62	0.26	7100.93	497.07	1106.25	5497.61	614301	8.95	24.52	85.08	2.23	1.47
2007	9870.00	5098.00	12.02	1432.66	116.81	0.14	8449.36	591.46	1274.50	6583.40	624798	10.54	28.87	100.17	2.63	1.73
2008	3135.01	2692.33	1.57	1526.03	194.66	0.10	1610.55	112.74	673.08	824.72	635167	1.30	3.56	12.34	0.32	0.21
2009	3766.00	2546.00	6.18	1443.35	161.71	0.27	2328.83	163.02	636.50	1529.31	645356	2.37	6.49	22.53	0.59	0.39
2010	4074.00	2168.00	4.83	1108.29	137.15	0.16	2970.54	207.94	542.00	2220.60	655291	3.39	9.28	32.22	0.84	0.56
2011	4533.00	3363.00	10.72	1272.02	138.55	0.33	3271.70	229.02	840.75	2201.93	667306	3.30	9.04	31.37	0.82	0.54
2012	5014.00	1985.00	2.14	1448.34	140.53	0.06	3567.80	249.75	496.25	2821.80	679400	4.15	11.38	39.49	1.04	0.68
2013	3756.00	2489.00	0.12	1226.40	148.47	0.00	2529.72	177.08	622.25	1730.39	691536	2.50	6.86	23.79	0.62	0.41
2014	4983.00	2651.00	3.20	1230.26	132.67	0.09	3755.94	262.92	662.75	2830.28	703653	4.02	11.02	38.24	1.00	0.66
2015	7434.00	3674.00	1.90	2040.18	137.78	0.04	5395.72	377.70	918.50	4099.52	715684	5.73	15.69	54.46	1.43	0.94
2016	10871.00	4773.00	4.21	3037.68	138.70	0.05	7837.53	548.63	1193.25	6095.66	727557	8.38	22.95	79.65	2.09	1.38
2017	7859.00	3809.00	1.17	3946.95	200.83	0.03	3913.22	273.93	952.25	2687.04	698408	3.85	10.54	36.58	0.96	0.63
2018	4260.00	2156.00	0.85	3368.58	477.43	0.10	892.27	62.46	539.00	290.81	705720	0.41	1.13	3.92	0.10	0.07
2019	6209.00	2386.00	3.16	2317.75	159.43	0.08	3894.41	272.61	596.50	3025.30	712973	4.24	11.63	40.34	1.06	0.70
Average	**5952.50**	**3158.24**	**5.05**	**1849.08**	**170.81**	**0.12**	**4108.47**	**287.59**	**789.56**	**3031.31**	**676939**	**4.51**	**12.35**	**42.87**	**1.12**	**0.74**

G.3 SSR%, IDR% and per capita consumption of garlic

Year	Production (MT)	Area (acres)	Import (MT)	Export (MT)	SSR (%)	IDR (%)	Available for supply (MT)	Post-Harvest loss (MT)	Less (Seed & Industrial use)	Net available for consumption (MT)	Eligible Population	Per capita Consumption Kg /year	Per capita Consumption g/day	Per Capita Dietary Composition		
														Calories (Kcal/day)	Protein (g /day)	Fat (g/day)
2006	803.00	1,519	20.01	0.00	97.57	2.43	823.0	16.460178	338.7	467.8	614301	0.8	2.1	2.7	0.11	0.01
2007	622.00	1,259	31.53	0.00	95.18	4.82	653.5	13.070554	280.8	359.7	624798	0.6	1.6	2.1	0.09	0.01
2008	2080.41	1,748	45.30	0.00	97.87	2.13	2125.7	42.514266	389.8	1693.4	635167	2.7	7.3	9.5	0.40	0.03
2009	629.00	1,436	27.43	0.00	95.82	4.18	656.4	13.12868	320.2	323.1	645356	0.5	1.4	1.8	0.08	0.01
2010	485.00	881	9.28	0.00	98.12	1.88	494.3	9.8856	196.5	287.9	655291	0.4	1.2	1.6	0.07	0.00
2011	584.00	1,433	9.78	0.00	98.35	1.65	593.8	11.8756	319.6	262.3	667306	0.4	1.1	1.4	0.06	0.00
2012	644.00	1,273	39.09	0.00	94.28	5.72	683.1	13.6618	283.9	385.5	679400	0.6	1.6	2.0	0.09	0.01
2013	752.00	1,744	39.12	0.00	95.06	4.94	791.1	15.822338	388.9	386.4	691536	0.6	1.5	2.0	0.08	0.01
2014	846.00	1,282	27.43	0.00	96.86	3.14	873.4	17.468548	285.9	570.1	703653	0.8	2.2	2.9	0.12	0.01
2015	899.00	1,263	36.92	0.00	96.05	3.95	935.9	18.71846	281.6	635.6	715684	0.9	2.4	3.2	0.13	0.01
2016	1176.00	1,409	37.24	0.00	96.93	3.07	1213.2	24.26478	314.2	874.8	727557	1.2	3.3	4.3	0.18	0.01
2017	708.00	1,441	61.34	0.00	92.03	7.97	769.3	15.386891	321.3	432.6	698408	0.6	1.7	2.2	0.09	0.01
2018	550.00	874	49.06	0.00	91.81	8.19	599.1	11.98114	194.9	392.2	705720	0.6	1.5	2.0	0.08	0.01
2019	761.00	770	47.88	0.00	94.08	5.92	808.9	16.1776	171.7	621.0	712973	0.9	2.4	3.1	0.13	0.01
Average	**824.24**	**1309.43**	**34.39**	**0.00**	**95.71**	**4.29**	**858.63**	**17.17**	**292.00**	**549.45**	**676939**	**0.81**	**2.23**	**2.90**	**0.12**	**0.01**

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