ASSESSMENT OF TOMATO CONSUMPTION AND DEMAND IN NEPAL

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ABSTRACT

Tomato is also known as the poor man's apple in Nepal. China is the largest producer of tomato in the world. Tomato is grown throughout the year in recent years in Nepal with the introduction of plastic house for off season production. Secondary information is used to assess the consumption pattern and national demand of tomato in 2015/16 for Nepal. The result showed the import from India is increasing compared to previous years. The reason behind this might be increase in consumption of tomato in recent years in Nepal. The central development region is the highest consumer of tomato compared to other regions of the country. The average national consumption of tomato was found 11.97Kg/person/year in Nepal.

***Key words**: Tomato, production, consumption, demand, eco-belt*

INTRODUCTION

Tomato (*Solanum lycopersicum* L.) is one of the important crops used as a fresh vegetable as well as in a variety of processed products such as ketchup, sauce, juice, puree, pasta sauce, salsa, tomato-based powders, sun-dried tomatoes, curries and ready-to-eat products (Subramanian, 2016). The largest producer of tomato is China (One quarter) followed by India and the United States (FAOSTAT Database, 2016). There are different varieties of tomato mostly producing red berry and there are also some tomato varieties that produce yellow, orange, pink, purple, green and white berry. They are also an excellent source of lycopene, which is the pigment that makes tomatoes red and has been linked to the prevention of many types of cancer (Giovannucci, 1999). The best sources of lycopene are found in processed tomato products, such as ketchup and other tomato products (Giovannucci, 1999). The world dedicated 5.02 million hectares in 2014 for tomato cultivation and the total production was about 188.2 million tons with world average farm yield was 37.46 tons/ha (FAOSTAT Database, 2016). Tomato farms in the Netherlands were the most productive in 2012, with a nationwide average of 476 tons/ha, followed by Belgium (463 tons/ha) and Iceland (429 tons/ha). In 2012, tomato production was valued at 58 billion dollars and tomatoes were the 8th most valuable agricultural product worldwide (FAOSTAT Database, 2012).

There are around 7,500 tomato varieties grown for various purposes (FAOSTAT Database, 2012). Heirloom tomatoes are becoming increasingly popular, particularly among home gardeners and organic producers, since they tend to produce more interesting and flavorful crops at the cost of disease resistance and productivity (Gentilcore, 2010).

Majority of Nepalese people depend on agriculture for their livelihoods and has contributed about 32.6% of nation's GDP alone by the agricultural sector in the year 2015/16 (WB, 2016). In the year 2014/15, the average economic growth was confined to 0.77% where agriculture sector growth rate was only 1.3% due to devastating earthquake and blockade by India (MoF, 2016). Traditional and conventional subsistence farming system, lack of rural infrastructures facilities, lack of proper market information system, inadequate technological extension as well as marketing support system, unavailability of sufficient quantity of quality production inputs and weak linkages among

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the stakeholders are hindering the rapid development of the agriculture sector. Nevertheless, agriculture commercialization and production of high value crops is gradually increasing. Fresh seasonal and off-season vegetables have been categorized as high value crops. Different promotional campaigning for the commercial production of vegetables has been initiated by government as well as private sector to increase the income of farmers and generation of employment opportunities at rural areas of the country resulting into significant increment of vegetable production. In the year 2013/14, the area of vegetable crops was 2,54,932 ha, total production was recorded at 34,21,035 mt and the yield was recorded at 13,419 kg/ha (MOAD, 2016).

In Nepal, there is a great potentiality of growing large number of vegetable crops because of the availability of a wide range of agro-climatic and topographical conditions from subtropical, temperate to cold climate. Nepal produces vegetables worth NRs 55 billion annually and around 70 percent of total household of country are being involving in vegetable farming with about NRs 12 billion investment in farming every year. Terai is the major vegetable growing area with an annual production of 1,437,921 mt, followed by hilly region with 1,261,041 mt. Of the total production, 39% (1.10 million mt) is used for household consumption and 61% (1.71 million mt) for sale (PACT, 2012). Tomato is most important vegetable crop having high market potentialities. While open field cultivation during Autumn-Winter is common in Terai, inner Terai and foot hills, cultivation inside plastic tunnels in Summer-Rainy season in the hills is getting popularity which is sold as off-season product fetching higher prices in Terai of Nepal and nearby Indian markets. Thus, there is comparative advantage for mid and high hills for income generation and improve the livelihood through tomato farming. Some popular tomato varieties among farmers in Nepal are Abinash, Allrounder, Trishul, Sirjana, Manisha, Shamjhana, Dhanalaxmi, Indira, Roma, Pusa Ruby, NBL-1 and others.

Tomato is labor intensive crop, wage alone constituting half of the total cost of production. Production peaks in summer in the Hills (from May to September) when it is off-season in Terai. On the other hand, it can be produced in the Terai in winter (from November to March) when it is too cold in the Hills. Market demand and prices also vary with season and locations of the country. Most of the tomato produced in Nepal is used for kitchen purpose, only small quantity used for industrial purpose. Import of fresh tomato as well as tomato paste for industrial purpose from India and China is in practice to make tomato ketchup. Tomato consumption has been increasing in Nepal during recent past resulting in high market demand throughout the year. The trend of using plastic house for off season tomato production has been increasing. Though this practice needs higher investment, it also means higher profit due to higher yield and higher prices compared to open field cultivation. The product flow and relationship among the actors is crucial to find out the gap for increasing chain efficiency of the product. Present study is an effort to analyze existing scenario of tomato, national level demand and supply situation, value chain and recommend market oriented solution for further intervention.

METHODOLOGY

Secondary information was used in assessing the demand and supply of tomato and its value chain. Secondary information were collected from district agriculture development office (DADO) publication, regional and central level organizations like Ministry of agriculture development (MoAD), Market research and statistics management program (MRSMP), Kalimati fruit and vegetable wholesale market (KFVWM) and central bureau of statistics (CBS). Publication of concerned stakeholders and unpublished office records were collected and analyzed. Two types of tomato production systems: open field cultivation in Terai region and plastic house cultivation in mid hill region was assessed.

RESULTS AND DISCUSSION

1 Production and Productivity

The required temperature regime exists in different agro-climatic regions of Nepal at different times of the year allowing almost year-round production in the country. There are two main groups viz. processing tomato—normally cultivated in open fields and table tomato—cultivated in open fields or in greenhouses. With ideal level of inputs and management practices open field cultivation can produce 100-120 mt/ha, while greenhouse cultivation can yield up to 500 mt/ha.

The national figures show that tomato was cultivated on a total 19,726 ha producing 2,98,594 mt in 2012/13 and decreased to 17,273 ha producing 2,32,897 mt in 2013/14. Average productivity was reported to be 15.1 mt/ha in 2012/13 and reduced to 13.5 mt/ha in 2013/14 which is quite low compared to other countries (Table 1). Among the 15 ecological/development belts, Central hill (which includes Kathmandu valley) produced largest volume of tomato followed by Eastern hills and Central Terai, respectively.

Table 1: Productivity of Tomato in the world, 2016

S.N.	Country	Productivity (kg/ha)	S.N.	Country	Productivity (kg/ha)
1.	USA	81000	7.	Iran	35800
2.	Spain	74000	8.	Turkey	33100
3.	Brazil	60700	9.	Mexico	30500
4.	Italy	50700	10.	India	21200
5.	China	48100	11.	Others	22600
6.	Egypt	39500	12.	World average	32800

Source: Subramanian, 2016

Table 2: Area, Production and Productivity Trend of Tomato in Nepal, 1991/92-2013/14 (MOAD, 2016)

Year	Area ('0,000 ha)	Production (Million mt)	Yield (kg/ha)
1991/92	14.05	1.13	8028
1992/93	14.05	1.18	8391
1993/94	14.05	1.20	8523
1994/95	14.05	1.21	8623
1995/96	14.44	1.33	9194
1996/97	14.65	1.36	9266
1997/98	15.00	1.45	9664
1998/99	14.02	1.34	9578
1999/00	14.90	1.49	9996
2000/01	15.72	1.65	10518
2001/02	16.10	1.74	10792
2002/03	16.60	1.80	10844
2003/04	17.26	1.89	10952

2004/05	18.08	2.07	11421
2005/06	18.98	2.19	11537
2006/07	19.19	2.30	11977
2007/08	20.81	2.54	12200
2008/09	22.52	2.75	12233
2009/00	23.51	3.00	12777
2010/11	24.41	3.20	13124
2011/12	24.50	3.30	13463
2012/13	24.64	3.30	13400
2013/14	25.49	3.42	13419

Table 3: Area, Production and Yield of Tomato by Region (2012/13-2013/14)

Ecological belt	Development region	2012/13			2013/14		
		Area (ha)	Production (mt)	Yield (mt/ha)	Area (ha)	Production (mt)	Yield (mt/ha)
Mountains		**906**	**10544**	**11.6**	**915**	**10407**	**10.6**
	Eastern	101	973	9.6	110	1086	10
	Central	527	6499	12.3	532	6481	12
	Western	51	694	13.6	38	509	13
	Midwestern	94	704	7.5	85	514	6
	Farwestern	133	1674	12.6	150	1817	12
Hills		**11417**	**166708**	**14.6**	**9284**	**146778**	**15.6**
	Eastern	2499	48957	19.6	2689	52066	19
	Central	6604	80692	12.2	4157	55813	13
	Western	1426	25171	17.7	1417	24989	18
	Midwestern	522	6464	12.4	653	8506	13
	Farwestern	366	5424	14.8	368	5404	15
Terai		**7403**	**121342**	**16.4**	**7085**	**113613**	**15.98**
	Eastern	1899	30679	16.2	1535	27156	18
	Central	2984	44608	14.9	2596	37902	14.9
	Western	937	21057	22.5	994	21632	22
	Midwestern	1435	23148	16.1	1280	21268	17
	Farwestern	148	1850	12.5	680	5655	8
Nepal		**19726**	**298594**	**15.1**	**17274**	**232896**	**14.6**

	Eastern	4499	80609	17.9	4324	80308	19
	Central	10115	131799	13.0	7285	62294	9
	Western	2414	46922	19.4	2449	47130	19
	Midwestern	2051	30316	14.8	2018	30288	15
	Far-western	647	8948	13.8	1198	12876	11

Source: Ministry of Agricultural Development, 2016

It was found that small scale growers were not interested in grading and proper packaging, whereas 80 percent of commercial farmers were found to use plastic crates for packaging and then transportation. All wholesalers and about 90 percent retailers use grading of their products before selling as they are aware that graded tomato fetch high prices. Similarly, plastic crates have been used for safe keeping and transportation of the product. Almost all traders (wholesalers and retailers) mostly like mature ripe tomato of large size with good fresh content. This type of tomato is needed especially for raw use (salad) in hotels and restaurants. Household level consumers prefer to buy small sized tomato for pickle.

2 Demand, Supply and consumption trend of Tomato in Nepal

Table 4: Percentage of tomato consumption by source

Region	**Home production (%)**	**Purchase (%)**
Nepal	**21.8**	**78.2**
Eastern	27.0	73.0
Central	9.2	90.9
Western	20.6	79.4
Mid-western	51.0	49.0
Far-western	51.7	48.3
Eco-belt		
Mountain	51.2	48.8
Hill	24.7	75.3
Terai	13.5	86.5

Source: NLSS_III, CBS, Nepal

The results showed that consumption of tomato is highest in central development region through purchase (90.9%) followed by western but the far western and western region purchased less than 50% of their requirement. The mountain belts purchase less than 50% of their demand of tomato while hill has around 75% demand meet by purchased tomato and Terai belt has higher purchased tomato (86.5%) (Table 4). The reason is around 50% of the population resides in Terai belt and higher the population, the demand will be higher. Besides this, around 25-30 lakhs population resides in Kathmandu valley only.The Terai belt are unable to produce tomato during rainy reason due to flooding and the Terai belt is known as the granary of cereals and all land is covered by paddy. So, only one winter season is allowed to produce tomato. The supply is less than demand of tomato in Terai. So, the source is purchased rather than home production.

Table 5: Consumption of tomato/person/Kg

Region	Tomato consumption			Population Estimate (million)			
	Kg/day	Kg/month	Kg/year	2013	2014	2015	2016
Nepal	**0.033**	**0.984**	**11.97**	**27.26**	**27.65**	**28.04**	**28.43**
Eastern	0.034	1.025	12.48	5.93	5.99	6.06	6.12
Central	0.033	0.997	12.13	10.00	10.18	10.36	10.54
Western	0.033	0.984	11.97	5.02	5.06	5.11	5.16
Mid-west	0.032	0.967	11.77	3.66	3.72	3.78	3.84
Far-west	0.027	0.812	9.87	2.63	2.67	2.72	2.76
Eco-belt							
Mountain	0.028	0.835	10.16	1.81	1.82	1.84	1.85
Hill	0.032	0.968	11.78	11.64	11.77	11.89	12.02
Terai	0.034	1.018	12.39	13.80	14.05	14.30	14.55

Source: NLSS-III, 2014

The results showed that average consumption of tomato is around 12 kg/year/person (Tale 5). The far western region has the lowest consumption of tomato (9.875 Kg/year/person) compared to other four development region (around 12 Kg). In case of belts, mountain belt has lowest consumption of tomato (10.84 Kg) compared to hill and Terai belts.

Table 6: Estimated Tomato requirement in Mt.

Region	2015			2016		
	mt/day	mt/month	mt/year	mt/day	mt/month	mt/year
Nepal	**919.7**	**27591.0**	**335690.8**	**932.6**	**27978.3**	**340403.2**
Eastern	207.1	6212.1	75580.8	209.2	6277.0	76370.1
Central	344.2	10325.2	125623.7	350.3	10508.2	127849.2
Western	167.7	5032.1	61224.3	169.3	5079.3	61798.3
Mid-western	121.9	3658.5	44511.2	123.9	3717.8	45233.3
Far-western	73.5	2206.1	26841.0	74.7	2241.0	27265.7
Eco-belt						
Mountain	51.2	1536.7	18696.3	51.6	1548.9	18845.3
Hill	383.9	11515.7	140107.7	388.0	11640.1	141620.7
Terai	485.3	14559.1	177135.6	494.0	14819.9	180308.1

Source : NLSS-III, 2014

Nepal required 919.7mt of tomato for daily consumption in 2015, the demand will reach to 932.6 mt in 2016. Far western region required 73.5mt, the lowest compared to other regions for daily consumption while it reached to 74.7 mt per day in 2016. Mountain belt consumed lowest tomato (51.2mt per day) in 2015 compared to Terai 485.3mt per day in 2016. The tomato demand in mountain will reach to 51.6 mt while in Terai,reached to 485.3 mt per day in 2016 (Table 6).

3. Trade

A study conducted by Central Bureau of Statistics (2010) indicates that 57 percent of tomato production is consumed by producers themselves and remaining 43 percent inters into market chain. On this basis nearly 128,395 mt of domestic production was traded out of which 27 mt was exported to India and nearly, 8,006 mt was imported from India in the year 2012/13. This means that a total of 136,374 mt was traded in the country. Large quantity of processed tomato products such as purée, paste, ketchup and sauces being imported from several countries including India, China and Thailand are not included in above figures. Kathmandu is one of the major domestic markets for tomato at national level. Most of the tomato is distributed from the Kalimati Fruit and Vegetable Wholesale (KFVW) market in Kathmandu. Data available from KFVWM showed that the market traded a total of 27,758.6mt tomato in 2069 BS (13/04/2012 to 13/04/2013). The total volume of tomato marketing is in increasing trend within inside valley but the imported volume from India is also increasing. The tomato volume imported from India was 5.28% in 2012/13 but it was found 12.75% in 2014/15.

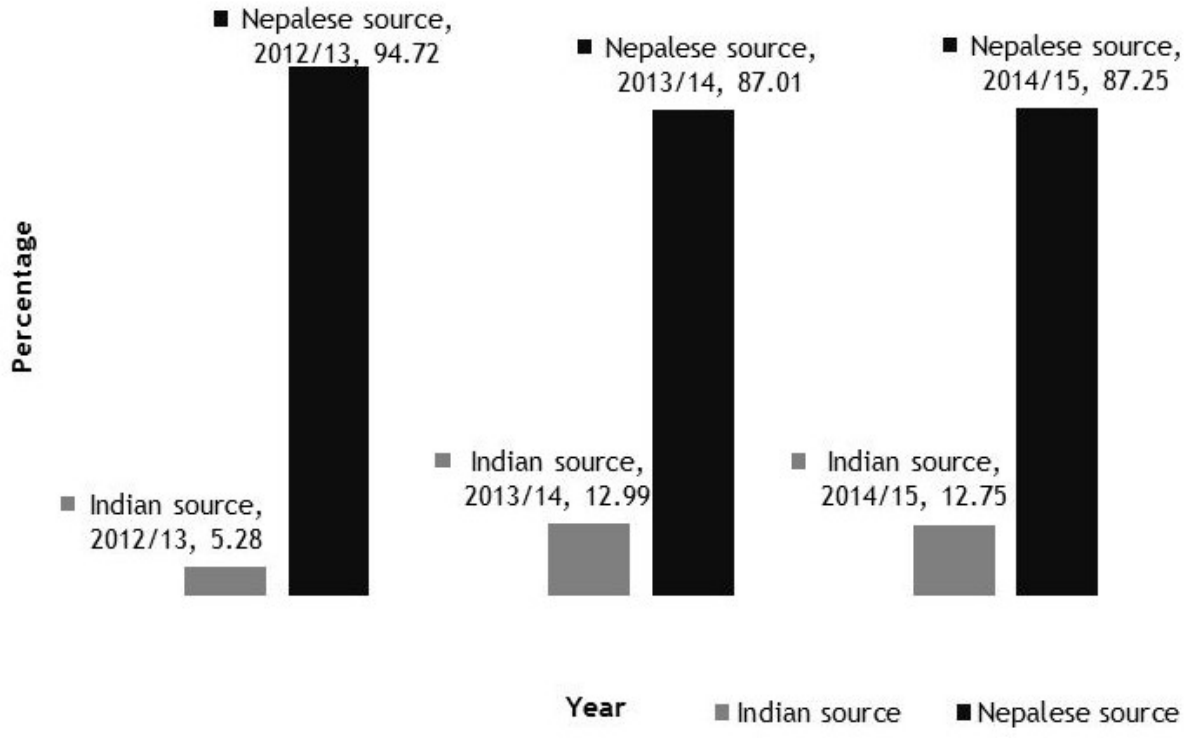


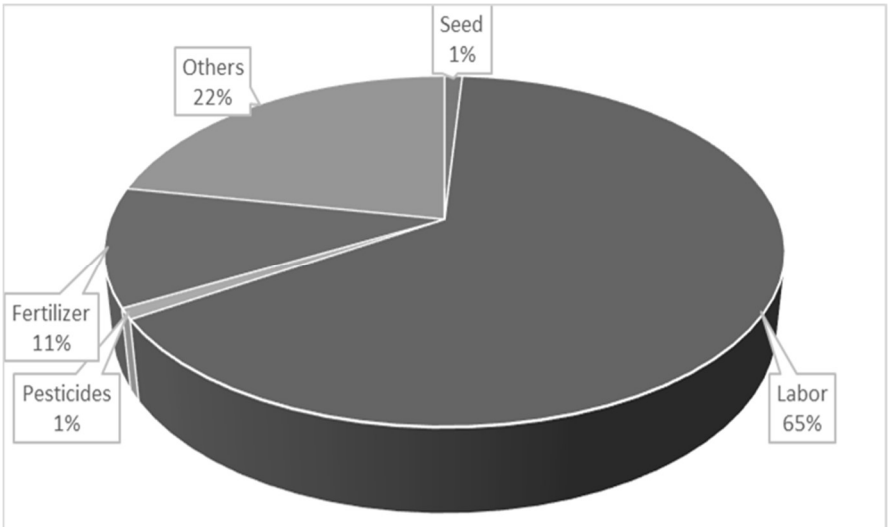
Figure 1: Percentage share of tomato from Nepal and India at Kalimati market from 2013-15

The lowest volume trade was recorded in September/October due to offseason while the highest volume of tomato trade was found in May/June due to seasonal production both in open and plastic house (KFVWM, 2016).

COST AND BENEFITS

1 Production Level

Initial investment in plastic house construction is the major cost of production for plastic house production. Seeds, fertilizers, pesticides, wages, and irrigation are other major cost items in production of plastic house and open field tomato. According to the MRSMP in 2015/16, the average farm gate price for tomato was Rs 20.25/Kg during January-February 2015. Local collectors spent about Rs 2.75/kg in collection, packaging, storage and transportation. They sold the product to wholesalers at about Rs 28/kg, making a profit of almost Rs 5.25/kg. Finally, average retail price in major market was Rs 42/kg. Considering packaging, transportation and handling cost of Rs 5/kg, it is obvious that intermediaries received large part of profit in fresh tomato chain. Traders reported that the high difference between producer and consumer price was due to high transportation cost and storage loss. It was estimated that post-harvest losses in fresh tomato was about five percent each at producers, collectors, wholesalers and retailers level. Higher land productivity is maintained by higher use of chemical fertilizers and pesticides. Frequent spraying with fungicide is common in tomato farming.



Source : MRSMP, 2016

Figure 2: Share of different cost items for tomato production per hectare in open field

Major cost of production of tomato in open field comprises five major cost items. They are seed, wage labor, fertilizer, pesticides, manure and stacking. Wage was recorded to be the highest cost component that comprised of 65% of total cost, followed by land rent, management cost and interest (22%), manure and fertilizers (11%), seed (1%) and pesticides (1%) (Figure 2).

PRICES AND PAYMENT SYSTEM

Producers do not have control on pricing of potato. Buyers usually fix the price of tomato depending upon domestic market demand and export/import opportunities. Wholesalers/traders observe the market signals, instruct commission agents accordingly and collect through those commission agents or directly from producers. There is no contract farming systems adopted among producers and buyers though there is often some commitment to buy according to going market price. There is also no system of price fixation before harvest and buy back guarantee to the producers, which is often, used in fruit crops such as orange. Some cooperatives and local traders also buy from producers with assurance that a fixed proportion of prices to be prevailed at terminal market on expected sales date will be provided to producers.

Payment system differs by stakeholders and locations. The commission agents generally buy in credit from producers and pay when they get payment from wholesalers. The wholesalers normally sell to the retailers in credit and get payment within mutually agreed date. Stakeholders reported that the informal payment system prevailing in domestic market often created disputes in the past, which were resolved by mutual understanding or through mediator within the chain. There is huge demand of fresh tomato in Indian markets during June to October which is off-season in plain areas of bordering states of India. However, Nepal is unable to catch up those big markets due to Indian restriction for Nepali agro products. Though small amount of tomato goes to India during those months through informal channels, most of the benefits go to intermediaries operating either side of the border.

Tomato being highly perishable the price is not stable in comparison of other vegetables. Difference between monthly minimum and maximum price was recorded from Rs 21 in May 2015 to Rs 43 per kg in April 2016 in KFVW market (Figure 8). Traders in KFVW market reported that price differences of up to Rs 20 per kg were observed within a day mainly because of mismatch between demand and supply. It was also revealed that bigger size tomato are sold at higher prices compared to smaller size as bigger sizes are preferred by restaurants and processors.

The average price is found lowest Rs. 20-25/Kg during April-June and around 30-40 during December-March, then the average price increased upto Rs. 60/kg in remaining months but range of price of big tomato is found Rs. 20-60 during the whole year (Table 10).The average price is found lowest Rs. 18 per Kg in June, January and February, then the average price increased up toRs. 50/kg in remaining months but range of price of small tomato is found Rs. 18-50 during the whole year (Figure 4).

Table 9: Monthly prices of Big and Small Tomato at Kalimati markets, 2015/16

Months	Monthly price (Rs.)					
	Tomato Big			Tomato Small		
	Minimum	Maximum	Average	Minimum	Maximum	Average
April	28.00	65.00	44.30	12.00	65.00	39.82
May	35.00	75.00	46.57	30.00	80.00	53.48
June	28.00	70.00	51.59	30.00	70.00	45.65
July	35.00	65.00	50.13	40.00	80.00	55.14

August	22.00	50.00	37.06	24.00	60.00	37.15
September	28.00	65.00	42.49	12.00	35.00	22.72
October	25.00	100.00	52.55	10.00	100.00	40.31
November	45.00	100.00	65.94	30.00	75.00	53.04
December	38.00	60.00	47.25	15.00	60.00	35.84
January	35.00	50.00	42.66	15.00	35.00	22.59
February	28.00	50.00	37.67	20.00	40.00	26.74
March	25.00	40.00	33.92	22.00	50.00	35.73
Average	**22.00**	**100.00**	**46.01**	**10.00**	**100.00**	**39.02**

Source: KFVWM, 2016

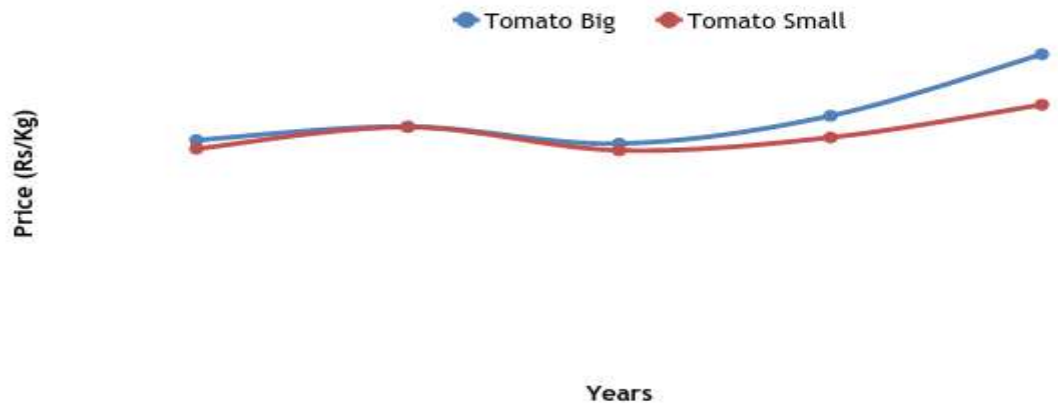


Figure 3: Comparison of price of big and small tomatoes in five years

Average price of both type of tomatoes was found quite similar from 2066-68. After 2069, the price was found differ and price of big tomato was found higher than small tomatoes. In 2070, the price was Rs. 44/Kg for big tomato while it was Rs. 35/Kg in 2070.

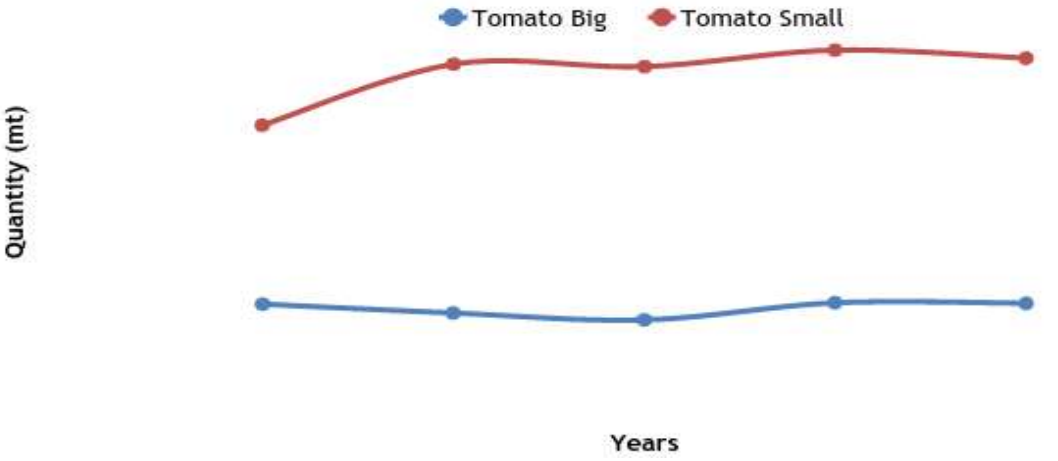


Figure 4: Comparison of quantity consumption of big and small tomatoes from 2066-2070

The quantity consumption of small tomatoes was found three times higher than big tomatoes in these 2066 but reached to four times after 2067 (Figure 8). The quantity consumption of small tomato was 15 million in 2066 but reached to above 20 million after 2067 onwards.

SUMMARY AND CONCLUSION

Tomato and its importance in Nepalese culture can be understood from the fact that it reaches to kitchen of every Nepalese household, irrespective of economic status and ethnicity, the difference being only of quantity and regularity. Diverse agro-ecological conditions in Nepal within short latitudinal distance offered comparative niche advantages for production of tomato in different seasons. There is great feasibility of production of off-season tomato along the mid-hills ecology. The market potential of such tomato is good both within and outside the country such as Tibet of China, bordering states of India and Bangladesh. Mostly seeds of hybrid varieties imported from abroad like Thailand, India, Korea and Japan are used in the production of off-season tomato. There is no strong research and testing of these hybrid varieties before introduction to the farmers' field. Considering large number of farmers, especially small and marginal farmers in the hills, being involved in tomato (off season) cultivation and large scope of export in international market.

The major problems observed in the tomato/vegetables export from Nepal were quick quality deterioration due to high moisture content, faulty packaging and packaging materials and lack of proper grading and proper handling during transportation. Hence, research is needed on quality production and also improvement in packaging, storage, transportation and handling. The off-season vegetable producing farmers' groups need to be provided technical support in the production of quality seeds within the country and production of fresh tomato in potential pockets with no or minimum use of inorganic chemicals.

Opportunities in this sector include scope of increasing the production area and overall productivity; increasing price through improved post-harvest practices like cleaning, grading & sorting; product and market diversification; import substitution; increasing employ of women and disadvantaged groups in production as well as processing activities and increasing earning of foreign currency through export.

The public sector should encourage farmers with certain subsidy on irrigation and postharvest handling along with support on infrastructure development like poly house. Farmers are lured toward tomato farming but they lack technical knowhow. Furthermore, tomato based industries should be promoted with especial benefit packages along with enabling environment for export of processed product.

REFERENCES

Agri-business Promotion & Marketing Development Directorate, 2015. Agricultural Marketing Information Bulletin, Special Issue-2013.ABPMDD, Kathmandu, Nepal. Agri-business Promotion & Statistic Division, 2012.

Statistical Information on Nepalese Agriculture, 2013/14.ABPSD, Kathmandu, Nepal.Agribusiness Promotion and Market Development Directorate, 2010. Cost of Production and Marketing Margin of Cereals, Cash, and Vegetable & Spices Crops, Nepal. DOA, Kathmandu, Nepal.

Agricultural commodity Export Promotion Program, 2013. Import Export of Agricultural Products FY 2068/69. ABPMDD, Kathmandu, Nepal.

Agri-Business promotion And Statistics Division, 2011.Selected Indicators of Nepalese Agriculture and Population, ABPSD, Gender Equity and Environment Division, Singh Durbar, Kathmandu, Nepal.

Budathoki, K., 2014. Tomato and its cost of cultivation in plastic house.Smirti Publication by DAAN, Kathmandu.

Central Bureau of Statistics, 2010. Nepal Vegetable Crops Survey 2009/10 Statistics Report, TA 7165-Nep: Strengthening Capacity for Microeconomic Analysis, CBS, Kathmandu, Nepal.

Commercial Agriculture Development Project, 2008. Product Chain Study: Tomato, Full Bright Consultancy (Pvt.) Ltd., Kathmandu, Nepal.

Gentilcore, D. 2010. A history of the Tomato in Italy.Columbia University Press. Columbia.

Giovannucci, E. 1999. Tomatoes, Tomato-Based Products, Lycopene, and Cancer: Review of the Epidemiologic Literature. Journal of the National Cancer Institute, Vol. 91, No. 4, Pp : 317-331.

KFVWM, 2016.Annual Book. Kalimati Fruits and Vegetables Wholesale Market, Kalimati, Kathmandu.

Mega Publication & Research Centre, 2012. District Development Profile of Nepal, A socio economic Development Database of Nepal, Mega Publication &Research Centre, Kathmandu, Nepal.

Ministry of Finance, 2013. Economic Survey 2012/13, MOF, Kathmandu, Nepal

Ministry of Finance, 2012. Economic Survey 2011/12, MOF, Kathmandu, Nepal

Naan Dan Jain Irrigation Ltd., 2012. Tomato cultivation in open fields and greenhouses, Post Naan, Israel.

Subramanian R. 2016. India processing tomato segment: current status, trends and opportunities for engagement. World Vegetable Center, No. 16-806.28 pp.