



Research Article

DYNAMICS OF GROWTH IN PRODUCTION OF SELECTED HORTICULTURAL CROPS IN INDIA VS. WORLD

GUNJA KUMARI* AND RAKESH SINGH

¹Agricultural Economics, Regional Research Station (RRS), Terai zone (Tz), Uttar Banga Krishi Viswavidyalaya, Pundiabari, Cooch Behar, 736165, West Bengal, India

²Professor and Head, Department of Agricultural Economics, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, 221005, Uttar Pradesh, India

*Corresponding Author: Email - gunjaubkv@gmail.com

Received: December 06, 2019; Revised: December 26, 2019; Accepted: December 27, 2019; Published: December 30, 2019

Abstract: Objectives of study is analysis of growth in area, production and productivity of selected horticultural crops from India and World.

Keywords: Horticulture, Production, NHM, HVC, GOI

Citation: Gunja Kumari and Rakesh Singh (2019) Dynamics of Growth in Production of Selected Horticultural Crops in India vs. World. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 11, Issue 24, pp.- 9358-9359.

Copyright: Copyright©2019 Gunja Kumari and Rakesh Singh. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Academic Editor / Reviewer: Prakash Kumar Singh, Jothiprakash Gitanjali, Dr Keshav Mehra

Introduction

Among all horticultural crops, fruits and vegetables have great potential in generating higher income, employment, reducing hunger, poverty and malnutrition and earning higher foreign exchanges for the country and hence considered as HVC. Production of horticultural crops are reaching newer higher limits with each passing year and in the year 2012-13 it surpasses the production of food grains in country. Despite being 2nd largest producer of fruits and vegetables in world it still represents a very small part in global export of these crops because of lower percentage of production translating to export. Several measures were taken by the GOI since long back in different forms to increase production of these crops and to translate this increased production into higher remuneration for both farmer and traders involved in farming and trading. Various schemes were launched/implemented in past to boost their production and trade like National Horticulture Mission. Despite all these efforts made it still lags behind in reaping the opportunities derived from its vast production base because of its poor management, lack of infrastructure, lack of awareness and lack of technical guidance related to both production of quality produce in volume and about its proper disposal for getting higher income. All these hinderance should be tackled wisely to reap the benefits of increased production and demand of these crops.

In 2017-18 total production of horticultural crops was 311.7 million tonnes from 25.43 million hectare of area and area under horticultural crops was growing at an annual rate of growth of 2.3 over 2016-17 while production grew at an annual rate of growth of 3.7 over 2016-17 year. Hence scenario of total horticultural production is encouraging in overall country. As fruits and vegetables constitutes for more than 90 percent of horticultural production hence in the present study selected fruit and vegetables will be studied for their production performance in India and world to understand the actual scenario over the years [1-4].

Material and Methods

For the present study in growth in area, production and productivity of selected horticultural crops, compound growth rate (CGR) was calculated with the help of exponential equation form as this is found as the best model for calculating CGR. Six crops i.e. three fruits and three vegetables were selected purposively as they form the major chunk of horticultural production. Among fruits mango, grapes and banana were selected while among vegetables onion, potato and tomato are selected for this study and a time series analysis for the period of 1985 to 2017

was being taken for both India and world. Data on area, production and productivity were collected from the FAOSTAT and cross checked with various other sources like NHB database, Indiastat.

Exponential growth model

Growth rates for variables of selected fresh fruits and vegetables in terms of area, production and productivity was computed for a period of 33 years from 1985 to 2017. The exponential growth model was selected for the analysis and the model is of the following form

$$Y = a b^t e \quad (1)$$

Where,

Y= Dependent variable for which the growth rate will be estimated (area, production, productivity of banana, mango, grapes, onion, potato, and tomato).

a= Intercept

b= Regression coefficient

t= Time variable (1985 to 2017)

e= Error term

Take logarithmic form of the equation (1) as to compute compound growth rate as below

$$\ln y = \ln a + t \ln b$$

To compute Compound growth rate (g) in percentage following formula is used by taking antilog of b coefficient minus one multiplied by 100.

$$g = (\text{Anti ln of } b - 1) \times 100$$

Results and discussion

Indian scenario

From [Table-1], it is clearly evident that there is significant positive growth in both area and production along with productivity for almost all the six selected crops in India except for grapes whose productivity is growing non-significantly at 0.32 percent CGR and for mango whose productivity is decreasing significantly with negative CGR of -1.27 percent. This negative growth in mango productivity might be the result of following poor management practices by mango cultivars. However, among all selected fruit and vegetable crops grape has highest significant growth in area with CGR 6.86 percent followed by onion with CGR 5.71 percent in area along with highest significant growth in production throughout the

study period with CGR 7.8 percent which is followed by grapes with 2nd highest CGR of 7.21 percent in production as close as onion. Both crops have highest CGR values in area and production among all fruit and vegetable crops may be because of their higher demand at both domestic and global level and capacity to fetch higher remuneration which encourages producers to grow it more. However, tomato shows a significant growth in area for overall study period in India having least CGR value of 2.01 among all selected crops may be because of its highly perishable nature among all of them and fluctuating domestic prices in seasons of glut & surplus production along with lack of proper technology and lack of infrastructural facilities to store it for longer duration as like in case of onion and potato or lack of proper technology to increase its self-life, which might be discouraging farmers to grow it on larger scale to avoid distress sale or dumping. However, least significant growth in production for overall period is of mango with CGR 2.57 percent, this might be because of nature of mango crops to bear fruits in alternative years or alternative fruit bearing nature of mango results in lower rate of growth in its production. In case of banana growth in area is significant with CGR value of 3.31 percent but growth in production is significantly high or more than growth in area and having highest rate of growth in productivity among all selected crops with CGR 2.59 percent. Which clearly shows that increase in production of banana is mainly due to the increase in its yield/productivity, which might have been achieved because of improvement in cultivation practices, growing of improved cultivars and techniques for this crop. [Table-1] also brought attention to develop & explore methods/techniques to improve productivity in case of mango crop particularly and also for grapes, along with some researches on developing methods/practices to improve self-life of perishable crops like tomato to avoid its area shrinkage in country so as to avoid any situation of dependency on imports for domestic consumption in near future.

Table-1 Compound growth rate in area, production and productivity of selected fruits and vegetables in India and World for overall period of study (1985-2017)

CGR (1985-2017) (%)	India			World		
	A	P	Y	A	P	Y
Banana	3.31 ^a	6.002 ^a	2.59 ^a	1.93 ^b	3.56 ^a	1.59 ^b
Grapes	6.86 ^a	7.21 ^a	0.32 ^{ns}	-0.11 ^b	0.903 ^a	1.43 ^a
Mango	3.89 ^a	2.57 ^a	-1.27 ^a	4.02 ^a	3.96 ^a	-0.07 ^{ns}
Onion	5.71 ^a	7.80 ^a	1.98 ^a	3.79 ^a	4.51 ^a	0.69 ^a
Potato	3.17 ^a	4.67 ^a	1.46 ^a	0.17 ^a	1.16 ^a	0.98 ^a
Tomato	2.01 ^a	3.24 ^a	2.17 ^a	1.33 ^a	2.01 ^a	1.51 ^a

Note: CGR (compound growth rate) in percentage (%). ns denotes not significant.

a= 1%, b= 5%, *=10% level of significance

World scenario

Results computed and presented in [Table-1] for growth in area, production and productivity of selected crops for overall study period clearly shows a highest significant rate of growth in area of CGR 4.02 percent in case of mango crop among all six selected fruit and vegetable crops in world. However, rate of growth in production of mango crop is again significant but is only of CGR value 3.96 percent which is lesser than rate of growth in area of this crop which clearly depicts that increase in production is led by area expansion rather than by increase in productivity of this crop. Hence, productivity of this crop which is growing non-significantly with negative rate of growth of -0.07 percent, needs to be improved by continuous research and development for this crop at global level (as like for India also). As despite its lower productivity area expansion is significant which shows the interest of producers to grow it more as the demand for this crop is very high at global level because of its unique taste, color and aroma which could fetch higher returns from this crop even from lower production which encourages producers to grow it. However, onion crop has 2nd highest significant rate of growth in area just after mango, and is of CGR value 3.79 percent, it has higher significant rate of growth for its production than mango and is of CGR value 4.51 percent in case of onion and its productivity is also growing significantly at a compound growth rate of 0.69 percent. However, unlike India rate of growth in area, production and productivity of banana, potato and tomato is significant and is growing positively with a CGR of 1.93, 3.56, 1.59, 0.17, 1.16, 0.98, 1.33, 2.01 and 1.51 percent respectively. And banana has highest significant rate of growth in productivity than all other selected crops followed by tomato,

grapes and potato. However, area under grapes is growing significantly negative or decreasing significantly but is having positive significant growth in production which is around one. Hence, it could be said that decrease rate of growth in area might be due to its lower production and productivity growth which could have possible reasons of lack of proper management in production and harvesting.

Summary and Conclusion

Among all fruits and vegetables, grapes has the highest significant CGR in area followed by onion and mango in India while in world mango has highest significant CGR in area followed by onion and banana. However highest significant CGR in production is for onion followed by grapes and banana in India. Also, in world highest CGR is for onion followed by mango and banana and is significant. While highest significant CGR in productivity is of banana followed by tomato and onion in India and banana followed by grapes and tomato in world. While mango has a significant negative rate of growth in CGR of productivity in India and non-significant decreasing CGR in productivity for world. Also, CGR in productivity of grapes is non-significant in India. Hence a serious policy framing is required in both India and world for improving productivity of mango and for grapes in India. Proper research and development by continuous studies is needed for these two crops as they could act like a great player in doubling of income of farmers and for achievement of nutritional security throughout the world.

Application of research: Study of compound growth rate in area, production and productivity of selected fruits and vegetables.

Research Category: Agriculture Economics

Abbreviations: CGR: Compound Growth Rate, GOI: Government of India

NHB: National Horticulture Board

FAOSTAT: Food and Agriculture Organisation statistics division

HVC: High Value Crops, NHM: National Horticulture Mission

Acknowledgement / Funding: Authors are thankful to Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, 221005, Uttar Pradesh, India. Authors are also thankful to Regional Research Station (RRS), Terai zone (Tz), Uttar Banga Krishi Viswavidyalaya, Pundiabari, Cooch Behar, 736165, India

***Research Guide or Chairperson of research:** Prof Dr Rakesh Singh

University: Banaras Hindu University, Varanasi, 221005, Uttar Pradesh, India

Research project name or number: PhD Thesis

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: IAS, Varanasi, 221005

Cultivar / Variety name: Mango, Grape, Banana, Onion, Potato and Tomato

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

References

- [1] Annesha Mech (2017) *Indian Journal of Agricultural Research*, 51 (4), 355-359.
- [2] Narasalingi V.M. and Shivashankar K. (2017) *International Journal of Scientific Engineering and Science*, 3(10), 9-20.
- [3] Patil R.S., et al., (2018), *International Journal of Current Microbiology and Applied Sciences*, Special issue-6, 2667-2673.
- [4] FAOSTAT (2019) <http://www.fao.org/>