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Research Article

SPATIO-TEMPORAL CHANGES IN AREA, PRODUCTION AND PRODUCTIVITY OF WHEAT (*TRITICUM AESTIVUM*) IN RAJASTHAN

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Abstract: The present investigation was carried out to find out spatio-temporal changes in area, production and productivity of wheat in Rajasthan. We made an analysis of the changes in wheat crop production, area and yield of Rajasthan for the period from 1995 to 2014. The present study revealed that: (a) increase in area, production and productivity of wheat yield in the state. (b) Sri Ganganagar, Hanumangarh, Alwar, Baran, Bundi, Jaipur, Bharatpur, Kota and Bhilwara districts were identified as primary zone of wheat in Rajasthan. (c) Banswara, Pali, Jalore and Dungarpur districts are fall under Medium spread and Low productivity category and Rajsamand is under Low spread and Medium productivity category where it requires increasing area under wheat.

Keywords: *Wheat, Area, Productivity, Rajasthan*

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Introduction

Wheat is the most important winter season cereal in Rajasthan occupying 15.9 % of the annual cropped area in the state. Rajasthan occupies nearly 9.3 % of total area under wheat and contributes 9.2 % of total production of wheat in India. The productivity of wheat in the state is around 3698 kg/ha with an area of 2.83 million ha and production of 9.0 million tonnes [1]. In recent past, considerable changes have been made in wheat crop cultivation, largely driven by the crop yield enhancement to meet the global demand for food due to the increase in global population [2]. Food demand is expected to increase anywhere between 59 to 98% by 2050 [3]. The differences in yield are primarily due to prevailing weather, inter seasonal climatic variability, soil conditions and agricultural inputs. The present investigation was carried out to assess the change in area, production and productivity of wheat in Rajasthan.

Methods and Material

The data on area, production and productivity of wheat on different districts in Rajasthan was collected for 18 years (1995-96 to 2013-14) from Govt. of Rajasthan, 2014. Based on information, the spatio-temporal changes in area, production and productivity was worked out. Subsequently, the period of 18 years was split in two of 9 year each which comprises period of between 1995-2004 and 2005-2014 for shift analysis of area, production and productivity of wheat.

Trend in area and production

Trends in area and production of wheat in the state was worked out by using data base from 1995-96 to 2013-14. Area, production and yield for 33 districts of Rajasthan were collected from www.krishirajasthan.gov.in.

Delineation of production zones

The net sown area in the state has been classified / demarcated into different categories of production zones during 2011-12 to 2013-14. The criteria adopted for the categorization of production zone is the area under the crop. Arranged districts in descending order and worked out the cumulative total upto 50 % of the total area of the state. Those districts which contributing upto 50% of the area in the state are termed as primary zone and districts contributing total 35%, excluding those districts which are already considered in primary zone, of net area sown under the crop are classified as secondary zone and the rest of the districts as tertiary zones.

Demarcation of productivity (yield) zones

Yield gap analysis was done to quantify the difference between the potential productivity of a crop in a region and its yield at farm level. It helps in the development of suitable strategies to improve the production at farm level. Though the yield gap analysis is generally done using experimental data, an attempt is made here to identify the regions with high productivity and regions with low productivity retaining heterogeneity of practical farming at district level. This comparison may ultimately result in identifying production constraints so as to bring all the zones to higher productivity levels. The criteria adopted in the demarcation of the zones are based on area as well as yield. District are placed in different categories depending upon the area and productivity levels and seven categories are considered *viz*., High area-High yield (HH), High area - Medium yield (HM), Medium area - High yield (MH), Medium area - Medium yield (MM), Medium area - Low yield (ML), Low area - Medium yield (LM) and Low area - Low yield (LL). Depending upon the availability of water resources, management strategies may have to be evolved to bridge the gap in yield levels.

Results and Discussions

Over 33 districts are producing wheat and of which 10 are major producers in state *viz*., Sri Ganganagar, Hanumangarh, Alwar, Baran, Bundi, Jaipur, Bharatpur, Kota, Bhilwara and Chittorgarh are important wheat producing districts of Rajasthan [Table-1]. Area, production and productivity of wheat are increased after 2009-10 [Fig-3]. Productivity was declined from 3521 kg/ha in 2012-13 to 3375 kg/ha in 2013-14. The average area, production and productivity for the current decade (2005-2014) in comparison to previous decade (1995-2004) in the state depicted in [Fig-4] showed that during 2005-2014 area, production and

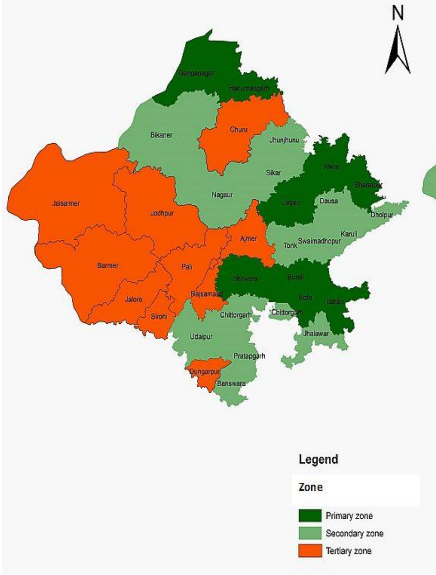

Fig-1 Productivity zones of wheat in Rajasthan

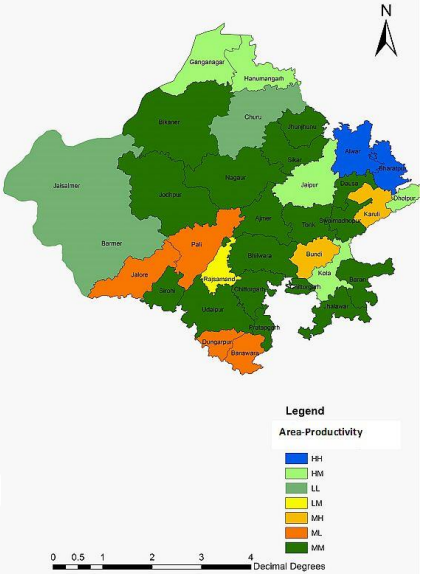

Fig-2 Potential area and productivity of wheat in Rajasthan

Table-1 *Area, production and productivity of wheat in different district (Average of 2011-12, 2012-13 and 2013-14)*

Name of district	Area (ha)	Production (tonnes)	Productivity (kg/ha)
Ajmer	56192	186271	3306
Alwar	199447	796712	3993
Banswara	88257	197600	2239
Baran	157493	608439	3857
Barmer	12764	17296	1348
Bharatpur	148406	641743	4326
Bhilwara	118611	393496	3302
Bikaner	98424	242503	2465
Bundi	156739	664328	4243
Chittorgarh	115294	459477	3982
Churu	29168	52720	1752
Dausa	91637	341887	3732
Dholpur	59805	244280	4087
Dungarpur	46103	86598	1879
Sri Ganganagar	252873	1011329	3995
Hanumangarh	243237	888603	3655
Jaipur	150922	481862	3193
Jaisalmer	13736	17999	1310
Jalore	31124	60614	1930
Jhalawar	93484	313240	3369
Jhunjhunu	81621	304046	3709
Jodhpur	59669	140659	2383
Karauli	79020	305552	3870
Kota	125930	520871	4141
Nagaur	72041	124608	1765
Pali	50336	127128	2532
Pratapgarh	59874	212146	3526
Rajsamand	32156	100396	3117
S.Madhopur	72444	226229	3133
Sikar	100518	317068	3154
Sirohi	35746	98121	2746
Sri Ganganagar	252873	1011329	3995
Tonk	62539	214707	3432
Udaipur	71781	193600	2699
Total	3067390	10592128	3083

Table-2 *Production zones of wheat in Rajasthan*

Zone	Area (ha)	Name of districts
Primary zone	1553657	Sri Ganganagar, Hanumangarh, Alwar, Baran, Bundi, Jaipur, Bharatpur, Kota and Bhilwara
Secondary zone	1086933	Chittorgarh, Sikar, Bikaner, Jhalawar, Dausa, Banswara, Jhunjhunu, Karauli, SwaiMadhopur, Nagaur, Udaipur, Tonk, Pratapgarh and Dholpur
Tertiary zone	426800	Jodhpur, Ajmer, Pali, Dungarpur, Sirohi, Rajsamand, Churu, Jaisalmer, Jalore and Barmer
Total	3067390	

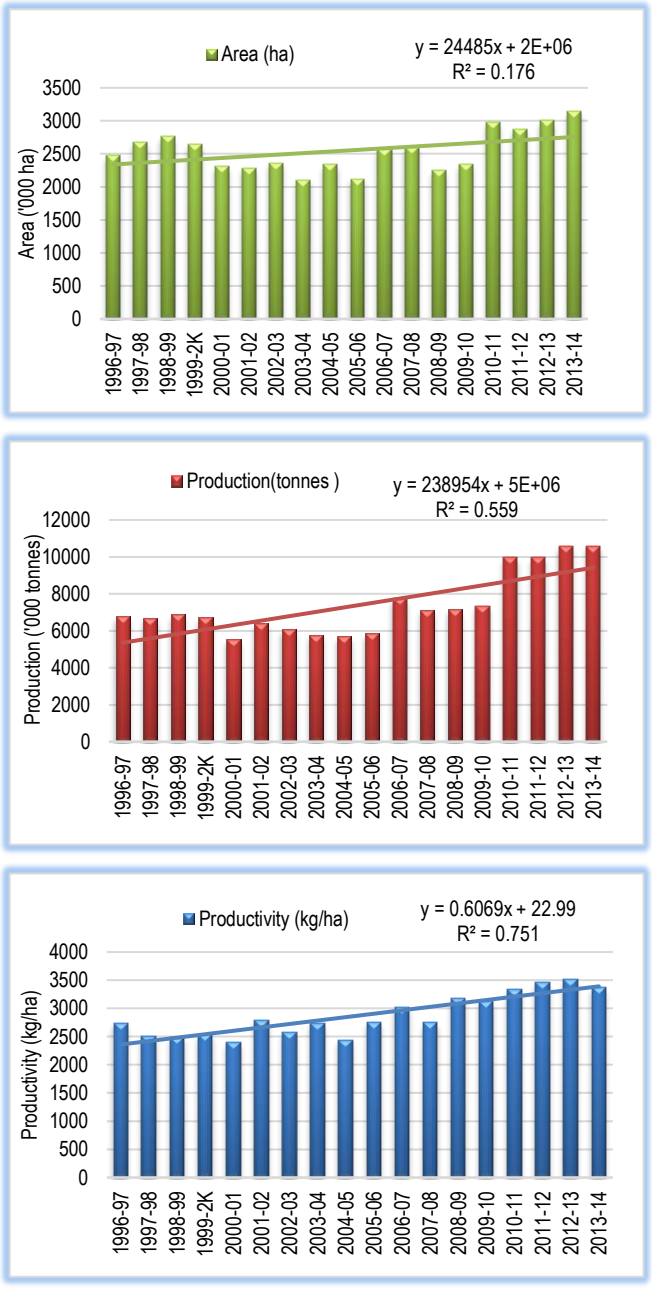

Fig-3 Trend of area, production and productivity of wheat in Rajasthan

Table-3 *Potential areas of wheat production and options to increase area and productivity in Rajasthan*

Area-Productivity	Districts	Option for increasing wheat production
HH	Bharatpur, Alwar	No Intervention required
HM	Ganganagar, Hanumangarh, Jaipur, Kota	Productivity required to be increased using NRM
MH	Karauli, Bundi, Dholpur	Need to increase area under cultivation
MM	Dausa, Jhalawar, Jhunjhunu, Chittorgarh, Sikar, S. Madhopur, Bhilwara, Ajmer, Tonk, Udaipur, Nagaur, Sirohi, Jodhpur, Bikaner, Baran	Area is to be increased with improved production technology
ML	Banswara, Pali, Jalore, Dungarpur	Bring more area under this crop and also increase productivity using NRM
LM	Rajsamand	
LL	Churu, Jaisalmer, Barmer	Explore alternative options

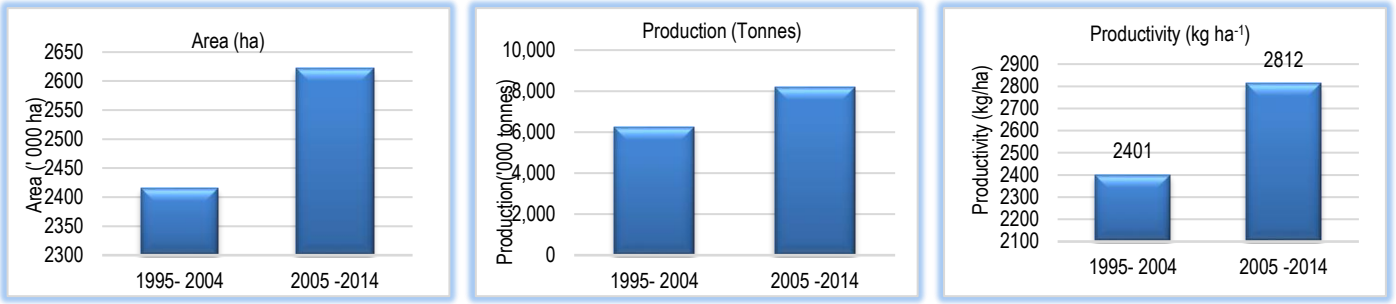

Fig-4 Area, production & productivity of wheat in Rajasthan during 1995-2004 and 2005-2014

productivity has increased by 8.6, 31.3 and 17.1 percent, respectively as compared 1995-2004. A significant increase in area, production and productivity of wheat was also noticed in Punjab [4].

Conclusion

The zones classified as per above criteria are shown in [Fig-1] and [Table-2]. This type of categorization helps in planning and implementing projects to expand areas under the crops currently grown or to introduce new crops or their cultivars into the new area. On the basis of above criteria, Banswara, Pali, Jalore and Dungarpur district are fall under ML category and Rajsamand is under LM category where it requires to increase area under wheat and strategies to enhance productivity whereas three districts *viz*., Churu, Jaisalmer, Barmer comes under LL category so here alternative options may be suitable for rabi season instead of wheat [Table-3] and [Fig-2].

Application of research: Study of area, production and productivity of wheat (*Triticum aestivum*) in Rajasthan

Research Category: Agrometeorology

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Study area / Sample Collection: Rajasthan

Cultivar / Variety / Breed name: Nil

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] Govt. of Rajasthan (2017) *Rajasthan Agriculture Statistics at a glance*, 2017-18.
[2] Ramankutty N., Evan A.T., Monfreda C. and Foley J.A. (2008) *Global Biogeochemical Cycles*, 22(1).
[3] Food and Agriculture Organization of the United Nations (FAOSTAT) (2017) *FAO Statistics Division 2017*
[4] Prabhjyotkaur, Singh Harpreet and Hundal S.S. (2006) *Indian Journal of Agricultural Sciences*, 76 (1), 52-54.