

Production of Food Crops and Sustainable Approach: A Case Study of District Bundi

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Abstract

The word sustainability refers to the ability to maintain a certain rate or level or balance in any sector. The word sustainability is generally used in the reference of development or economic growth. Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs. Sustainable approach focuses upon the balance between the needs of the present generation as well as of the future generation. The present economic scenario shows that a sustainable approach is essential to sustain the present level of development. The world population is growing gradually. The availability of food will be a big challenge in future. The production of food crops will play a major role in this reference. However India is independent in the production of food crops like rice, wheat, maize etc. But the growing rate of population growth will lead to the increasing demand of the food crop's production in India. This paper emphasizes the present and future situation of food crops production in district Bundi of Rajasthan. The discussion focuses on the sustainable approach to ensure the food crops production for the growing population of district Bundi.

Key Words: Sustainability, Sustainable Approach, Food Crops.

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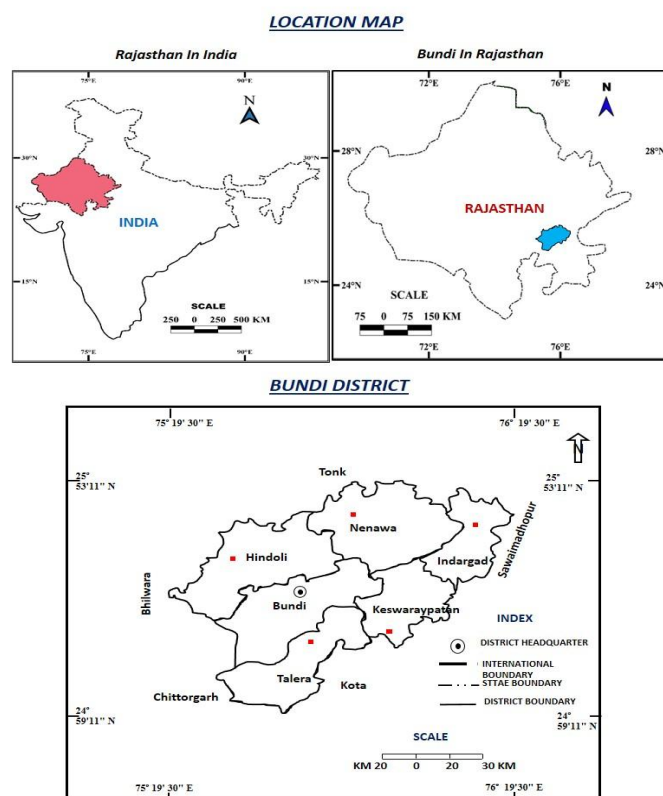
I. Introduction

The district is situated in the south-east of Rajasthan, between latitudes 24° 59'11" and 25° 53'11" North and Longitudes 75° 19'30" & 76° 19'30" East. The length of the district from east to west is about 110 km. and it is about 104 kms from north to south. Bundi is bounded on the north by Tonk District, on the west by Bhilwara and on the south – west by Chittorgarh district. The river Chambal forms the eastern boundaries, separating the Bundi and Kota territories. The southern tehsil of Bundi forms a wedge between Bhilwara and Kota and also touches Chittorgarh district. The total geographical area of the district is 581938 hectares. The Bundi district ranks Twenty second among the existing 33 Districts of Rajasthan from the point of view of the area. The population of district Bundi is 1110906 (2011). The rank of district Bundi is 30th in Rajasthan according to the population of 2011.

Table-1.1
Administrative Setup: District Bundi

S.N.	SUB DIVISION	TEHSILS	AREA (Sq. Kms)	VILLAGE NUMBERS	TOWN
1	Bundi	Bundi	1929	161	Bundi
2	Talera	Talera	N.A.	106	Budhpura
3	Keshavrai Patan	Keshavrai Patan	754	122	K.Patan Kapren
4	Indergarh	Indergarh	668	121	Indergarh, Lakheri
5	Nainwa	Nainwa	1158	190	Nainwa
6	Hindoli	Hindoli	1341	186	Hindoli
Total			5850	891	7

Source: District Statistical Year Book 2018



Agriculture is the main economic activity of India. Indian agriculture is successfully providing food to about 1392 million population of India. Rice, wheat, maize, sorghum, pearl millet (Bajra), barley are the major food crops in India. The Third Advance Estimates of production of major agricultural crops for 2020-21 have been released by the Department of Agriculture, Cooperation and Farmers Welfare. As per Third Advance Estimates for 2020-21, total food grain production in the country is estimated at record 305.44 million tonnes which is higher by 7.94 million tonnes than the production of food grain of 297.50 million tonnes achieved during 2019-20. Further, the production during 2020-21 is higher by 26.66 million tonnes than the previous five years' (2015-16 to 2019-20) average production of food grain. In fiscal year 2020, in Rajasthan the total production of food grains was over about 23 million metric tonnes. Table 1.2 shows the per capita net availability of food grains in India from 2018-2021. Sustainability in the production of food crop production indicates the balance between the production of food crops and per capita availability of food grains. It is very challenging to sustain the production of food crops for the rapidly growing population. District Bundi of Rajasthan is famous for its versatile agriculture production. It is a leading district in the production of various crops like rice, wheat, mustard, soybean, sugarcane etc. The total production of food grains of district Bundi in 2017-18 was 722082 metric tons. Census data shows that the population is growing gradually from national to district level. There are a lot of efforts to be done in the sector of agriculture to ensure the production of food grains for this growing population. As we know that most of Indian agriculture is dependent on the monsoon. Various aspects including monsoon are affecting the production of various crops in India. In district Bundi there are also various geographical, socio-economic aspects which affect agriculture production including food grains. A sustainable approach towards the development of agriculture in district Bundi is required.

Table - 1.2
Per Capita Net Availability of Food Grains (As on 27.10.2021)
(000 TONNES UNLESS OTHERWISE STATED)

Year	Population in Thousand Person	Production		Net Availability	Per Capita Net Availability	
		Gross	Net		Kg Per Year	Grams Per Day
2018-19	1338995	285209	255680	235663	176	482.2
2019-20	1353378	297500	266567	247867	183.1	501.8
2020-21	1367173	308647	276495	253413	185.4	507.8

Source: <https://www.indiabudget.gov.in/economicsurvey/doc/stat/tab119.pdf>

In the words of Thomas Malthus “Malthus specifically stated that the human population increases geometrically, while food production increases arithmetically. Under this paradigm, humans would eventually be unable to produce enough food to sustain themselves.”

II. Material and Methods

Related Work

In 1983 “World Commission on Environment and Development” was set up to study and understand the issues of development and environment. In 1987 a report was published by this commission entitled “Our Common Future”. This report was further known as “Brundtland Report”. It is named after the Commission’s chairperson Gro Harlem Brundtland. In this report it was discussed that the growing unmanaged economic development will lead to various environmental problems, whether they are related to the natural or social environment. The guidelines or principles for development given by this commission are known as the principles of sustainable development today. This commission defined the sustainable development as follow “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Later the concept of sustainable development was adopted in every sector, whether socio-economic or environmental. Scholars used and discussed this concept in the reference of agriculture also because the world population is growing rapidly. Only the sustainable approach towards agriculture can provide the food for this growing population. Various aspects were discussed and written down on the sustainable aspect of agriculture and food availability. In the present scenario of the 21st century this is an important aspect for the scholars for study.

Alok Chantia & Preeti Misra in 2010 studied about the food security and sustainability of agriculture in India. They discussed the problem of food security and sustainability in India in the reference of human rights. They stated that the fulfillment of food needs is the basic human right of people. In 2011, Vedamani Hans conducted an analytical study on food security and sustainability in India. Dr. Pattanayak, in 2017 studied sustainability in a different aspect. Dr. Pattanayak discussed crop diversification in the reference of sustainable agriculture. According to the study, crop diversification can lead to versatility and production in agriculture. In 2018 Dr. Prakash Shankar Kamble and Mr. Dipak Gopinath Chavan discussed about sustainability of Indian agriculture. They also find out the certain challenges and opportunities for Indian agriculture. Nasim Ahmad, K. Singh, D.K.Sinha and R. Mishra in 2019 studied food security and sustainability of agricultural production. In this study an economic analysis was done in the context of India.

III. Methodology

Primary and secondary data are collected for analytical study and finding conclusions. Intense surveys and field visits are undertaken to bring out the empirical results for study. Secondary data are collected from various published and unpublished administrative publications. Results and conclusions are found after the detailed study and analysis of various aspects about the food grains production in district Bundi. A comprehensive study and analysis of literature and various reports and publications was undertaken to observe the variations and changing patterns in the production of food grains in the study area. Data of agriculture production and population growth are compared to find out the actual position of balance. Theory of sustainability is also used to analyze the future of sustainability in the field of food grain production in district Bundi.

IV. Results

District Bundi has an important place in the production of various crops in Rajasthan. Geographical conditions of district Bundi are quite favorable for the production of food crops as well as cash or industrial crops. Rice, Sorghum, Pearl Millet, Maize, Wheat, Barley are the major food crops produced in district Bundi. On the other hand soya bean, mustard, groundnut, sesame are industrial or cash crops of district Bundi. In 2017-18 net sown area under the food crops in district Bundi was 219608 hectare, while net sown area under the oil seeds was 46113 hectare. Tehsil Bundi is leading in the reference of net sown area under the food crops in district Bundi. In 2017-18 net sown area under the food crops of tehsil Bundi was 60464 hectare. Tehsil Keshoraipatan is in second position with the net sown area of 47201 hectare under food crops. Wheat is the major food crop according to the net sown area in district Bundi. Total net sown area under wheat was 146747 hectare in 2017-18. Rice and maize are other important food crops according to the net sown area in district Bundi. Total sown area under rice and maize was 47006 and 22944 hectare in 2017-18. Sorghum is the food crop with the lowest sown area in district Bundi.

Table 1.3
Area under Food Crops: District Bundi

Year	Crops (Area in Hect.)						
	Rice	Sorghum	Pearl Millet	Maize	Wheat	Barley	Total
2013-14	29465	68	1370	29737	160285	859	221784
2014-15	34548	68	1604	34169	172991	724	244104
2015-16	39856	98	1357	29715	154914	723	226663
2016-17	44345	167	1132	30340	162248	1040	239272
2017-18	47006	99	922	22944	146747	1890	219608

Source: District Statistical Abstract, 2018

Table no. 1.3 shows the area under various food crops in district Bundi. Tehsil wise distribution of net sown area of 2017-18 shows that tehsil Bundi is leading in the net production area of rice and sorghum. Tehsil Keshoraipatan is leading in the production area of wheat in district Bundi. Table 1.4 shows that tehsil Hindoli is leading in the production area of maize and barley, while tehsil Indergarh is leading in the production area of pearl millet in district Bundi. Wheat, rice and maize are major crops that are used for food in district Bundi. As wheat is the major food crop in the district, table 1.4 shows that tehsil Bundi, Talera and Keshoraipatan are leading the production area of wheat in district Bundi. These three tehsils cover 67.27% of total area under the production of wheat in district Bundi. We can see the same pattern for the production area of rice also, where these three thesils are in the leading position. 93.95% of total area under the rice production is covered by Bundi, Talera and Keshoraipatan tehsils. This fact shows that the geographical conditions of these three thesils are in the favor of the production of wheat and rice. Bundi, Talera and Keshoraipatan tehsils have an important impact in the sustainable future of food crops production of district Bundi. Remaining three thesils Indergarh, Nainwa and Hindoli are leading the production area of Maize, Barley, Sorghum and Pearl Millet. The geographical conditions of these tehsils are suitable for the production of these types of crops. Due to these favorable conditions tehsil Bundi is at the first position according to the total area under the food crops while tehsil Nainwa has the lowest area under the production of food crops in district Bundi.

Table 1.4
Tehsil Wise Area under Food Crops: District Bundi (2017-18)

Tehsils	Crops (Area in Hect.)						
	Rice	Sorghum	Pearl Millet	Maize	Wheat	Barley	Total
Bundi	21675	44	1	2862	35361	521	60464
Talera	13768	5	0	3480	25475	50	42778
Keshoraipatan	8723	0	0	243	37882	353	47201
Indergarh	406	18	418	136	14458	90	15526
Nainwa	124	1	199	2104	5633	313	8374
Hindoli	2310	31	304	14119	27938	563	45265
Total	47006			22944	146747		

Source: District Statistical Abstract, 2018

While concentrating on the production pattern of food crops in district Bundi, table no. 1.5 reveals that wheat was leading the production of food crops in district Bundi with the production of 794653 M.T. in 2017-18. Rice (130363 M.T.) and maize (31577M.T.) was the second and third major food crops according to the production in district Bundi. Sorghum, Barley and Pearl Millet were fulfilling the local needs of district Bundi. The total production of food crops in 2017-18 was 963413 M.T in district Bundi. Sorghum was at the last position according to the production in 2017-18.

Table 1.5
Production of Major Food Crops: District Bundi

Year	Crops (Production in M .T.)						
	Rice	Sorghum	Pearl Millet	Maize	Wheat	Barley	Total
2013-14	70096	96	961	24003	638652	2529	722082

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2014-15	82646	100	1199	29768	194147	485	308345
2015-16	151608	113	995	36122	738820	1725	929383
2016-17	265970	277	2307	41486	794048	2541	1106629
2017-18	130363	88	1939	31577	794653	4793	963413

Source: District Statistical Abstract, 2018

Table 1.6 shows that tehsil Keshoraipatan is leading the production of food crops in district Bundi. The total production of food crops of Keshoraipatan tehsil was 321804 M.T in 2017-18. Tehsil Bundi(211304 M.T.) and Talera(183828 M.T.) were at second and third position in 2017-18. Tehsil Nainwa was at last position with the production of 14445 M.T. In 2017-18 tehsils Bundi, Talera and Keshoraipatan produced 72.58% wheat, 91.79% rice and 58.95% maize of district Bundi. These tehsils are leading the production of three major food crops (wheat, rice, maize) of district Bundi. Table 1.6 shows that sorghum is also a major food crop of Bundi and Talera tehsils. Indergarh, Nainwa and Hindoli tehsil are leading the production of pearl millet and barley in district Bundi. About 100% of pearl millet and 63.17% of barley is produced in Indergarh, Nainwa and Hindoli tehsil.

Table 1.6
Tehsil Wise Production of Major Food Crops: District Bundi (2017-18)

Tehsils	Crops (Production in M .T.)						
	Rice	Sorghum	Pearl Millet	Maize	Wheat	Barley	Total
Bundi	47154	52	1	4452	159124	521	211304
Talera	55072	13	0	13920	114638	185	183828
Keshoraipatan	17446	0	0	243	303056	1059	321804
Indergarh	1203	5	1672	544	72290	315	76029
Nainwa	248	1	199	2104	11270	623	14445
Hindoli	9240	17	67	10314	134275	2090	156003

Source: District Statistical Abstract, 2018

Here we find out some key characteristics about the production of food crops produced in district Bundi. Total area under food crops in 2017-18 was 219608 Hect. Wheat, rice and maize are major food crops of district Bundi according to production. Indergarh, Nainwa and Hindoli lead the production area of Maize, Barley, Sorghum and Pearl Millet. Bundi, Talera and Keshoraipatan are leading the production area of rice, wheat in district Bundi. tehsil Keshoraipatan is leading the production of food crops in district Bundi. In 2017-18 tehsils Bundi, Talera and Keshoraipatan produced 72.58% wheat, 91.79% rice and 58.95% maize and 73.86% of sorghum of district Bundi. 100% of pearl millet is produced in Indergarh, Nainwa and Hindoli tehsils. Versatile geographical conditions are responsible for this specific pattern of food crops in district Bundi. This specific pattern has a key role in the planning for the sustainability in the production of food crops of district Bundi.

Discussion and Strategies for the sustainable development in agriculture (food crops) of district Bundi

The population is growing gradually all over the world. For the small and developing districts like Bundi, it is a challenge for agronomists as well as policy-makers to provide proper and sufficient food for the growing population. Strategies which are focused on sustainability are required to overcome the vulnerability and problems related to food sustainability for the rapidly growing population. Well planned strategies and suggestions should be executed in the field of agriculture of district Bundi. Wheat, rice maize, barley, sorghum and pearl millet are the major food crops which are produced in district Bundi. The geographical conditions of Bundi, Talera and Keshoraipatan thesils are in the favor of the production of wheat and rice. Bundi, Talera and Keshoraipatan tehsils have an important impact in the sustainable future of food crops production of district Bundi. Remaining three thesils Indergarh, Nainwa and Hindoli are leading the production area of maize, barley, sorghum and pearl millet. The geographical conditions of these tehsils are suitable for the production of these types of crops. Sustainability should be developed according to the geographical characteristics of district Bundi. Policies should be formed to encourage the production of rice, wheat in Bundi, Talera and Keshoraipatan tehsils. While in the tehsils of Indergarh, Nainwa and Hindoli the production of maize, barley, sorghum and pearl millet should be encouraged, because the geographical condition of these tehsils are favorable for these crops. This will help to economic development and sustainability in the production of food crops in district Bundi.

The production of food crops of district Bundi is facing a hard competition from the production of oil seeds like mustard, soya bean, groundnut and sesame. Strategies should be formed for filling the gap in

agriculture. The gap between the yield area and production in district Bundi should be covered. Crop intensity should be increased. There should be a continuity and stability of food crops production in district Bundi. The production of food crops in district Bundi is not stable. Production of food crops is facing a sharp competition with the production of cash crops like soya bean, mustard, sugarcane, mustard etc. Policies should be formed to encourage the production of food crops. Financial and economic assistance should be given to the farmers of district Bundi. It is necessary to provide farmers with basic facilities like; high quality seeds, proper irrigation facilities, equipment, fertilizers, storage etc. The farmers of district Bundi are very poor and poorly facilitated in the reference of these basic facilities. Awareness towards sustainable agriculture should be developed among farmers. A wide literacy program for the farmers of district Bundi should be undertaken. Under this program the key concepts of sustainable agriculture should be delivered to the farmer. This will develop a sustainable approach among the farmers of district Bundi. The farmers of district Bundi have a lack of interest towards the management of inputs in agriculture. The inputs of agriculture like finance, labor, machinery, power, fertilizers should be managed properly by farmers for the optimum production of food crops. Farmers should also be inspired to adopt the cost effective agriculture process. Cost effective agriculture will lead to the balance between input and output in the agriculture process. Cost effective agriculture process will also increase the income of farmers in district Bundi. Growing use of chemical fertilizers, genetically modified seeds are threats to sustainable agriculture. Eco-friendly methods of agriculture should be adopted in agriculture by the farmers of district Bundi. The culture of organic farming is developing among farmers of district Bundi. The use of organic or natural fertilizers, use of biofuel, and optimum use of irrigation are friendly to the ecosystem of a balanced agriculture. Entrepreneurship in agriculture is quite necessary for the financial betterment of agriculture and farmers of district Bundi. Entrepreneurship in agriculture is a way to find out various other sectors and sources of income by the side of contemporary agriculture. This will sustain the financial stability of agriculture and farmers also. Farmers of district Bundi are adopting the culture of truck farming, green house farming and organic farming. Support and assistance should be given to the farmers of district Bundi for these practices. This will lead to sustainability in future agriculture. It will also encourage the income and production of farmers. Special insurance policies for the food crops should be formed and implemented at grass root level in district Bundi. The attraction of insurance policies will encourage the farmers for the production of food crops. This will also help in disaster and risk mitigation in the sector of food crops production here. The idea of micro and macro financing will also be helpful for farmers. Small funding for fertilizers, seeds and other facilities will encourage the small farmers. The agriculture sector of district Bundi is waiting for a positive support form administration and politics. Administrators, politicians and policy makers play a major role in the development of the agriculture sector. Good governance will contribute towards the sustainability of food crop production in district Bundi. District Bundi is facilitated with the irrigation facilities of the Chambal River. Other irrigation projects are also working here. The overall system and mechanism of water distribution for irrigation is not managed. Distributaries are in very poor conditions all over the district. Irrigation Department of district Bundi should work for the renovation of the entire structure of canals of district Bundi. This will lead to the maximum use of irrigation water. An authentic government seed center is also required in district Bundi to provide good quality seeds. Government agencies every purchase a fixed amount of production of food crops like wheat etc at a certain support price. The main aim of this purchase from governmental agencies is to encourage food crops production in district Bundi.

V. Conclusion

Sustainable approach emphasizes to maintaining a certain level in every field for a long time for the welfare and betterment of human beings. Sustainability is required in the field of food crop production to provide necessary food for the growing population. Wheat, rice, maize, barley, sorghum and pearl millet are the major food crops of district Bundi. Production of food crops is dependent upon the geographical conditions of a certain area. The study indicates that the geographical conditions of Bundi, Talera and Keshoraipatan thesils are in the favor of the production of wheat and rice. Bundi, Talera and Keshoraipatan tehsils have an important impact in the sustainable future of food crops production of district Bundi. Remaining three thesils Indergarh, Nainwa and Hindoli are leading the production area of maize, barley, sorghum and pearl millet. The geographical conditions of these tehsils are suitable for the production of these types of crops. For the sustainability in food crop production it is necessary to promote certain food crops in certain favorable conditions. Emphasis of each effort and plan should be made to maintain a positive balance between the growing population and food crop production. Optimum balance is required to sustain the food crop production for future. At the last in the words of Thomas Malthus **“The table of nature is laid for a limited number of guests and those who come uninvited must starve.”**

The agriculture sector has the most challenging sector in respect of economically, environmentally and socially. The Indian agriculture sector faced various traditional as well as new global challenges the key

challenges addressed as follows.

→ The conservation and enhancement of ecological foundations for sustainable agriculture, which included land, water, biodiversity, and marine resources. Urbanization and non-agricultural land uses to create tremendous challenge before agriculture.

→ The 80 percent farmers in India having small size of land. They are not economically sound and lack of market attachment.

→ The net income from agriculture of small and marginal farmer's quite low or some time it become negative. Because of large increase in production cost in agriculture sector.

→ The contribution of private sector in agriculture investment quite low and declined trend of public investment in agriculture after 2000.

→ The agriculture productivity is very low and hamper income of the farmers. The per unit area productivity also low in case of major crop producing in countries. The agriculture sector has the most challenging sector in respect of economically, environmentally and socially. The Indian agriculture sector faced various traditional as well as new global challenges the key challenges addressed as follows.

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