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Physico-Chemical Study of Soils in Banswara District of Rajasthan

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ABSTRACT

Banswara is a city in the Banswara district in southern Rajasthan, India. The name, Banswara, came from "Bans wala" (bamboo) forests, as Bamboo grew in abundance around this place within the area. Banswara is also known as "City of a Hundred Islands", which is often referred to as "Cherrapunji of Rajasthan", because it receives the most rain in Rajasthan, as well as for the numerous islands in the Mahi River, often referred to as "Mahati", an alternate name for Mahi river, in Vayu Purana text, which flows through the city. It is the greenest city in Rajasthan due to the heavy rainfall which it receives.The city has a population of 101,017, of whom 51,585 are male and 49,432 are female.

The soil of Rajasthan , Banswara is dry sandy and is suitable for growth of plants which are succulents, thorny, bushy, etc. and have the ability to withstand this hot dry climate. The research work is based on detection of soil nature basically physico-chemical characteristics which is mainly responsible for flora and fauna of this area. Cactus, Opuntia, Babool, Kikar, Ber, Aloe vera, Giloe, Cassia etc are plants which are commonly adjustable to this soil. Animals adapted to dry desert area in Banswara are Camel, goat, sheep, salamander, snake, scorpions, lizards, spiders, etc. Banswara in Rajasthan is a rural area which has started developing by the ministry of Rajasthan. People are bhils, chamars, meena, tribals and now general settlement is started to get attained there. Water is salty and people are adapted to it. Water in ponds, lakes, reservoirs are useful for growth of fish adapted to salty water like Gambusia, roheo, Catla etc. which are reared here for business also. Cow , sheep, Goat, Buffalo are used for milk /dairy business. They are also reared for meat.

KEYWORDS: Banswara, Rajasthan, soil, physico-chemical, water, animals, plants, fish, dairy, meat, development, government , ministry

1. INTRODUCTION

We investigated a the study area and soil characterization was done. A plateau region with hill top, side slope, foot slope, undulating pediment, moderately sloping pediment, gently and very gently sloping pediment and also alluvial plain was studied. Some areas were excessive while some were well drained. The soil depth in centimeters was taken to the laboratory in polythene bags and their analysis was done. The pH range was found to be slight acidic to alkaline.Electrical conductivity range was from 0.24 to 0.56. Calcium carbonate content in soil was from 12.0 to 36.51 gm/kg. the CEC, OC and BS values were detected as seen in table. See table

Banswara district in Rajasthan

Pedon	Landform	Wetness (w) Drainage	Soil depth (cm)	$CaCO_3$ (g kg^{-1})	CEC (cmol (p^+) kg^{-1})	BS (%)	pH (1:2)	OC (g kg^{-1})	EC (dSm^{-1})	ESP
P1	Hill top	Some what excessive	30	12.0	22.40	96.67	6.40	12.3	0.24	2.14
P2	Side slope	Some what excessive	45	14.12	28.05	96.82	6.45	10.3	0.31	2.02
P3	Foot slope	Some what excessive	45	15.29	32.79	95.34	6.56	9.5	0.38	2.13
P4	Undulating pediment	Some what excessive	52	15.0	20.50	93.90	6.70	5.5	0.28	1.07
P5	Moderately sloping pediment	Well drainage	60	36.51	32.32	96.76	6.63	7.0	0.56	2.57
P6	Gently sloping pediment	Some what excessive	20	18.70	24.10	95.76	6.50	13.6	0.41	3.60
P7	Gently sloping pediment	Well drainage	50	33.74	31.79	94.73	7.02	5.6	0.43	2.23
P8	Gently sloping pediment	Well drainage	130	31.22	34.76	96.45	6.95	8.1	0.45	2.60
P9	Very gently sloping alluvial plain	Well drainage	30	29.50	33.90	95.57	7.10	9.9	0.46	2.18
P10	Very gently sloping alluvial plain	Some what excessive	20	22.40	24.10	91.95	6.90	8.5	0.37	2.48

Soil was found to be suitable for agriculture if vermicomposted, addition of micro and macro nutrients. The farmers if supported by the state government will be able to grow crops, vegetables and fruits according to the environmental conditions and seasonal fluctuations.

Banswara has a tropical savanna climate (Köppen Aw), less extreme than that in the desert regions further north and north-west. The maximum temperature is 27 to 41 °C (80.6 to 105.8 °F), while the minimum temperature is 13 to 27 °C (55.4 to 80.6 °F). Normal annual rainfall is 922.4 mm or 36.31 in[1,2]

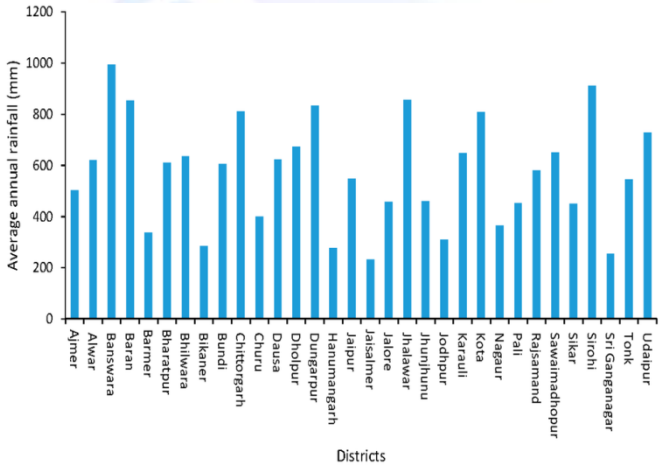
Hide Climate data for Banswara (1981-2010, extremes 1965-2012)													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	34.2 (93.6)	39.6 (103.3)	44.1 (111.4)	45.5 (113.9)	47.0 (116.6)	47.5 (117.5)	41.5 (106.7)	39.8 (103.6)	40.0 (104.0)	40.0 (104.0)	37.5 (99.5)	35.2 (95.4)	47.5 (117.5)
Average high °C (°F)	27.6 (81.7)	30.4 (86.7)	35.5 (95.9)	39.6 (103.3)	40.7 (105.3)	38.0 (100.4)	32.2 (90.0)	30.5 (86.9)	32.8 (91.0)	34.9 (94.8)	32.4 (90.3)	29.0 (84.2)	33.6 (92.5)

Average low °C (°F)	12.7 (54.9)	14.9 (58.8)	19.6 (67.3)	23.6 (74.5)	26.4 (79.5)	26.5 (79.7)	24.6 (76.3)	23.8 (74.8)	23.4 (74.1)	20.8 (69.4)	17.0 (62.6)	13.6 (56.5)	20.6 (69.1)
Record low °C (°F)	2.8 (37.0)	5.4 (41.7)	7.4 (45.3)	15.9 (60.6)	16.4 (61.5)	18.1 (64.6)	17.9 (64.2)	18.4 (65.1)	14.3 (57.7)	12.7 (54.9)	8.9 (48.0)	4.5 (40.1)	2.8 (37.0)
Average rainfall mm (inches)	1.9 (0.07)	0.2 (0.01)	0.4 (0.02)	0.4 (0.02)	3.0 (0.12)	103.9 (4.09)	331.6 (13.06)	327.5 (12.89)	141.3 (5.56)	15.7 (0.62)	4.3 (0.17)	3.0 (0.12)	933.2 (36.74)
Average rainy days	0.3	0.0	0.0	0.0	0.3	4.4	11.5	12.9	6.0	1.1	0.4	0.2	37.1
Average relative humidity (%) (at 17:30 IST)	40	32	24	22	26	44	67	75	64	44	40	44	43

2. DISCUSSION

Central ground water board (CGWB) has shown good mineral composition in water. Krishi vigyan Kendra in Banswara shows sandy, loamy, red and clayey soils in different regions according to climatic conditions. Farmers can grow Prosopis, Ber, Aloe, Cassia, Giloe in sandy soil areas; cereals and legumes in loamy soils; Cotton and mustard in red soil whereas rice varieties in clayey soils. If given land and facilities of fertilizers farmers can really develop the soil of Banswara into gold. [3,4]

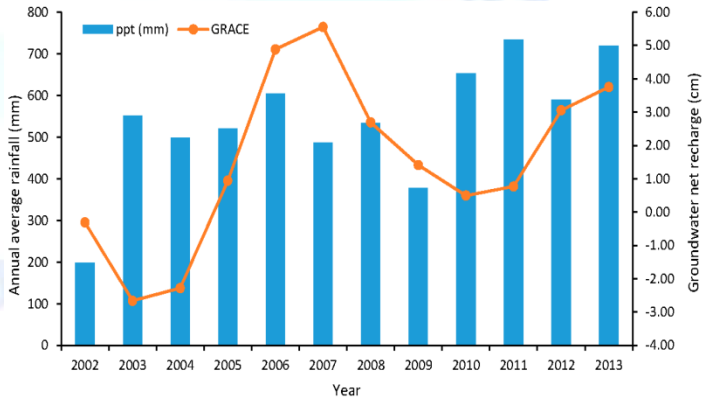
As rainfall is usually 70-100 cm ; supplementation of artificial rains , water supply and humid greenhouses can be done using proper costs and finance by the government



Women tribal labourers are also given employment these days with proper wages almost equal to men.

Water supply by central ground water board in different areas of Rajasthan including Banswara is highly effective and organizing for the well being of common gentry.

Groundwater storage is done which is used during supplementation to crops.[5,6]



Groundwater storage is understood in modern times by remote sensing

3. RESULTS

THE Mahi Bajaj Sagar dam in Banswara is a good provision for water supplementation, energy supply and electricity in Banswara[7,8]

Plants and animals in Banswara soil adaptation

Chameleon

Peacock

Green Snake

Camelion lizard

Camel milk

Plants in Banswara are general which are found in Rajasthan as told above.

The major soils of Banswara district in Rajasthan were evaluated for their suitability for maize cultivation using limitation method regarding number and intensity of limitations. Rural distress pushed the adivasi population of Banswara, Rajasthan to seek work far away from home. But now, with support from a local non-profit and the state government, several migrant families have returned home and taken up organic cultivation that is bearing fruit.[9,10]

There are approximately 500,000 farmers in Banswara that has a population of about 1.8 million. The land under cultivation of kharif crops is about 235,000 hectares, where soybean, urad dal, rice and cotton are grown. And for the rabi crops of wheat, chana and maize, 142,000 hectares of land are under cultivation."Banswara has about thirty thousand hectares of land under organic cultivation," RK Varma, district agriculture officer, Banswara, told Gaon Connection. "Kushalgarh tehsil is where most of the organic cultivation is happening in the district," he said. The Rajasthan government has been encouraging zero-budget agriculture that promotes low cost cultivation and the use of inexpensive natural fertilisers and pesticides such as cow dung, cow urine, jaggery, etc. This gave an impetus to farmers in 39 villages of Banswara where they were taught about zero-budget farming. Groups of 50 farmers were created for this purpose.

These farmers were shown how with the dung and urine of just one cow of a native breed, 30 acres (over 12 hectare) could be fertilised and kept safe from harmful pests. The farmers had no need to spend money on

buying fertilisers and pesticides from the market. Even the use of water and electricity for irrigation came down. With almost nil input costs, the organic farmers could get better and healthier yields. [11,12]

According to the Union ministry of agriculture and farmers' welfare, as of March 2020, of the 140.1 million hectares of land under cultivation in the country, 2.78 million hectares were under organic cultivation, that is about 2 per cent of the total cultivated area.

4. CONCLUSIONS

Progressive organic farming is getting its much needed boost in Banswara with the help of VAAGDHARA (Voluntary Association of Agricultural General Development Health and Reconstruction Alliance), a non-profit that works with farmers.

"The farmers in Banswara are adopting new practices along with the traditional modes of farming," Jayesh Joshi, who heads VAAGDHARA, told Gaon Connection. "Through the farmers collective we are providing several training capsules as a result of which the farms are flourishing, especially in the adivasi areas," he said. [13,14]

There are many examples of farmers who have embraced the organic way. Bhurji Katara from Banswara who once struggled to grow anything on his two bighas of barren land, is a happy man now. With the use of organic fertilisers made of cow dung and cow urine, his land has come alive and he now grows an abundance of fruits and vegetables that is earning him a good income.

"It is heartening to see so many farmers adopting organic cultivation. They are becoming aware of the value of natural farming, indigenous seeds and the importance of a healthy soil," Joshi said.

Many of them, who were on the verge of selling off their land because it yielded nothing, have changed their minds, the head of Wagdhara pointed out, as awareness drives and training in organic farming in several villages helped them rejuvenate their lands.[15,16]

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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