An Appraisal of Water Resource and Irrigational Status of Ambedkar Nagar District in Uttar Pradesh

[1]Sheetla Prasad Sharma, [2]Arvind Singh Yadav, [3]D. C. Pandey
[1&3]Dept. of Geography, Kumaun University, DSB Campus, Nainital, India.
[2]Dept. of Geography, Kumaun University, SSJ Campus, Almora, India.

Abstract:

Agriculture is the mainstay of people all over the world from time immemorial. Largest part of population for its subsistence and livelihood depends on agriculture and allied activities. Water is the most essential component in sustaining agriculture and provide base to the modern farm activities and processes. Progress of agriculture; crop and livestock production profoundly depend on the effectual and regular availability of water for irrigation. Production of crops, cropping pattern, crop productivity, crop commercialization and livestock in any area is determined by the water resource available in that particular area. Water resource rich areas in the world are also rich in crop production qualitatively as well as quantitatively; promote food security to the masses. Present paper investigates the water resource viz. ground and surface water available in Ambedkar Nagar district of Uttar Pradesh, changing scenario of water use in agriculture and other activities, scarcity, depletion and degradation of water resources in the district with its impacts on agriculture and food security.

Keywords: Agriculture, Food Security, Modern Farm Activities, Subsistence and Livelihood, Water Resource.

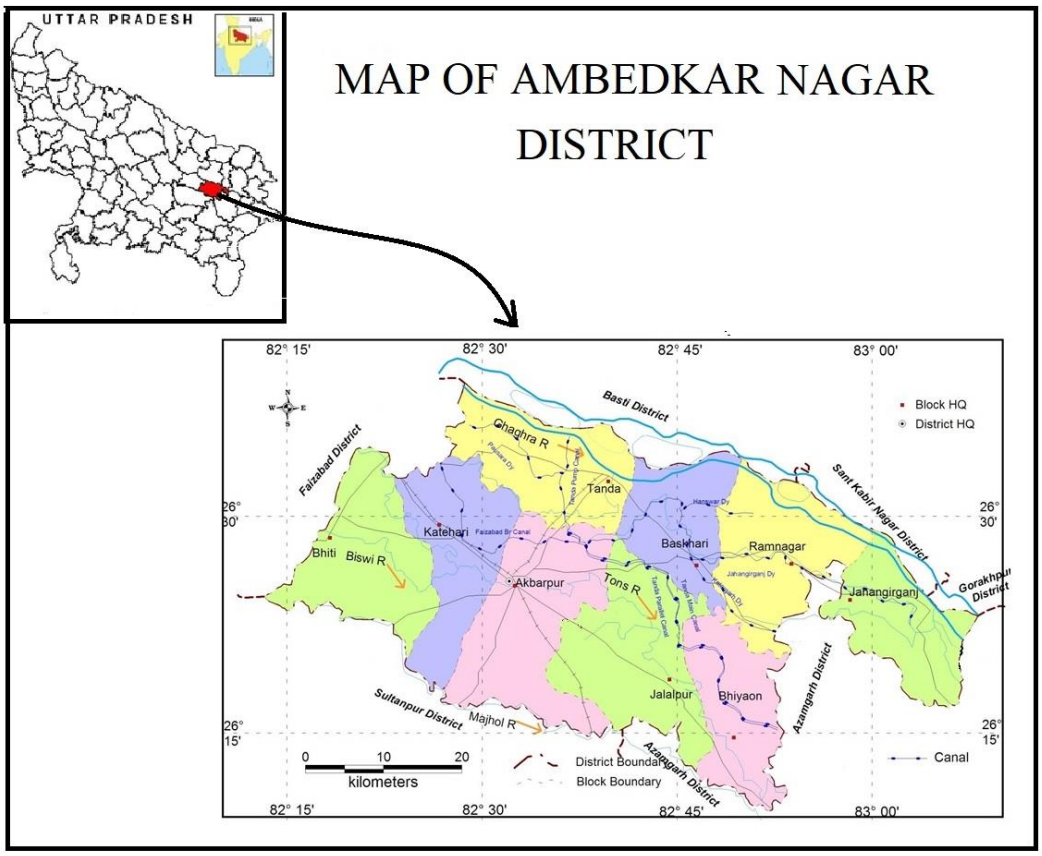
I. INTRODUCTION:

India is the second largest populous country, having 2.45 percent area of the world and retains 17.5 per cent population of the earth alone. Total population of the country is 121.08 crore which is equivalent to the total population of the U.S.A., Indonesia, Brazil, Pakistan, Bangladesh and Japan (Census, 2011). Such a giant population consume large amount of natural resources viz. soil, water, air, minerals, coal, and energy. Country has four percent of water resources of the world, while country receive only 1170 mm of average rainfall, which corresponds to annual precipitation, including snowfall of 4000 billion cubic meters (BCM). Average annual flow potential of the Indian rivers is 1869 billion cubic meters (BCM). Among all water resource availability in India, only 1123 billion cubic meters (BCM) water available for the country annually. In which 690 billion cubic meters (BCM) is available in the form of surface water and rest 433 billion cubic meters (BCM) water is available as ground water (GOI report, 2007).

Currently, in India Ground Water is depleting at much higher rate due to irrational, unbounded, and unbalanced and faulty use and exploitation of water by agricultural and industrial sectors. Ground water irrigation capacity is going to continue high according the increasing want, time & technological development because there is great demand of water to sustain agriculture and food security of the population in the country. In 1950 country's irrigation capacity by ground water was 6.50 million ha; has now increased to 70 million ha. Following to the increased irrigation capacity, net irrigated area of the country has also been increased by the time. Net irrigation area was 22.80 million ha in 1950 of the country now has been increased and reached to 68.10 million ha (Directorate of Economics & Statistics, 2014).

There are two main sources of irrigation in the country, first is the surface water sources i.e. irrigation by canal, ponds, other similar sources and second is ground water sources i.e. Tube wells, wells etc. These two sources facilitate the whole irrigation system in the country after1970 specially; ground water use is on higher side as compared to surface water. Dependency of modern agriculture on ground water irrigation has increased manifold, due to its well-established comparative advantages over canal irrigation (Sivanappan, 1995). Development of ground water took a major pace through private modern water extraction mechanism (WEMs). ownerships of which are highly skewed towards large farmers due to huge capital investment needed and relatively better consolidation of land holding among them (Singh & Singh, 2006; Shah, 1993 and Dhawan, 1982). In areas where aquifers are substantial and water tables high, recent evidence indicates rapid increases in private investments in modern WEMs (Dhawan, 1982). In India, there exists huge contrast in terms of opportunities of ground water irrigation/exploitation (Srivastava and Kumar, 2007) which is causing severe regional disparities in use of ground water. increased density of wells can increase the welfare of the people in the eastern region Farmers with fragmented holdings are very much depended on ground water irrigation leading to the rampant use of ground water and dramatic drop of ground water table.

II. STUDY AREA:



Source: Report of DGWB, Ambedkar Nagar, 2014.

Figure 1. Location Map of Ambedkar Nagar

The study area Ambedkar Nagar is a district of Uttar Pradesh which is located in the eastern part of the state. District has its extent in 26º 09' N to 26º 40' N latitudes and 82º 12' E to 83º 09' E longitudes and covers 2350 sq km of geographical area. Geographically it is the part of middle Gangetic Plain. Akbarpur is the head quarter and main town of the district. According to the census of 2011, it has population of 2,397,888 persons in which 12,12,410 are males and 11,85,478 are females. The population density of the district is 1020 person/sq km (Census, 2011).

III. OBJECTIVE OF THE STUDY:

The broad objective of the study is to study the status of water resources existing in Ambedkar Nagar district and analyse the development of irrigational organizations of the district. Further to discuss the type of water resources used in irrigation; its availability and their changing nature in space and time.

IV. METHODOLOGY:

In this paper secondary data have been used which is collected by different sources like government website, District Census Handbook, Central Ground Water Board, District survey reports and Sankhiki Patrika of the district, further analysis of the data have been done.

V. RESULT AND DISCUSSION:

Water Resource Status:

There are two main sources of Irrigation in the district one is ground water and another is surface water. The coverage of irrigated area by ground water is 235.053 thousand ha which is 87 percent of the total irrigated area of the district. On the other side irrigation by canal covered 35.255 thousand ha of the total irrigated area of the district. It is approximately 13 percent of the total irrigated area of the district. So, these two sources are covering the 270.308 thousand ha of the total Gross area irrigation in the district.

Status of Ground Water:

Ground water is the main sources of irrigation in the district Ambedkar Nagar. The Ground water is classified by the ground water board, U.P., about 5 and 10 mbgl (meters below ground level) and is observed by the ground water monitoring well stations. Depth of water in the district in Pre and Post-monsoon season is as below:

Pre-monsoon depth to water level during 2012 is 1.05 – 7.48 mbgl.

Post-monsoon depth to water level during 2011 is .85 – 7.50 mbgl.

In pre-monsoon season fall of water table have been noticed between 0.03 m to 0.15 m/year and while, post monsoon season it is 0.02 to 0.15 m/year in the year 2012-13. The exploratory drilling about 305m at two places in Jalalpur block in the southern part of the district and deep exploratory drilling (750m) in adjoining Faizabad and Azamgarh districts also suggests that multiple aquifer system present in the area (DGWB, Ambedkar Nagar, 2014).

The ground water quality of the district is not up to the mark and presence of chemical constituents is more than permissible limit. Excess of chemicals like; As, Fe etc. are more frequent. Quality of water is ranges between fresh to brackish, Fluoride is within the permission limits, Constituents of Nitrate are above permissible limit at Tanda (146 mg/1), Baskaari (59 mg/1) and Jahangirganj (65 mg/1) (DGWB, Ambedkar Nagar, 2014).

Surface Water:

Two rivers namely, Tons and Ghaghara flow through the district Ambedkar Nagar are the major source of water in the district. All the major canals of the district borrow water from these two.

The Tons is Main River of the district which flows from the middle part of the district and divided the region into two parts, northern part of district is low land and southern part is highland. The Surface water is an important source of water in the district which is distinguished by canal, pond and others sources

of irrigation. All these collectively covered the 13 percent of the total irrigation of the district. There are four main canal network systems in the district viz. Tanda pump canal, Tanda main canal, Tanda parallel canal and Faizabad branch and its various distributaries. The main canals and its coverage are as follows:

Table 1: Surface Water Sources in Ambedkar Nagar

Sl. No.	River	Total Length (in km)	Area Covered (in km)	Area Coverage (in %)
1.	Ghaghara	60	120	5.1
2.	Tons	75	37.5	1.59

Source: District Survey Report Ambedkar Nagar, 2017

The river Ghaghara decided the northern boundary of the district. It is a tributary of river Ganga. The elevation of the river Ghaghara from west to east Purwa Kajepur to Dewara are/have 92 m to 75 m respectively and the river tons elevation from west to east Mathia to Lakhmipur are 91 m to 85 m respectively.

Table 2: Canal Network System in Ambedkar Nagar District

Canal	Length (in km)	Canal Coverage Area (ha)	Area Covered
Chaudhary Charan Singh Tanda Pump Canal	41.92 (including minors)	5287	Starts from right bank of Ghaghara river in Tanda block, covers parts of Akbarpur and Tanda blocks through associated minors.
Tanda Main Canal	103.37 (including minors)	9346	Originates from Tanda Pump Canal near Nasirpur in Tanda block, irrigates parts of Tanda, Akbarpur, Baskhari and Bhiyon Blocks through associated network of minors and passes into Azamgarh district.
Tanda Parallel Canal	116.05 (including minors)	11702	Runs parallel to Tanda Main canal to the left side; irrigates parts of Jalalpur and Bhiyaon blocks through associated network of minors and passes in to Azamgarh district.
Jahangirganj, Hanswar and Kathargarh distributaries.	249.59 (including minors)	33701	Jahangirganj Distributary takes off from Tanda main canal very near the letter's origin, irrigates parts of Akbarpur, Tanda, Baskhari, Ramnagar and Jahangirganj blocks through Hanswar and Katargarh distributaries and associated minors.
Faizabad Branch Canal	29.8	4694	Originates in Faizabad district, covers parts of Tanda, Katehari and Akbarpur bocks.
Pausara Distributary	18.5	1675	Parts of Tanda blocks
45 Minors are associated with Faizabad Branch and Pausara	162.4	17156	Parts of Tanda, Katehari and Akbarpur blocks.

Source: Report of DGWB, Ambedkar Nagar, 2014.

Table 3: Block-wise Net Area Irrigated by different sources in Ambedkar Nagar District, U.P., 1995

Block	Net Irrigated Area (ha)	Different Irrigation Source (Net Irrigated Area in ha)						Total GW	%Area Irrigated by GW	% Area Irrigate by Canal
		Canal	Tube well		Well	Pond	Other			
			Public	Private						

Akbarpur	24021	4081	1649	18291	0	0	0	19940	83.01	16.99
Tanda	15593	2516	0	13076	0	1	0	13076	83.85	16.15
Baskhari	12500	1041	0	11459	0	0	0	11459	91.67	8.32
Ramnagar	13979	985	15	12979	0	0	0	12994	92.95	7.05
Jahangir Ganj	11320	215	23	11082	0	0	0	11105	98.1	1.9
Jalalpur	20696	862	601	19233	0	0	0	19834	95.83	4.17
Bhiyaon	13359	2220	100	11038	0	0	1	11138	83.37	16.63
Total Rural	142050	18151	5873	118019	1	4	2	123893	87.21	12.78
Total Urban	1251	0	63	1178	0	0	10	1241	99.2	0.78
Total District	143301	18151	5936	119197	1	4	12	125134	87.32	12.66

Source: Sankhiki Patrika

Table 4: Block-wise Net Area Irrigated by different sources in Ambedkar Nagar District, U.P., 2005

Block	Net Irrigated Area (ha)	Different Irrigation Source (Net Irrigated Area in ha)					Total GW	%Area Irrigated by GW	% Area Irrigate by Canal
		Canal	Tube well		Well	Other			
			Public	Private					
Bhiti	13944	0	944	13000	0	0	13944	100	0
Katehari	17567	3405	511	13651	0	0	14162	80.61	19.38
Akbarpur	29606	6225	1397	21984	0	0	23381	78.97	21.03
Tanda	16937	5735	285	10902	0	15	11187	66.05	33.86
Baskhari	13357	2642	175	10540	0	0	10715	80.22	19.77
Ramnagar	14874	967	22	13885	0	0	13907	93.49	6.5
Jahangir Ganj	13743	99	11	13633	0	0	13644	99.27	0.72
Jalalpur	20056	1511	997	17548	0	0	18545	92.46	7.53
Bhiyaon	14813	2541	122	12150	0	0	12272	82.84	17.15
Total Rural	154897	23125	4464	127293	0	15	131757	85.06	14.92
Total Urban	565	65	0	500	0	0	500	88.49	11.5
Total District	155462	23190	4464	127793	0	15	132257	85.07	14.91

Source: Sankhiki Patrika

Table 5: Block-wise Net Area Irrigated by different sources in Ambedkar Nagar District, U.P., 2015

Block	Net Irrigated Area (ha)	Different Irrigation Source (Net Irrigated Area in ha)				Total GW	%Area Irrigated by GW	% Area Irrigate by Canal
		Canal	Tube well		well			
			Public	Private				
Bhiti	13978	0	2670	11308	0	13978	100	0
Katehari	18526	3213	1206	14107	0	15313	82.65	17.34
Akbarpur	25073	1260	2136	21677	0	23813	94.97	5.02
Tanda	21417	5700	572	15145	0	15717	73.38	26.61
Baskhari	13677	2865	517	10295	0	10812	79.05	20.94
Ramnagar	17538	3527	512	13499	0	14011	79.88	20.11
Jahangir Ganj	13325	1039	810	11476	0	12286	92.2	7.79
Jalalpur	18448	1858	1250	15340	0	16590	89.92	10.07
Bhiyaon	13746	3244	773	9729	0	10502	76.4	23.59
Total Rural	155728	22706	10446	122576	0	133022	85.41	14.58
Total Urban	2705	0	226	2479	0	2705	100	0
Total District	158433	22706	10672	125055	0	135727	85.66	14.58

Source: Sankhiki Patrika

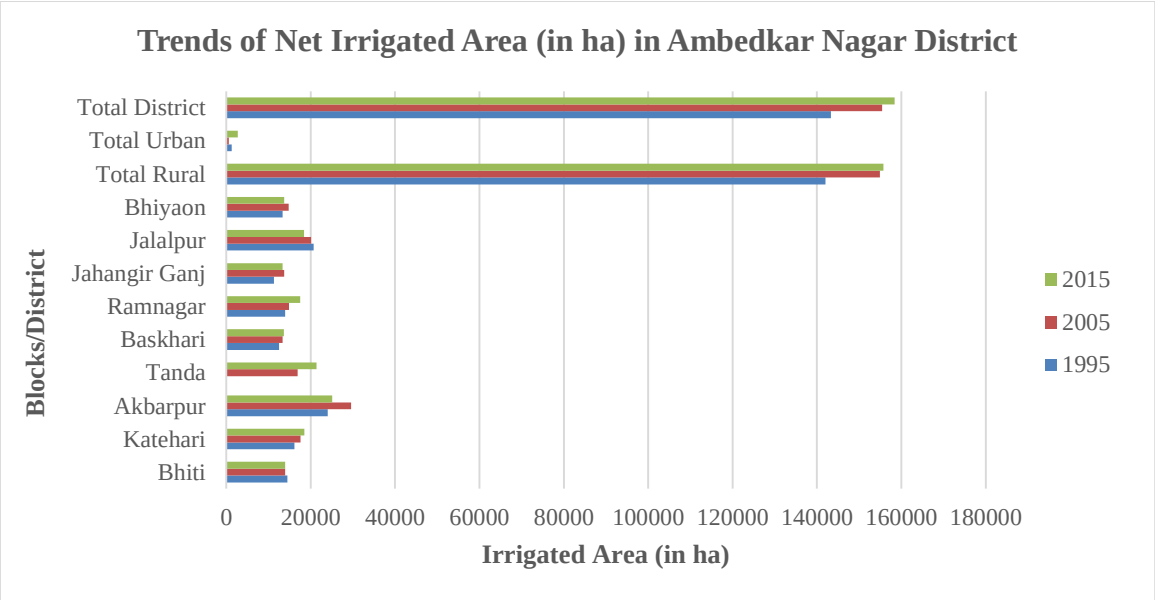


Figure 2: Trends of Net Irrigated Area in Ambedkar Nagar District

It is clear from the tables 3, 4, 5 and figure 2 that in the year 1995 net irrigated area in the district Ambedkar Nagar was 143301 ha in which 87.32% land was irrigated by groundwater whereas 12.66% of net irrigated area was under canal irrigation. Percentage increase of net irrigated area was 8.48% in the year 2005 and 1.92% growth has been shown by Net irrigated area from year 2005 to 2015 and decadal increase was 10.55% in the decades of 1995 to 2015. In the year 2005 percentage of ground water decreased by 2.25% from 87.32% (1995) to 85.07% (2005) and increased by only .95% from 2005 to 2015. Whereas net irrigated area by the canal increased by 2.25% i.e. from 12.66% (in 1995) to 14.91% (in 2005). But net irrigated area by canal decreased by 0.33% in the decade 2005 to 2015. Due to sudden decrease of urban irrigation area in the decade of 2005 to 2015.

Urban Area shows a drastic variation in canal irrigation as in the year 1995 only 0.78% of total net irrigated land was under canal irrigation which increased to 11.50% of total net irrigated area in 2005. Urban Area irrigated by canals decreased to 0% by the year 2015 of net irrigated area by the canals.

VI. CONCLUSION:

Ambedkar Nagar is an agriculturally rich area and most of the population is engaged in agriculture in the district. Modernisation of agriculture started here in the district some late but recently use of tools and techniques increasing swiftly. High yielding variety (HYV) crops, commercial cropping, vegetables and horticultural crops need time bound and frequent water in the form of irrigation. Earlier water was available in abundance for agriculture and domestic use but recently growing population has pressurised the water resources in the district. Increase in domestic and industrial use of water, scanty rainfall, lowering underground water table, and irregular rainfall and increasing demands of irrigation has changed the

scenario of water availability in the district Ambedkar Nagar. Growth and development of industries, housing facilities and large infrastructure projects adding a lot in lowering underground water table. Per year recharge of underground water is decreasing continuously. Degradation and depletion of water sources like, wells, ponds, canals and rivers are at peak due to modern developmental activities, use of chemical, plastic, fertilizers, pesticides etc. All these deteriorating the water quality and quantity used in agriculture. Food security of the population may suffer a lot in near future due to lack of irrigational facilities and poor availability of water in agriculture and allied activities. To cope up with these rising situations judicious use of water resource is inevitable with focusing on the development of reliable sources of water, its management and conservation.

VII. REFERENCE:

1. Dhawan, B.D. (1982). "Development of Tubewell Irrigation in India". New Delhi. Agricole Publishing Academy.

2. District Ground Water Brochure, Ambedkar Nagar District, Uttar Pradesh (2014). Central Ground Water Board Northern Region Lucknow.

3. Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare, 2014.

4. Government of India, (2007). Report of the Expert Group on Groundwater Management and Ownership. Planning Commission, New Delhi.

5. Shah, Tushar (1993), "Groundwater Markets and Irrigation Development: Political Economy and Practical Policy". Oxford University Press, Bombay.

6. Singh, D.R. and Singh, R.P. (2006). Structure, Determinants and Efficiency of Groundwater Markets in Western Uttar Pradesh. *Agricultural Economics Research Review*, 19:129-144.

8. Sivanappan, R.K. (1995). "A proposed Action Programme to Maintain Groundwater Levels and Achieve Sustainable Agriculture in Tamil Nadu". News from the Fields, Groundwater development and lift irrigation, ODI Irrigation Management Network paper 5, Overseas Development Institute, London.