CROPPING INTENSITY AND IRRIGATION FACILITIES IN UTTAR DINAJPUR DISTRICT.WEST BENGAL .INDIA

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Abstract:- Irrigation is practised in those areas where rainfall is seasonal and the amount is not satisfactory for crop production. The monsoonal land having seasonalrainfall,require irrigation either from canal, tank or well so as to ensure agricultural production. In India rainfall is seasonal and the distribution of rainfall is uneven. India has the largest acreage of land under irrigation. In the high irrigated area the cropping intensity is found high and in the low irrigated areacropping intensity is found low. This article focussed on the present status of irrigation and cropping pattern on block basis in the Uttar Dinajpur district, in West Bengal, India. After applying different methods and technique (Pearson's product moment correlation co-efficient, Regression line etc.). It has been concluded that the districts has a negligible relationship between two variables. Though the ground water utilisation is the main sourceof irrigation but other sources are also used to increase the cropping intensity in the region. Some blocks gets high irrigation facilities but the facilities is not well enough.

Key words:-Irrigation,Irrigation by Teesta Canal, Cropping Intensity ,Suggested remedial measures.

Introduction:- Water potential in India is vast. This can be tapped and usefully employed for irrigation. Irrigation is the artificial application of water to the land or soil. It is used to assist during periods of inadequate rainfall. Irrigation also has a few other uses in crop production. Cropping intensity is generally high in the well irrigated area is found low in less rainfall area. The intensity of cropping refers to raising a number of crops,from the same land during one agricultural year. Higher the index, greater is the efficiency of land use .

The cropping intensity has direct correlation with assured irrigation which enables farmers to go for multiple cropping and use higher dose of fertilisers and HYV seeds. As the water availability is high so the high yielding variety seed can be introduced in the district.High yielding variety seeds needs to be introduced with organic farming as the cattle population is good in the district.As the agricultural sector is mainly dependent on good irrigation facility the whole area needs to be brought under good irrigation facility. Soil amelioration will result in increased crop yield.The aforesaid area is high potential to in increase cropping intensity to 250.63% of net cropped area is irrigated and multiple cropping is practiced, for that reason Uttar Dinajpur stands first in rate of growth of good grain productivity among all the district of West Bengal.

Location:-After bifurcation of West Dinajpur district Uttar Dinajpur was created on 1st April 1992. The district occupies an area of 3142 km^2 enclosed by Bangladesh on the east, Bihar on the west,Darjeeling district and Jalpaiguri district on the north and Malda district and South Dinajpurdistrict on the south and lies between latitude 25 ^{0}11' N to 26^0 49' N and longitude 87^0 49'E to 90^0 00'E. The district is one of the most backward in the state. There are mainly two sub-division-1)Raiganj 2)Islampur consisting of 4 municipalities,9 blocks and 99 panchayat.Bengali is the main language which is spoken here.

Table No-1

TOTAL IRRIGATED AREA OF UTTAR DINAJPUR DISTRICT,2011

(Area in '000 ha.)

Total Geographical Area	314000
Gross Cropped Area	276460
Net Cropped Area	121260
% of irrigated area to total cropped area	43%
Cropping Intensity	210%

Source – District Statistical hand book, 2011

Hydrogeology:- The district is peculiar in shape very much like the blade of a scythe .The flow of the river shows that the land is flat, sloping gently towards the south .The soil of the district may be classified as old alluviam, alluvium in the transition phase and new alluvium. Generally the soil of the district is fertile 46.32% and 22% of the total cropped area are of sandy loam and loam.

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Internal drainage of the soil is good .The entire soil group is moderately rich in phosphate and potash content. The major river systems are Kulik, Nagar and Mahananda.This river network provides sufficient surface water all over the district.The northern portion of Uttar Dinajpurhas two indentified fault structures running on either side of it, known respectively as the Kishanganj&Kartoya faults. Underground water supply and management is satisfactory in this region. Ground water occurs both under unconfined and confined condition within the explored depth maximum 600mbgl.Aquifers are fairly thick and regionally extensive with large yield prospect of about

150 m^3/hr .Ground water can be utilised through heavy tube wells within 120 mbgl and shallow tubewells within 60mbgl(Central Ground Water Board, West Bengal)

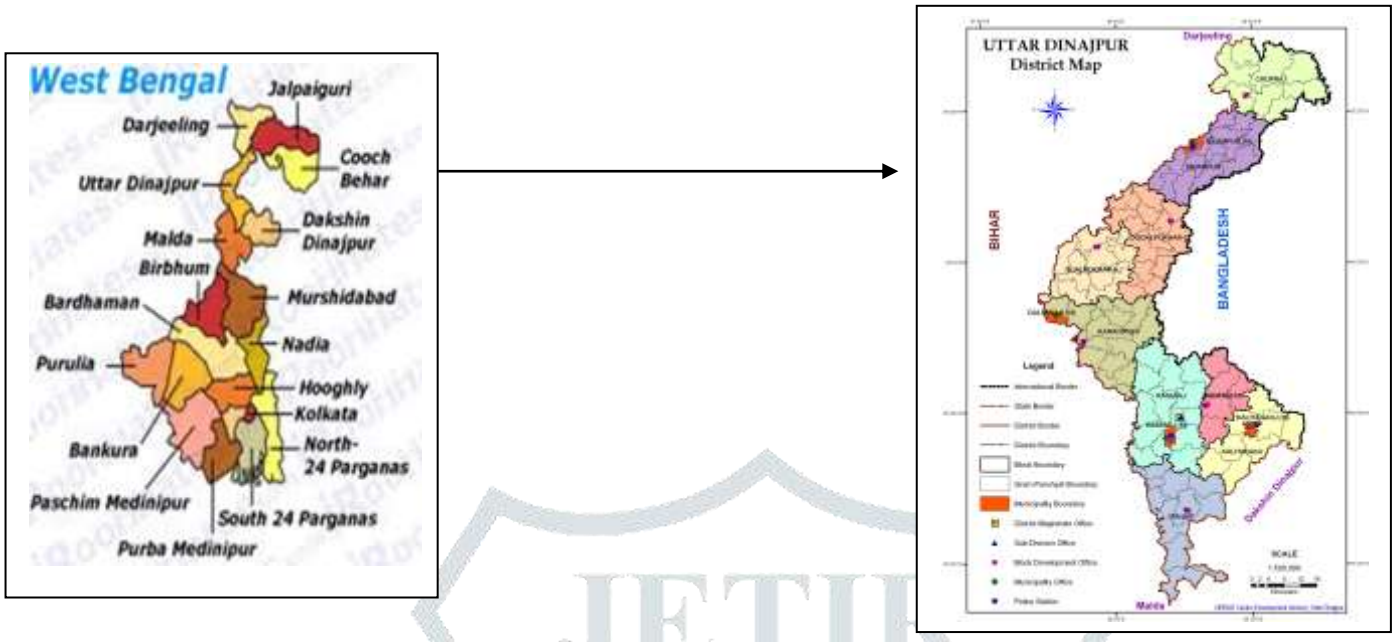

Fig 1 : Locational map of the study area

Materials and Methods :-The entire work mainly based on secondary data i.e, collected from District Statistical Hand book of Uttar Dinajpur(2008), District Census Handbook of Uttar Dinajpur (2011), Central Ground Water Board ,West Bengal (CGWB),Comprehensive District Agriculture Plan for Uttar Dinajpur District and many others research papers .

After collecting the data of net sown area (NSA) and Gross Cropped area (GCA) cropping intensity has been calculated by following formula:

(GCA/NSA) x100

Data for block level irrigated area of Uttar Dinajpur district has been calculated from comprehensive district agriculture plan for Uttar Dinajpur district.Considering these two variables,product moment correlation coefficient (Karl Pearson's method) has been done .software.Finally different thematic maps also have been prepared.

Result &Discussion:-

Irrigation:- Irrigation potential upto 2010-2011 reveals that ground water has been the main source of irrigation in Uttar Dinajpur.Shallow ground water table,high rainfall and occurrence of alluvial soil have created opportunities for easy access to GW by the local farming community.On an average about 56% of total potential is utilized by the farmers for irrigation from GW sources.As such it, is desirable to tap the potential to a further extent and to bring more cropped area under irrigation leading to higher cropping intensity and production.
The annual rainfall of the district is 1857mm.This region takes rainfall by S.w Monsoon is 1448mm,by N W Monsoon ,138mm and in winter rainfall receives 19mm and in summer it is 252mm approx.The climatic condition is characterized by hot summer abundant rainfall and humidity.The district on an average has good rainfall and it is spread over the months.The ground water recharge is also good because of the good rainfall.It is surprising that even then irrigation potential is less.
The soil of this area is alluvium and mostly sandy to sandy loam in texture land porous.Which great prospect of ground water recharge.Uttar Dinajpur is bestowed with a very fertile soil.The soil is very rich in nature due to the alluvial deposion which helps to grow many crops.
Table No-2

MAJOR SOIL TYPE IN UTTAR DINAJPUR:-

Major Soil Type	Area ('000 ha)	% of total cultivated area
Sandy soil	56.47	23.40
Sandy Loam Soil	97.78	40.52
Loamy Soil	51.07	21.16
Clay Loam Soil	32.86	13.62
Clay	3.1	1.30

Source-District Statistical Handbook of Uttar Dianjpur 2011-12.

The rivers are either rainfed or perennial with the source from the the normal snow melt from the Himalayas.Presence of kulik, Mahananda ,Nagar and a number of other streams provide sufficient surface water all over the districts.High irrigation potential already created in this region through tube wells,tube wells,deep tube wells and other water bodies.Approx 121260(‘000 ha)area is under irrigation coverage .Only 54.08% of total irrigation potential is utilized and 30% of TIPC by surface water is used.

With the help of irrigation department,it is necessary to increase the irrigation potential in the district.As the indivisual farmers are not having enough money,are largely depends upon monsoon for water needs.

Ground water is main source of irrigation on but there are other sources of irrigation also present.There are many sources of irrigation which are used in the district.Below the following tables are show about the sources of irrigation-

Table No – 3

Area irrigated by different sources in Uttar Dinajpur district

Sources of irrigation	Area (in%)
Govt.canal	2.59
Tank	6.00
HDTW	8.12
MDTW	0.68
LDTW	1.08
RLI	6.92

Source :-Agrimarketing Board ,West Bengal .

Area Irrigated by different sources in Uttar Dinajpur District.2011

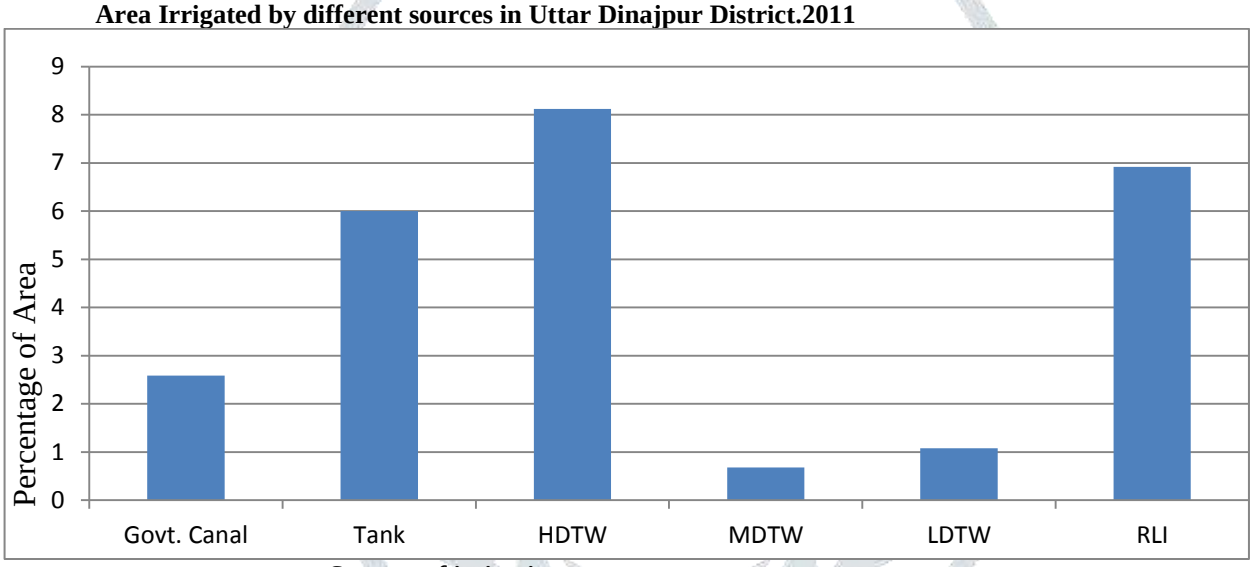

Fig 2

HDTW-High capacity deep tubewell
MDTW-Middle capacity deep tubewell
LDTW-Low capacity deep tube well
RLI-River lift irrigation

Table No-4

BLOCK WISE DISTRIBUTION OF IRRIGATED AREA BY VARIOUS SOURCES IN UTTAR DINAJPUR DISTRICT ,2011-12

Name of block	Area under Tube-Well	% of net irrigated area of block	Area under canal	% to net irrigated area of block	Area under Tanks	% to net irrigated area of block	Area under other sources	% to net irrigated area of block
Chopra	8169	72.39	3000	26.59	93	0.82	22	0.19
Islampur	2821	85.69	450	13.67	0	0.00	21	0.64
Goalpokhar-I	2574	96.95	0	0.00	0	0.00	81	3.05
Goalpokhar-II	17372	98.61	0	0.00	70	0.40	175	0.99
Karandighi	18852	99.30	0	0.00	0	0.00	132	0.70
Raiganj	3358	92.51	0	0.00	0	0.00	272	7.49
Hemtabad	12269	98.72	0	0.00	25	0.20	134	1.08
Kaliyaganj	17867	91.85	100	0.51	1300	6.68	185	0.95
Itahar	32486	96.20	0	o.oo	980	2.90	304	0.90

Source-District Statistical Handbook Of Uttar Dinajpur, 2011-12.

Table No-5

BLOCK WISE DISTRIBUTION OF IRRIGATED AREA & CROPPING INTENSITY ,UTTAR DINAJPUR DISTRICT ,2011-12

SL No.	Name of the Block	Irrigated Area(%)	Net Sown Area (hec)	Total Cropped Area(hec)	Cropping Intensity
1	Chopra	55.09	22260	37840	169.99
2	Islampur	9.46	26000	36010	138.5
3	Goalpokhar-I	5.48	29500	35840	121.49
4	Goalpokhar-II	45.38	29076	32208	110.77
5	Karandighi	36.78	29061	38584	132.77
6	Raiganj	5.82	35200	47421	134.72
7	Hemtabad	50.74	16653	19160	115.05
8	Kaliaganj	52.1	23360	31160	133.39
9	Itahar	56.1	30182	34856	115.49

Source-(C-DAP,Uttar Dinajpur District,West Bengal)

On the basis of irrigation utilization in area ,there are three categories would be identified-

1)**High percentage irrigated area**:-4 blocks fall under this category.The highest irrigated area found in Itahar block(56.09%) followed by chopra(55.09%),kaliaganj(52.1%)and Hemtabad (50.74%). The farmers of these blocks mostly uses DTWs and HDTWs which were provided by the Government for maximum utilization of ground water and surface water.The main economical activities of this area is agriculture.So the target of the farmers is to enhance the facilities of irrigation for better farm output.

2)**Medium percentage of irrigated area**:-2 blocks fall under this category.The main source of irrigation in this blocks are STWs and Tank irrigation.NH-31 and NH-34 passes through these blocks and the land near the highway used for many activities rather than agriculture.Only one river found in Goalpokhar –II blk which dry most of the tiocme.

3)**Low percentage irrigated area**:-3 blocks fall under this category Islampur(9.46%),Raiganj(5.82) and Goalpokhar-I (5.48).Islampur and Raiganj are two sub-divisional towns of the district.Here the peoples are mostly engaged in business and services rather than agriculture activities.The ground water table is very low here,so the sources of irrigation are not successfully worked here.

Irrigation by Teesta Canal:-Teesta Barrage Project is envisaged to provide annual irrigation to an area of 5,27,000 ha in the six district of north Bengal, Uttar Dinajpur is among of them.One pick up barrage across river Daukat Chopra in Uttar Dinajpur district is found.Mahanandamain canal and Nagar –Tangon main canal passing through a little bit portion of the district.Dauk Nagar Main Canal (DNMC) of 80.20 km length to provide annual irrigation of 14,590 ha over a CCA of 94750 ha. Total no. of distributaries =18.

Cropping Intensity Regions:- This district is predominantly agro based and agriculture is the main stay. Majority of the rural population is engaged in agriculture and multiple cropping is practiced. The cropping intensity is not same in all the districts. The percentage of irrigated area is high in Hemtabad district,here the percentage of gross cropped area records low. compared to the other blocks shows a positive relationship between the irrigated area and cropping intensity. Overall this in the general scenario of the district.

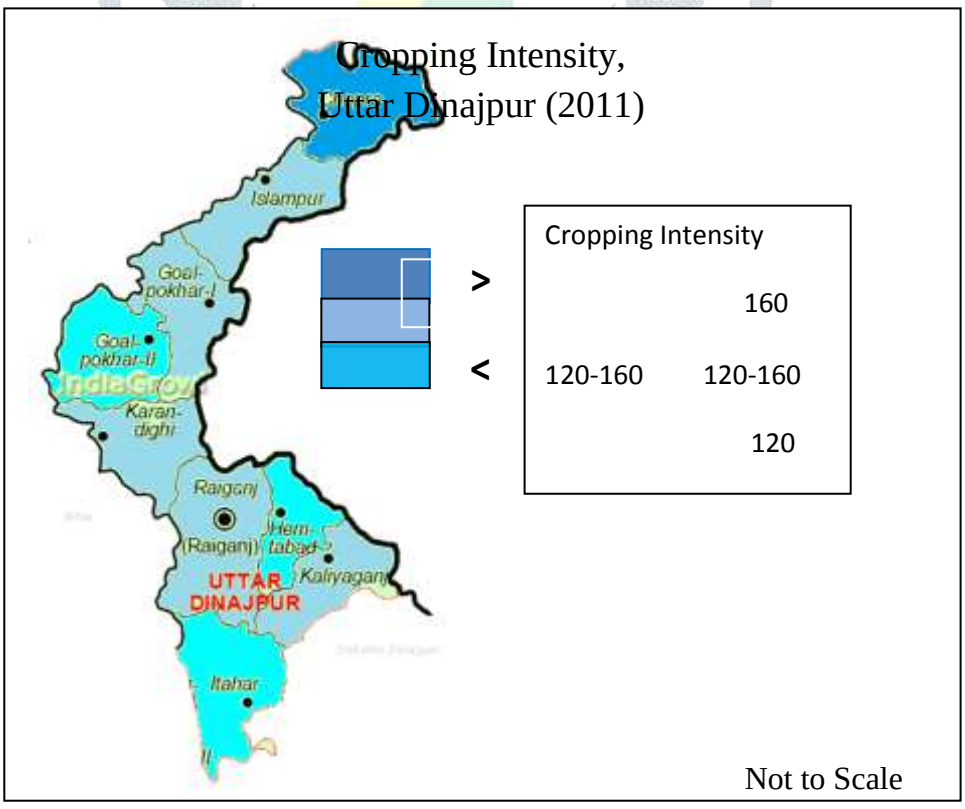

Fig-3 :- Block level cropping Intensity in Uttar Dinajpur District, 2011

Cropping Intensity	Value in percentage	Number of blocks	Name of the Blocks
Low	<120	3	Goalpokher –II,Hemtabad , Itahar
Moderate	120-160	5	Islampur,Goalpokher –I, Karandighi ,Raiganj,Kaliaganj
High	>160	1	Chopra

(Source :-C-DAP Uttar Dinajpur)

The annual rainfall amount is not same all over the district.Hemtabad gets minimum rainfall, so the percentage irrigated area is high in Hemtabad but the cropping intensity shows low. But in Chopra block the annual rainfall is very high,percentage of irrigated area are moderate but cropping intensity shows very high here.

Correlation Coefficient Method analysis-For increasing the intensity of cropping there need a intensity of irrigation.In this part of analysis percentage irrigated area and cropping intensity have been assessed as independent (x) and dependent variables(y) respectively. It is clear that both the variables has negligible relationship. After getting the calculated value by using pearson"s product moment correlation coefficient (0.006) for the district and block, it indicate that the relation between two variablesis insignificant.Though the districts received good annual rainfall and the ground water tableis so good here but the irrigation facilities sufficiently used by different blocks. In this district the source of irrigation are govt. canals, tank, HDTW, MDTW, RLI etc.It is important to improve the irrigation facilities all over the district so that the cropping intensity in the various blocks improves. The increase in cropping intensity will increase the agriculture production also

Suggested remedial measures:- It is important to improve the land utilization of the various crops so that the cropping area in the various blocks improve.The cropping intensity is not same in all the districts so first step is to have a uniform cropping intensity in all the area.The increase in cropping intensity will increase the agriculture production also. With proper water harvesting measures cropping intensity can be increased. By effective water management practices &with the use of suitable agricultural inputs gross cropped area can be increased. Little effort has been made so far towards surface water irrigation through harvesting of rainwater, so the farmers should utilised that irrigation system widely.

Conclusion:- Improvement in agriculture of a country mainly depends on ground water utilization and cropping pattern of that region. Irrigation is needed in those area where ground water facilities are lacking. Irrigation potential ranges from 25 to 40 percent in different blocks of the district so there should be given special attention to the use of ground water. But today increasing occupation avenues and lack of interest among young farmers in the agricultural and allied activities is found. Little knowledge about surface water conservation and management, low irrigation efficiency(57.49%) are responsible for reducing ground water potential. So, therefore in this district, there needs a efficient and scientific, modern technique of irrigation system and other surface water irrigation facilities for increase in the ground water table for future use as well as increase in agriculture productivity.

References:-

[1] Hussain . M. (2009) – Geography of India, Tata McGraw – Hill Publishing Company Limited, New Delhi.

[2] Guha J.L. &Chattoraj. P.R. – A new approach to Economic Geography – A study of resources. The World Press Private Limite, Kolkata (2009)

[3] District Statistical Handbook, 2008, Uttar Dinajpur. Published from Bureau of Applied Economics & Statistics, Govt. of West Bengal, India.

[4] UDDHR (2010):- Uttar Dinajpur District Human Development Report, HRDCC, Development & Planning Department, Govt. of West Bengal

[5] India – WRIS Wiki (Water Resources Information System of India) – Teesta Barrage, St. L, St. L, Ph. LJL02921

[6] Comprehensive District Agriculture Plan for Uttar Dinajpur District – Agriculture Finance Corporation Ltd., Eastern Regional Office, Kolkata.

[7] Water resources investigation and development department Raiganj ,uttar dinajpur (Agri –irrigation) division.

[8] Agriculture contingency plan for district/ uttar dinajpur, west Bengal (2011).