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https://doi.org/10.29321/MAJ.10.A03749

Changing Pattern of Cropping in the *Lower Bhavani Ayacut*

by

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Introduction : India has the longest mileage of irrigation canals in the world with the second largest acreage under irrigation (Anon 1962). In Madras State, the Lower Bhavani Project commanding 2,07,000 acres in the Gobi, Erode, Bhavani and Dharapuram *Taluks* of Coimbatore district and Karur *Taluk* in Tiruchirapalli district is an important irrigation scheme. The construction of this 10·5 crore project was started late in 1948 and completed in 1956 and the entire system thrown open for irrigation by September 1956. The evolution of Cropping Pattern in this Lower Bhavani Project Ayacut in the last decade is discussed in this article.

About the Project : The Dam is built just below the confluence of the Rivers Bhavani and Moyar some ten miles from Sathyamangalam. The dam rises upto 140 feet high above the river-bed. The storage reservoir called Bhavanisagar has a water spread of 30 square miles and a catchment area of 1,621·5 square miles. The height of maximum water level in the Dam is 120 ft. and on an average over 38,000 million c. ft. of

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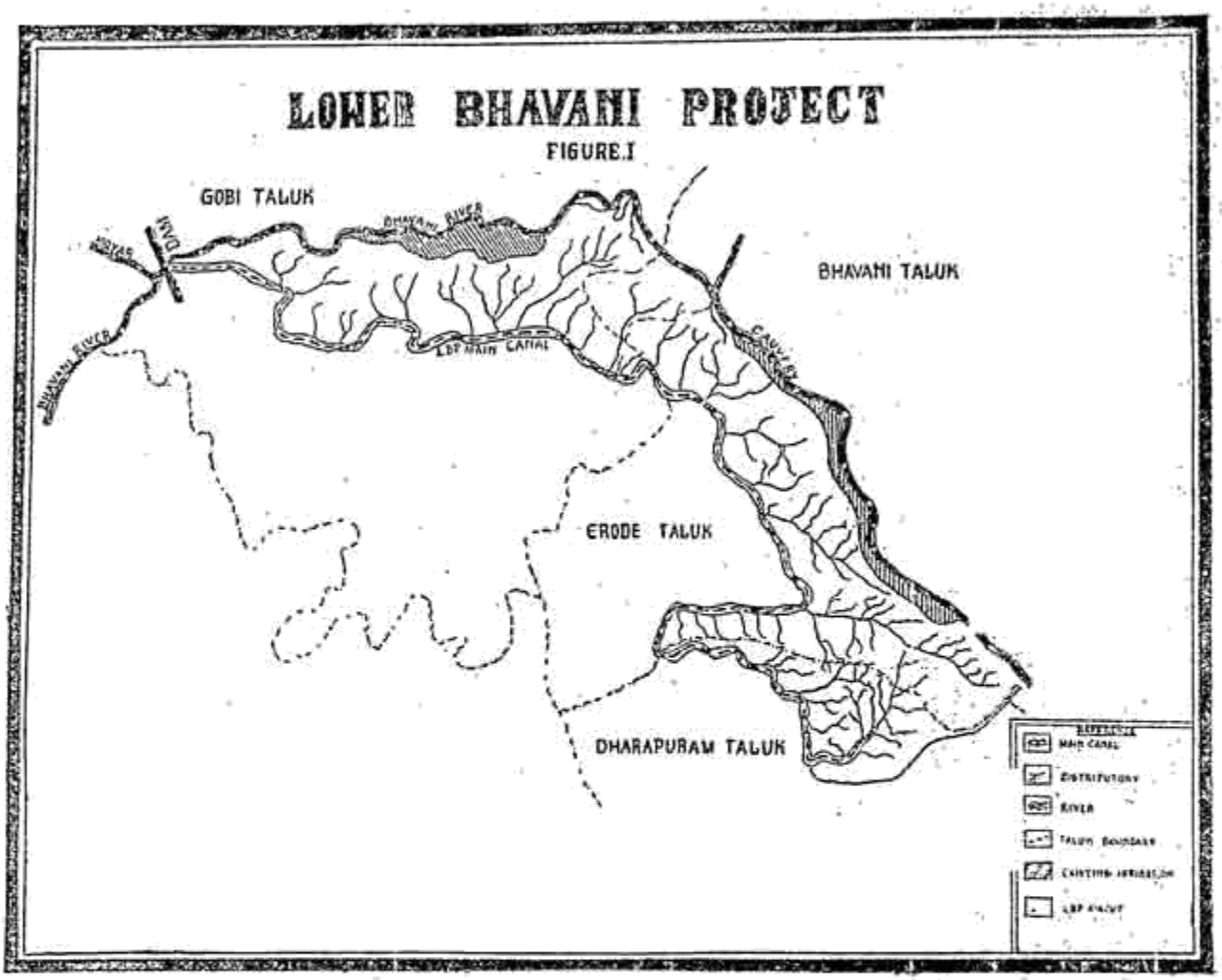
Received on 14—1—1967.

water is annually discharged into the canal. The main Lower Bhavani Canal which runs on the highest contour is 123·82 miles long with a total length of distributories of about 700 miles and with a full supply capacity of 2,300 cusecs (Anon, 1955).



Agro-climatic Features of the Ayacut Area: The topography of the land is undulating with numerous elevations and depressions cut up at intervals by natural drains. The *ayacut* has a pronounced dip towards the river Bhavani, the slope being generally of the order of 1 in 200 with even steeps as 1 in 100 particularly near the river margins.

(a) *Soil:* The soil is classified as red gravelly loam admixed with kankar nodules and fragments of quartz. The depth of top soil is generally from 6 to 9 inches except in the valleys where it may be upto 35 inches. The soil is poor and open in texture with an average of 75 per cent coarse fractions and an aggregate of 25 per cent fine fractions. The clay content in the finer fraction is only 50 per cent. The moisture holding capacity is aroud 26 per cent under laboratory conditions and may be about 20 per cent under field conditions- The soil is poor in nitrogen, phosphoric acid and organic matter while potash content is satisfactory.

b) *Climate:* The climate of the area can be described as hot and dry. The highest mean maximum temperature recorded is 37·8° C in May and the Lowest mean minimum temperature recorded is 17·2°C in January. The mean annual rainfall of 720 mm. is distributed at 140 mm. on eleven days during South-West Monsoon Season (June to September), 365 mm. on 23 days during North-East Monsoon season (October - January) and 215 mm. on eleven days during Hot Weather Season (February-may). The weather has been found to be favourable for irrigated crops and permits wide margin for the selection of sowing time with respect to individual crops.

Objective and Cropping Pattern Orginally Envisaged: In the early stages of exploration on the feasibility of the project at the dawn of this century, the irrigation scheme was conceived as one for providing irrigation for raising wet crops. This idea was subsequently abandoned in the thirties and the possibibility of evolving a scheme for developing an *irrigated dry crop ayacut* was explored by conducting detailed investigations for a period of three years from 1950—'51 onwards by special staff at Mewani, a village eight miles from Gobi. The experiments were mainly to investigate the problems which will arise when continuous canal irrigation is made available in a new area such as (1) system of turns and frequency of irrigation (2) size of field channels or *bothies*, (3) size of plot or bed for different crops and (4) cropping pattern. The experiments were conducted by the Public Works Department in collaboration with the Agricultural Department under the supervision of a technical committee with Executive Engineers, Assistant Engineers (Public Works Department) and Millet and Cotton Specialists (Agricultural Department). The investigations brought out the following inferences and conclusions (Anon., 1956).

(a) *Cropping pattern with seasons*: The crops of millets *(bajra, jowar* and *ragi)* and cotton have generally responded well to irrigation and the folloing cropping pattern was found to be most suitable.

(i) Cotton: September — October to February — March.

(ii) *Ragi* September to December followed by *jowar* in December to March.

(iii) *Bajra* September to December followed by *ragi* in December — March.

MCU. 1 cotton, on account of its short duration, is best suited for sowing in September — October and not later than 15th October.

(b) *Time schedule of irrigation:* A ten day irrigation for all crops with a depth of two inches gives high yields.

(c) *Size of beds:* For gentle slopes of 0·5 per cent and 1 per cent, bed sizes may go up to 3 to 2·5 cents and in slopes of below 1 per cent 1·5 cents size is better, for greater slopes than 1 per cent it has to be reduced to one cent or even 0·5 cent according to slope.

(d) *Size of bothies:* 15 inches at the head of sluice and narrowing down to 12″ or 9″ at the tail end.

(e) Night irrigation is not recommended due to its usual disadvantages.

Based on the above findings from the Mewani experiments, an "Intermittent turn system of irrigation" was evolved and recommended for adoption in the *ayacut* area. For the purpose, the *ayacut* was divided into I and II turns i. e., all the *ayacut* fed by sluices under odd miles as I turn and that under even miles as II turn with slight adjustments to get the *ayacut* equalised in both turns. Under each turn, irrigation from a particular sluice will be for $5\frac{1}{4}$ days or 126 hours. Allowing a time of 6 hours for the water to reach the field from the sluice head, the net time allowed will be 120 hours only. If a sluice has got an *ayacut* of 60 acres the entire water will be diverted to a particular field at the rate of 120/60 i. e., 2 hours flow per acre and this field will get the benefit of irrigation once in $10\frac{1}{2}$ days of rotation. By this system it was envisaged that the entire *ayacut* of 2,07,000 acres will normally receive irrigation for one crop every year. The low lying seepage affected area of 10,000 acres will come uncer rice and of the remaining 1,97,000 acre 50% will be sown with irrigated dry crops i. e., millets and groundnut in rotation and the other half cotton. The period of supply will be from September to March.

The Unintended Shift in Cropping Pattern: Before the advent of the Lower Bhavani Project the cropping was entirely dependent upon rainfall and wells. In the rainfed areas with the receipt of rainfall in late June, millets like *bajra* and *jowar* were sown and these were the only crops raised and such cropping system continues to exist in the surrounding non-project area. In the garden land areas provided with wells, commercial crops such as cotton (October - March), tobacco (October - February), turmeric (April - February) and yam (July - December) are generally grown in rotation with short duration crops such as *jowar* (February - April) *ragi* (June - August) and groundnut (January - April).

The canal was first opened for irrigation to a small area during 1953—'54. As the work progressed, more area and mileage of channels were added on until the entire *ayacut* was thrown open for irrigation during 1956—'57. The envisaged intermittent turn system described above was

enforced, banning rice cultivation except in the estimated seepage affected area of 10,000 acres. But in actual practice, this did not work satisfactorily and the farmers began growing rice wherever possible against the contemplated cropping pattern and ignoring all the threats of penalty, impositions and the like. The probable causes are:— Due to the highly porous and previous nature of the soil with the undulating terrain of the area, excessive seepage occurred on both sides of the channels resulting in water logged areas suited for rice cultivation only. For growing rice, there was overdrawal of water which naturally affected the continguous plots and led to their gradual conversion to wet land.

Secondly, much difficulty was experienced in getting equitable distribution of water under this intermittent turn system. Scaricity of water in the tail-end reaches of almost all distributories was felt for want of co-operation among the *ryots* in adopting the time schedule. The *ryots* at the upper reaches resorted to excess drawal of water without any governmental agency to prevent it. In practice neither the Public Works Department nor the Revenue Department exercise any control over distribution of water in a field channel of less than 300 to 350 acres. The tail-end *ryots*, due to uncertain supply, naturally could not grow commercial crops like cotton while the *ryots* at the upper reaches began growing rice with the copious supply made available at the expense of *ryots* at the tail-end. Thus rice was being grown more and more.

Thirdly, the most important reason for this switch over to rice cultivation is that rice comes in handy as an easy crop as compared to commercial crops like cotton. Two crops of rice can be easily taken and the produce sold on the thrashing floor itself, whereas in the case of cotton only one crop can be grown and that too involves elaborate plant protection and harvesting operations. The *kapas* has to be bulked and stored for some time after harvest before it is disposed off to ginning factories or merchants. Too much dampness on the cotton crop due to lateral seepage lowered the yield which compelled the farmers to restrict its area to garden lands on the highest contours. The progressive cultivation figures (Vide Table and Fig.) indicate a trend of steady and progressive increase in area under rice.

As years passed, more and more areas of the *ayacut* were affected by seepage and the farmers found it more and more impracticable to grow dry crops and it culminated in an open clamour in the year 1958 for the removal of all restrictions on cropping. The government re-examined the whole issue and the result was the lifting of the ban on rice cultivation and the enforcement of a modified turn system called the "Zonal system of

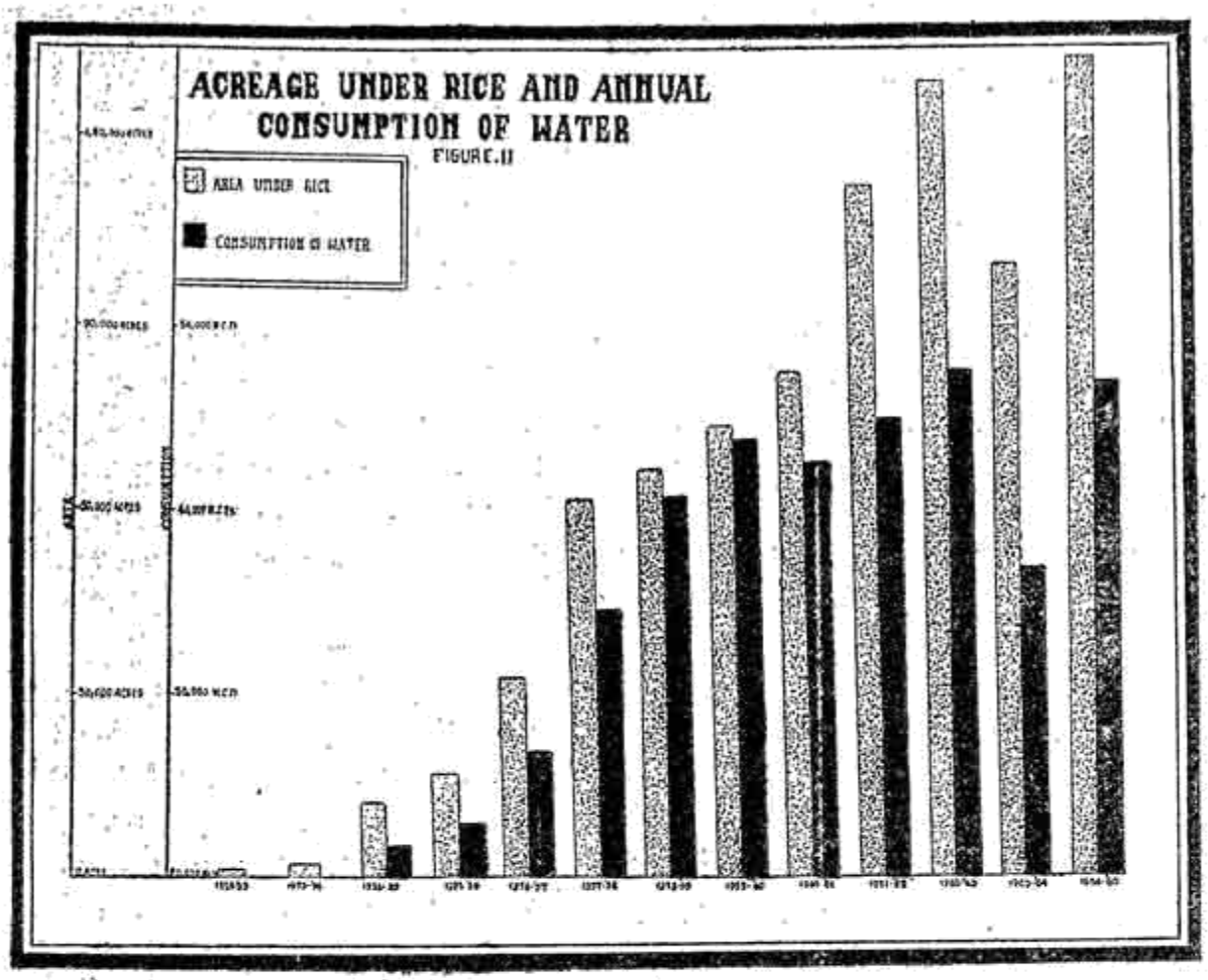
TABLE 2. *Cropped area and consumption of water in the Lower Bhavani Ayacut.*

Year	AREA IN ACRES[1]															Consumption of water in LBP. canal in Million C.ft[2]
	Rice			Cotton			Millets			Other crops			Total			
	I Turn	II Turn	Total	I Turn	II Turn	Total	I Turn	II Turn	Total	I Turn	II Turn	Total	I Turn	II Turn	Total	
1952–'53	...	...	302*	...	...	1,082*	...	...	2,947*	...	...	808*	...	...	5,139*	...
1953–'54	...	...	1,271	...	...	1,416	...	...	4,138	...	...	2,398	...	...	9.223	...
1954–'55	...	...	12,510	...	...	26,825	...	...	24,995	...	...	8,709	...	...	73,039	21,505
1955–'56	...	...	17,190	...	...	36,015	...	...	27,971	...	...	20,737	...	...	1,01,913	22,468
1956–'57	...	...	32,529	...	...	43,136	...	...	39,787	...	...	21,011	...	...	1,36,463	26,623
1957–'58	...	...	61,898	...	...	29,031	...	...	44,134	...	...	53,121	...	...	1,88,184	34,423
1958–'59	...	...	66,557	...	...	19,886	...	...	48,266	...	...	74,541	...	...	2,09,250	40,569
1959–'60	41,655	31,142	72,797	2,506	6,483	8,989	11,327	11,162	22,489	28,686	21,455	50,141	84,174	70,242	1,54,416	44.560
1960–'61	47,204	35,242	82,446	1,905	5,982	7,887	6,310	50,671	15,981	18,693	23,384	42,077	74,112	74,279	1,48,391	43,380
1961–'62	62,257	53,457	1,15,714	139	3,509	3,648	8,492	7,227	15,653	21,829	25,287	47,116	92,651	89,480	1,82,131	45,820
1962–'63	70,020	60,071	1,30,091	145	5,063	5,208	4,113	6,386	10,499	16,244	16,906	33,150	90,522	88,426	1,78,948	47,900
1963–'64	66,616	34,124	1,00,740	220	5,452	5,672	7,691	2,467	10,158	18,458	12,522	30,980	92,985	54,565	1,47,550	36,543
1964–'65	69,998	64,638	1,34,636	70	5,392	5,462	6,064	5,682	11,746	16,193	21,519	37,712	92,325	97,231	1,89,556	47,291

[1] By courtesy of the Executive Engineer, Canal Division, Erode

[2] By courtesy of the Executive Engineer, Bhavanisagar.

* Revenue Figures.



irrigation". According to this system the whole *ayacut* was classified into two zones almost equal in extent on the basis of irrigation from the odd and even number of sluices. The first zone was to receive irrigation from the odd numbered sluices from August 1st to 30th November (for 122 days) and the second zone from the even numbered sluices from December 1st to March 15th (105 days). The rotation was interchanged every year so that each zone got the advantage of seasonal rains and favourable cultivation season (August to December) every alternate year. This system is in vogue from 1959—'60.

Under this system only a short duration rice, millet or groundnut alone can be raised because of the small spells of supply of water for 122 days and 105 days. If cotton is to be grown, it must necessarily be supplemented by well water or normal seasonal rains. As the cotton season commences from September - October to March - April, if a farmer chooses to raise cotton in one year utilising canal water, a period of supply of nearly $1\frac{1}{3}$ to 2 months during August - September will be wasted. So he goes in for a short duration rice crop early in August so that he can raise a second crop of groundnut or rice itself in December - March. The usual rotation followed is :

	I turn August — November	II turn December — March
(a)	Rice	Groundnut
(b)	Groundnut	Rice
(c)	Rice	Rice

Another factor heavily weighing for preference to rice is the availability of a plastic hybrid strain of rice, TKM. 6 having the desirable traits like short duration, non sensitiveness to photo-period, cosmopolitan habit with good quality white grain. It gives an average yield of 1,800 kg. per acre in the *ayacut*. This single advantage cannot be ignored easily. The position of cotton is that, it is mostly limited to old garden land areas commanded by wells and as seen from Table the area remains more or less static at around 5,000 acres. The reason as already stated is that the varieties now grown like MCU. 1 or 2 or even P. 216 F cannot fit in the turn system. However if short duration cottons like the Russian strains now developed are made available they may be grown during the second turn at least in areas not so much affected by seepage. Apart from this, there is scope for further increase in area under cotton in summer season provided more wells are allowed to be dug in the *ayacut* where the acquifer would have been enriched after the advent of the project. A short duration Russian strain of cotton, PRS-72 has been a success during the summer season in the Project area, recording a *kapas* yield of 673 kg per acre demonstrating the scope of increasing the area under summer cotton after the harvest of rice supplemented of course, by well irrigation. (Santhanam, 1966).

In spite of the peculiar position for rice cropping, the Government still wanted to regulate cultivation of rice giving preference to other crops. Accordingly in 1964 — '65, a Government order was issued introducing a new system of "Crop freedom-cum-crop control" by which complete freedom in cropping was allowed during the 1st turn (August — December) when approximately 24,000 million c.ft of water was let in for irrigation, while in the second turn (December — March) only irrigated dry crops (except paddy) was allowed with 12,000 million c.ft. of water only. Even for this partial restriction, there was protest from *ayacutdars* and the Government had to defer implementation of the order. Thus the zonal system continues with no restriction on rice cultivation.

Conclusion: Now the question which bothers the irrigation authorities is whether it would not be still feasible to encourage the cultivation of dry crops like cotton, millets and groundnut limiting rice cultivation to the low

lying water logged area of 10,000 acres as originally envisaged (Thirumala Rao, 1964). But the chances of effecting a change appears to be more and more remote as we see the unintended shift in the cropping pattern in favour of rice which has taken place for certain inevitable conditions and causes. This pattern of cropping evolved by the cultivators is getting stabilised and a rice belt of wet land is being built up in the LBP *ayacut*. And Uppal (1961) while suggesting cropping patterns for the Bhakra Canal area has stated that in evolving crop patterns the cultivator should not be deprived of the freedom of action in the utilization of water and exploitation of land. The actual consumption of water in the canal during the various years (Vide Column 8 under Table) shows a progressive increase except in the year 1963–'64 due to failure of rains in the catchment area. The possibility of future increases in supply in the Reservoir is evident as a net work of 14 small reservoirs and five hydel power houses under construction in the catchment area of the Lower Bhavani Reservoir both on the river Bhavani and Pykara, a tributory of Moyar river. Some reservoirs have been completed and it is estimated that on an average a supply of 1,600 cusecs routed through the power houses will be flowing into the Lower Bhavani Reservoir. With these prospects of increased supply and in the context of the present food shortage it may not be unadvisable to continue the *Status quo* (i. e., the present Zonal System of irrigation with unrestricted cropping) for some more years when a true picture of the farming pattern of the tract will emerge.

Acknowledgements: The author wishes to record his grateful thanks to the Agronomist and Associate Professor of Agronomy, Agricultural College and Research Institute, Coimbatore for his encouragement and guidance in writing the article. The author's thanks are also due to the Executive Engineer, Lower Bhavani Project, Bhavanisagar and the Executive Engineer, Canal Division, Erode for kindly making available the basic data pertaining to the Lower Bhavani Project.

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