CHAPTER – II

REVIEW OF EXISTING BODY OF LITERATURE
## CONTENTS OF CHAPTER – II

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Title</th>
<th>Pg.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Introduction</td>
<td>29</td>
</tr>
<tr>
<td>II</td>
<td>Review of Literature</td>
<td>31-56</td>
</tr>
<tr>
<td></td>
<td>Studies from 1 to 21</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Conclusion</td>
<td>56</td>
</tr>
<tr>
<td>IV</td>
<td>References</td>
<td>57</td>
</tr>
</tbody>
</table>
CHAPTER – II

REVIEW OF EXISTING BODY OF LITERATURE

I. Introduction:

Number of studies have been conducted on impact of irrigation at States level, District’s level, Mandals level, Village’s levels and source-wise but all of them are different in Methodology, Area of Study, Period of Study, Data Base Purpose etc. Some studies concentrated on the comparison of production and productivity in the command area as well as non-command area. The difference of production and productivity between the command and non command areas is attributed to irrigation.

The Department of Economics itself has conducted socio economic study under Sriramsagar project command area by its technical cell which has been renamed later as centre for Planning and Development Studies which is financed by Government of Andhra Pradesh. The study is mainly based on primary data; number of staff members were sent to fields for months together and brought out the elaborate report dealing with problems, advantages and disadvantages in 1980’s.

Number of scholars has studied impact of irrigation in the Department of Economics, Osmania University for their M. Phil’s and
Ph.D’s. Some scholars dealt with Nizamsagar, Sriramsagar, Nagarjuna Sagar and brought out their results by using both primary and secondary data. Irrigation is multifarious concept dealing with tank irrigation (which was popular in the olden days) even today Vizianagaram District of Andhra Pradesh stands first in the country in providing tank irrigation. As time passed the irrigation by tanks is neglected and started depending upon wells.

The Government of Andhra Pradesh provides supply of electricity free of cost to the farmers for lifting the water. In some villages French wheel lifting and mota (water lifted by buffaloes and other cattle). But today everybody is preferring to provide assured irrigation water by constructing dams across the major rivers. In this connection Bhakra Nangal Project, Nagarjuna Sagar Project, Nizamsagar Project, Hirakud Project may be mentioned as examples.

In the Department of Economics, Osmania University many faculty members took many major research projects funded by UGC, ICSSR Government of Andhra Pradesh etc, who dealt with various aspects under different sources of irrigation dealing with cost of cultivation, production, productivity, surplus, advantages and disadvantages. Here it is opt to quote the work of Mr. Adinarayana (M. Phil), Late. Dr. P. Sanjeeva Reddy, Prof. G. Gopal Reddy (himself and with several other scholars deeply
involved in this work). Prof. M.Narasimhulu, Prof. K.Chakradhar Rao have also worked on the similar topic.

All the above studies are very important. It is felt that our study should not become replica of those studies. Therefore we wish to review some of the studies conducted on the impact of irrigation in general and canal irrigation in particular. After reviewing these studies we wish to identify the gaps in those studies with respect to methodology, period taken, data base, irrigation place and the source, technique used, analysis carried and results obtained. Thus there is a purpose of review of literature.

II. Review of Literature:

V. Anil Kumar (2001)\textsuperscript{1}: The study deals with the period of 36 years (1960-1996) in the irrigation region of South Telangana, Andhra Pradesh. He has conducted survey of two villages in Miryalguda Mandal of Nalgonda district. He dealt with the process of agrarian change which are reflected in commercialization and changing social relations of production, tenancy arrangements, Migration of labour and Local Politics. He says that irrigation came to Miryalguda in 1967 from Nagarjuna Sagar Project. Due to this project the entire region shifted cultivation of Millets, Pulses, and Castor to Paddy. The cultivation under Nagarjuna Sagar Left Canal made all the cultivators of the villages to cultivate only paddy. Prior to 1967
subsistence paddy crop was prevailing much, but on release of Nagarjuna Sagar Left Canal water paddy is grown on commercial basis along with canal water the farmers have started using high yielding, variety of seeds and chemical fertilizers which made the farmers to produce huge amount of surplus which was sold in the market. Actually the productivity increased in 1980’s with the adoption of new technology. Banks came forward to give huge amount of loans to the farmers. Tractors replaced the plough, among all the farmers. Tractors were used for all agricultural purposes. In this mandal it is the dominant Reddy community modernized the agriculture. However in addition to Reddy’s, Brahmans and Velma’s also became landlords.

During the study period he says the qualitative changes, have taken place in the agrarian relations. The communities other than Reddy, Brahmin, and Velma could not compete with them, their economic position weakened most of the marginal and small farmers became casual and agricultural labourers.

The villages he studied are Yadpalle and Gudur. The small and marginal farmers sold out their lands and disappeared from the agriculture and Brahmin, Velma landlords became more richer with the water supply.
He has mainly concentrated on changes on the agrarian relations. He says the marginal farmers constitute 23% of the SC’s, 77% of the BC’s and large farmers were negligible. In short in the early period the marginal and small farmers SC and BC farmers were predominant but this scenario is changed with release of the water. The study concentrates more on class caste relations in agriculture rather than production and productivity. He feels that due to irrigation number of large farms increased. Landlords got more benefits and the position of SC’s, ST’s who generally own small farm became either casual labour or permanent labour. But this study also fails to deal with development of education, health, communication, transport etc., which are certainly influenced by irrigation.

The study as such is not much use except the fact that he has taken the same mandal as I have taken i.e., Miryalguda. He has taken Nagarjuna Sagar Left Canal which I have taken. I have used primary data which he has also used (in a different manner).

**K.Chakradhar Rao (1982)**: He has studied the impact of technological change on Agricultural Development. He has taken Nagarjuna Sagar as the study area. He said though green revolution stared in 1965-66 but it has little effect in south. The effect can be seen in the north-western part of India, that to in wheat production. However the
second important crop which came under new technology in small way was rice wherever assured irrigation was prevailing. He says new technology lead to on one side increase in production and on other regional imbalances and disparities of income and wealth between different classes of farmers and agricultural labourers. He has taken Nalgonda district as a study area which is economically backward with poor soils and small peasant holdings. In many parts there was only one crop grown. Yields were low. Farmers were poor and unentreprising. Due to lack of resources they were unresponsive to adoption of technological change. However due to release of Nagarjuna Sagar Left Canal 182 villages of this district covering two talukas started responding to technological change since 1968. This has created a great spurt in Agricultural development. The element of risk was reduced. However in the rest of the district cultivation remained as traditional. With the availability of the Nagarjuna Sagar Left Canal water investment on farms increased more and more inputs of modern type such as chemical fertilizers, high yielding variety seeds, pesticides, modern equipment etc. The cropping pattern changed along with methods of Marketing, productivity has also increased. All this was happening only under Nagarjuna Sagar Left Canal irrigated area but in non canal area the situation remained static. Therefore he has compared production, productivity, crop formation, profitability, surplus, wages, employment
between the irrigated areas and un-irrigated areas (which he referred as upland areas).

The study is mainly based on primary data collected by canvassing a questionnaire in both the areas, wherever necessary he has also used secondary data. He says that Nalgonda district ranks first in the production of Rice, Bajra, and Castor in Telangana and in the production of Bajra and Castor in Andhra Pradesh. Nalgonda is the second important groundnut producing district and ranks third in greengram production as well as total agriculture production in telangana region as well as is significant in the State.

He made the inter regional and inter farm comparison based on the input data of cross sectional samples. He has used multi stage stratified random sampling techniques in collecting the household data. Nalgonda district was the first stage of the study. Second stage is the agricultural zones one is command area (NSL) and another is uplands i.e., non command area formed by the two talukas. In the third stage villages have been selected and in the next stage households are selected. He reveals that 86% of large farmers are in the high scale of adoption, whereas small and marginal farmers are in the low scale of adoption. The percentage of irrigated area is higher on small and marginal farmers than medium and
large farmers. Mechanization is more on large farms which saved labour
time. The early adopters are younger and more educated enterprising
willing to take risks. They operated large farms have higher incomes and
social status. Early adopters reaped large income benefits.

Finally he compared the cropping pattern, production, productivity,
wages between the command area and upland areas and in all these aspects
the performance of command area is better than the non-command area.

He mainly concentrated his study between the comparison of
production, productivity farm wise and class wise in Nalgonda district.
Though it is an exhaustive study but our study deals with only impact of
Nagarjuna Sagar Left Canal on agriculture development whereas his study
did not touch much of the structural change that has taken place in the
study area such as education, health, sanitation, drinking water and other
important issues.

Sanjeeva Reddy, P (1997)² : He has discussed the impact of new
technology under different sources of irrigation in Telangana region of
Andhra Pradesh as part of Ph.D thesis which he got from Osmania
University, Hyderabad and published the same in the form of book. He
examined size, net profit, returns to scale, distribution of income, cost of
cultivation, between different farm categories and different source of irrigation. His study mainly based on primary data collected by canvassing the questionnaire he has also used secondary data published by Directorate of Economics and Statistics, Government of Andhra Pradesh. He has used multiple regression analysis. He has worked out cost and return for each acre. He has used the concepts of A B C in the cost calculation. He says that net irrigated area in both the periods i.e., 1956-60 and 1994 canal irrigation is an important source in Andhra Pradesh. Irrigation intensity is highest in well dominant cluster districts, yields also highest under well irrigation followed by canal irrigation. Land productivity has increased under all the sources of irrigation. However well irrigation which has revealed highest productivity. His study shows that productivity and land size are positively related in canal and well irrigation. Productivity is highest among the medium farmers under tank irrigation. Costs are positively related to farm size. In canal and well irrigated areas it is highest for medium farmers under tank irrigation. Medium farmers earned the highest profit per acre. Ratio of costs to gross returns is highest in well irrigation and lowest in canal and tank irrigation. Rental value of the land is the highest cost for all the crops under three sources of irrigation second important cost is the labour cost in canal and tank irrigation and irrigation charges were high under well irrigation. Irrigation charges constitute 20%
in well irrigation where as 2 to 6% under canal, tank irrigation. This holds good category wise as well as for the two seasons of different crops.

Though the study is the detailed one but could not deal with the impact of canal irrigation on agricultural development.

Singaraj and Kumar etc (2009) 4: The authors in their article say that the effects of global warming and climatic change on the agricultural sector are likely to threaten both the welfare of the population and the Economic Development of the state. Their study deals with Tamilnadu which heavily depends on agriculture. They have taken the period 2005-06. It received 7.3% rainfall as against normal rainfall of 8.8% because of this, the major reservoir could not be filled and agriculture was affected. This has got an impact on agricultural production and productivity. They showed the positive relationship between the rainfall and agricultural production. This they have explained with the data. Index of agricultural production was 12.16 points in 2004-05 when there was good rainfall. Where as it was 2.19 points previous year when actual rainfall was short of normal rainfall. They explained the impact of climatic change on agriculture. They say that in the developing countries the economies are sensitive to climatic changes in agriculture.
The State was facing multiple stress due to population growth. Urbanization, Industrialization and Globalization where some crops are suffered due to maximum temperature. Agriculture yields decreased. They quote the agricultural commission data 1976 that agriculture had 50% of the variation due to rainfall which has impact on cotton and groundnut. In Tamilnadu the irrigated area is 40% of the net area cultivated even today dependent on rainfall. For them due to global warming welfare of the people and Economic development of the state are effected. Due to droughts, floods the agriculture affected mostly. This will affect the cost in capital investment and lower agricultural yields. They have suggested that Government should take effective policies to meet the situation because it cannot influence the nature and global warming.

B. D. Dhawan (1993)⁵: He says that the introduction of Green Revolution technology with its inherent affinity for assured irrigated areas has magnified the canal irrigation. He tried to measure the effects of irrigation in terms of output growth, stability and protection against drought. Though the actual magnitude of these effects may vary across regions but their positive impact cannot be denied. He has estimated that addition of one gross irrigated hectare has resulted in an additional output of 19 quintals in food grain energy equivalent during the 1980’s. This addition is observed to be the highest with 27 quintals in Punjab and lowest
with 7-9 quintals in Bihar and Orissa. Further this is found to be highest in the case of ground water irrigated lands than in surface irrigated lands but in the context of depletion of ground water resources, the superiority of canal irrigation is once again established, (Recently it is reported that due to heavy accumulation of sand and mud the storage level of water in Srisailam Project and Nagarjuna Sagar Project the storage of water level is decreasing). Similarly statistics reveal a significant rise in income per hectare, as a dry crop hectare is converted into an irrigated one. The rise is from Rs. 350/- to about Rs. 1830/- in the Indus basin from Rs. 440/- to Rs. 2,220/- in the Gangetic basin from Rs. 530/- to Rs. 2,225/- in the Southern Peninsula and from Rs. 250/- to Rs. 4,550/- in the Deccan Plateau in the year 1970-71.

Gain in output stability due to spread of irrigation is estimated to be substantial. Dhawan’s estimates show reduction in the coefficient variation from 11.4 to 5.4% in the case of output of all crops; from 11.4 to 6.5% in the case of food grains output, from 9.3 to 4.3% in respect of overall crops yield and from 2.9 to 1.9% in respect of crop acreage. Stability gain in yield is estimated to be much more than the corresponding stability gain in acreage. According to him the reduction in irrigation, output during the drought of 1972-73 was only 7% below the trend level in contrast to 20% reduction in un-irrigated segment. Another advantage of perennial
irrigation combined with modern technology is the size neutrality farms
with respect to input costs and returns per acre. In short small and marginal
farmers are as efficient as large farms. He further says that canal irrigation
has also given rise to certain problems like displacement of people, siltation
in reservoirs, inefficiency in use of water, large incidence of malaria in
command area etc. Finally he made several suggestions to overcome the
above problems.

He has taken number of variables for his study and also number of
regions. He also studied both advantages and disadvantages of canal
irrigation. He has used the technique of coefficient variation. Our study is
mainly concentrated on impact of irrigation on agricultural development
with reference to Nagarjuna Sagar Left Canal by taking two villages for
intensive study farm category. Thus our study is slightly different from
Dhawan’s Study.

Neelamani P.Verma (1989) 6 The author has observed that
irrigation has contributed to rise in productivity of land. These have led to
3.3 times increase in the price of land. It has reduced risks of farmers in
rain-fed areas. Stable production conditions and higher returns have been
observed. Krishna Bharadwaj (1974) noticed that there was a general
tendency for the intensity of cropping increase with the increase in the
percentage area irrigated. Similarly a persistent trend was observed in the matter of percentage area irrigated and earnings per acre.

His study has a limited scope for policy prescriptions it is general in nature. Number of notable statistical tools are used. No data base is mentioned.

**Katar Singh (1994)**: He has indicated that after abolition of Zamindari and Talukdari systems in the post independence era, ownership rights to private tanks were taken from Zamindars and talukdars and were vested in the hands of State Government. In West Bengal the State Government has handed over these tanks to Gram Panchayats for its management. Whereas in Andhra Pradesh the tank management was handover to minor Irrigation Department. Thus in all cases in the country the tanks have become common property resources. All farmers own land in the command area of a tank have access to tank water. He says that like all other community property resources tanks are victims of tragedy of the commons.

These tanks are silted and infested by weeds, their beds and their fore sure areas encroached, their sluices and outlets are chopped in the absence of regular cleaning. Water distribution channels are either non
existent or badly silted and breached. All these problems arise basically from a tendency on the part of co-users of tanks to shrink to their responsibility in contributing to their repair and maintenance, protection and marketing.

Katar Singh study is concentrated only on tank irrigation. His focus was that before independence the tanks were maintained and managed by Zamindars and Talukdars and were in good condition and water management was proper. The tank irrigation became worse after independence because it has become public common property resource for which no single person were responsible and tank irrigation is badly effected.

The lacuna in this study is that he was not dealing with production, productivity of crops.

Uma Shankari (1991): Like Katar Singh, the author also discussed about tank irrigation. He has made an intensive study on tank irrigation in Chittoor district of Andhra Pradesh. Non-cooperation of farmers in cleaning the channels, encroachment of tank bed, inadequate repairs, weed infestation and siltation were responsible for disintegration of the conventional tank systems. It was suggested that the tank management
should be transferred to the farmers in the tank command to formulate rules and regulations and the government should adopt a need-based approach to promote it.

Parathasarathy, G (1971)\(^9\) His study deals with reference to technological change in agriculture in West Godavari district of Andhra Pradesh. He has compared the yields and income of seeds used local variety and high yielding variety of rice for the year 1968-69. He found that the paddy yield per acre in Kharif was 2513 Kgs and in Rabi it was 2236 Kgs per high yield variety seeds whereas for traditional (local seeds) it was 1738 Kgs and 1304 Kgs in Kharif and Rabi respectively. Gross income per acre was Rs. 976.64 in Kharif and Rs. 1213.36 in Rabi for high yielding variety seeds whereas it is Rs. 739.37 and Rs. 757.97 for local seeds in Kharif and Rabi respectively. The author also studied the impact of chemical fertilizers and compost pit there he found that the output per acre was more in both the seasons where chemical fertilizers were used and vice versa. He was in the opinion that income inequalities are developed among various categories of people due to adoption of modern technology in paddy cultivation.

S. Norra … et al (2003)\(^{10}\) The authors concentrated their attention on ground water with reference to Bengal Delta Plain. Much of the water is
used for drinking purpose in West Bengal and as well as in Bangladesh. Their study concentrated on calamity conditions. They have taken Kalichak in Malda District, West Bengal as their study area. Here ground water was used for irrigation of vast fields of wheat and paddy. The paddy soil was water saturated. They estimated ground water for paddy and wheat. They have taken only the water pumping and used for irrigating the fields. They have also taken filter water samples. Their study revealed that ground water was used for irrigation of sandy soils. The land also possess several types of mineral composition. The study deals more with the elements of science than Economics. Therefore for taking decisions on irrigation their study is not much of use.

B.C.Biswas (2010) 11 The author says that out of 141 million hectares of net cropped area 85 million hectares is under rain fed (60%). In Andhra Pradesh out of 10.7 million hectares, net cropped area is 6.3 million hectares rain fed (58%). Nalgonda is one of the important rain-fed areas dominating the district. The author says that Mr. Narayan Reddy of the village Induluru created a history in farming production through the adoption of good farming system.

Induluru village is a rain fed area where drought and crop failure are common. Poverty is permanent. The soils are rocky, under fed cattle, poor
farm family in such a situation Mr. Reddy made a good fortune by following scientific methods of farming. It is estimated that by 2012 his annual income would amount to Rs. 7.5 million (Rs. 1,70,454) as against his present income of Rs. 2.77 million when the fruit trees of his orchid would give full potential yields. His farm planning is based on micro watershed principles. Land and water are efficiently used. Land is properly leveled; regular watering through tube wells he has a fishery pond in 2 hectares. Therefore there was no water crisis for crops and animals. He adopted integrated plants nutrients systems through the use of fertilizers, green manure and compost which helped him to get high yields and more income. More over he has avoided the cultivation of higher water requiring crops such as paddy. He has produced crops by taking into consideration market demand. 80% has been allocated to Horticulture, 8% to Paddy Cultivation, 3.2% to Green Fodder, which needed for animals which are 100 in number (75 buffaloes and 25 cows) and poultry farm with 500 birds. Compost is prepared from the cow dung and poultry litters. A vermi compost unit with 400 tonnes per annum capacity was also installed. 200 tonnes are sold at a price of Rs. 3000 per tonne. Biogas plant was also installed adjacent to dairy farm to produce gas to cater the energy needs, cooking and lighting of the house.
His productivity conditions are also good. Rice yield was 4 tonnes per hectare, Mango yield 5 tonnes per hectare, Sweet Lime yields 7.5 tonnes per hectare. Buffaloes yield 2500 litres of milk, while a cow yields 3000 litres up to a period of 300 days. Thus it is not simply canal irrigation or tank irrigation. But it is a management of agriculture with choosing the crops requiring low quantity of water and also making self sufficiently in animal food, milk energy etc. This is a lesson for those farmers that even the traditional type of fertilizer i.e., compost, cow dung, perimiculture low level of water will help to produce more and earn more income. However our concentration is on canal irrigation. Its impact on Agricultural Development as well as over all Economic Development.

Madhusudan Bhattari … et al (2002)\textsuperscript{12}: The authors have highlighted in their article on “Impact of Irrigation on Agricultural Growth and Poverty Alleviation: Macro Level Analysis in India” The positive impact of irrigation is identified on agricultural intensification and increased crop yields. However the marginal returns of irrigation compared to returns to other inputs is a controversial issue. The authors have studied growth of irrigation and other inputs on productivity and poverty alleviation for a period of two and half decades (1970-94) for 14 major states of India which covers more than 90% of agrarian economy of India. The actual impact of agricultural growth and poverty varies by the nature,
region and time period selected. Many of the studies conducted reveal that there is a positive relationship between irrigation development on agricultural development and which intern led to reduction of poverty particularly the rural poverty. The authors concluded that there is no significant growth taking place in Agricultural productivity when all inputs and their cost taken into consideration. However the productivity trend differed for each input factor. The study shows that improvement in irrigation and rural literacy rate are the two most important critical factors for the recent growth as well as overall development of agriculture sector in India.

The study concentrated more on establishing the impact of irrigation on poverty reduction. These they were studied with reference to several crops such as Fruits, Vegetables field crops etc. They have also discussed the water and food production in doldrums. Though it is a good study but the lacuna in this study is that they have taken irrigation and its impact on reduction of poverty. They have discussed the irrigation in general whereas our study concentrated more on canal irrigation and its impact on agricultural development.

**Sanatan Nayak (2005)**: He has discussed irrigation development during pre and post independent periods. He has devoted his attention
particularly on Sriramsagar Project. He has studied pattern of irrigation, Pattern of land utilization, Agro Economic conditions of the Sriramsagar command area. He has adopted the technique of cost benefit analysis. He has calculated the displacement as a social cost. He says there are several differences between the actual irrigated yields and estimated yields of different crops in the Sriramsagar Project command area. The yields of Maize in the Kharif and Rabi seasons is 35 quintals per hectare as mentioned in the project estimation but actually the annual yields of maize is 29.41 quintals per hectare during the period 1976-1997. The productivity of Jawar is 22 quintals in both seasons actually, whereas the estimated one is 70 quintals. Same way the groundnut productivity mentioned is 16 quintals per hectare (estimated) whereas actually the productivity was 14.86 quintals during the same period. He concludes that financial and economic aspects of the cost benefit analysis play a crucial role for the determination of benefits over costs for an irrigation project. Thus his study concerned with comparison of output estimation’s of various crops and actual yields. He is not dealing with canal irrigation as such with reference to irrigation development on agriculture development. This study is of little use for policy formation purpose.

Moorti T.V (1976): He was concerned with the impact of irrigation water on production of output, cropping pattern, yields and
fertilizer used in a sample of 141 farms in Aligarh district during 1966-67. His study shows that output responsible for irrigated water was highest in Rabi season, Peas, followed by Potatoes being 0.8 and 0.6 quintals per hectares per 100 Cubic Meter of Water. The output response was much lower for Maize. His study shows that private tube well irrigation is better than canal irrigation because the private farmers use water, fertilizers and other agricultural inputs practices with more efficiency. Same conclusion is derived by Mellor who studied Aligarh district of Uttar Pradesh. The lacuna of this study is that they have compared the yields under different sources of irrigation dealing with one area i.e., Aligarh. This study is of more than four and half decades old.

Roberto, L Lenton (1982)\textsuperscript{15} : He outlines some practical and operational methods to measure productivity and equity in large scale irrigation system. The measures of productivity taken by him are quantity and timings of water delivery to farms and crop yields from irrigated lands. He has taken two major irrigation system one in Maharastra for Kharif 1980. He came to the conclusion that yields of head reach in a distributory are more than that of middle and lower reaches. His study shows that the cropping pattern shifted from dry crops such as Jowar, Korra, Groundnut, and Cotton to high yielding paddy, HY Cotton and HY Chillies. The second important conclusion drawn by him is that net income per hectare
increased by 10 times. The rate of return per unit of input increased more than 3.5 times and bullock labour utilization is doubled.

Dhawan, B.D. (1982)\textsuperscript{16} : He has measured the magnitude of increase in farm incomes due to public canal irrigation and to assess the extent to which his income increased was positively associated with farm size. He has taken two sample farms from two major irrigation projects in Maharashtra in 1975-76. He says that large farmers on account of easy access to all inputs have gained greater advantage of income as compared to small farmers.

Narayan and Narayan Nair (1983) \textsuperscript{17} In this study the authors have explored as to what extent irrigation has succeeded in increasing and stabilizing paddy cultivation. It is found that, irrigation has some impact on stabilizing and improving yields of autumn crops but not winter and summer crops. Thus this study came to the conclusion that the impact of irrigation can only be said to be marginal in stabilizing and raising the productivity of paddy in Kerala State. This is a specific study limited to Kerala and this study shows undermining of irrigation on productivity. The conclusion derived is not tallying with many other studies which have shown that increase in irrigation facilities will lead to increase in productivity per man and per unit of capital.
Kiran Kumar, A.K. Sharath Chandra Lele and Praveen Shiva Shankar (2002) 18: In the article the authors were dealing common property resources in which irrigation is one factor. They have studied the impact of irrigation by using micro and macro level data as well as NSSO data. It is found that in irrigated areas the villagers derived large fraction of their fuel and fodder from agricultural residue as compared to un irrigated villagers. They have quoted the study of Iyenger for Gujrat, who compared irrigation and un irrigated villages. The authors studied their problem with reference to Karnataka State particularly with reference to Krishna River flowing from in Karnataka. They say that cropping pattern depend upon type of soil and on irrigated and un-irrigated lands. Their study is a multifarious one dealing not only with irrigation but also forest, grazing loads, fodder, un- irrigated lands etc. This study is a general in nature.

Shanan, L (1987)19: The author referred to prevalence of irrigation for the last 1000 years in the Nile valley and comparatively for long periods in Syria, Persia, Java, Indonesia and Italy. In Egypt the dam was built 5000 years ago both for irrigation and drinking purpose. Irrigation in China was begun at 4000 years ago. There are reservoirs in Sri Lanka more than 2000 years. As far back as 2300 BC the Babylonian code of Khammurabi provided water through canals. The excellent historic example is found in the stony gravel limestone desert of in Israel. The area of irrigated land in
the world today is about 250 million hectares, $\frac{2}{3}$ of which is located in China, India, Pakistan, Soviet Union and USA. With the introduction of irrigation the dry lands have become highly productive. In order to ensure the stability and permanency of this project we cannot afford to overlook the potential hazards intrinsic to irrigation development as irrigation development leads to transformation of lands. He has identified some problems of irrigation such as water logging, leakages from canal, wastage from distributaries, over irrigation and lack of suitable drainage facilities. Many examples are given for water logging in India, Pakistan, USA, Australia, North America and China. He has referred to number of water treaties that have taken place in various regions across various rivers. His main concern was government today to maintain the canals properly. Stop the wastage of water and water logging. This study is general dealing with development of irrigation which is a centuries old and also explained the drawbacks of the canal irrigation and the role of government to check these. This definitely a good study. His focus is more general dealing with irrigation through dams across the world. The conclusion derived was also general in nature.

Tulasi Das, V.. (etal) 2007: The Andhra Pradesh Government has taken up a programme for irrigation development which is known as Jalayagnam. The Congress Government which came to power in Andhra
Pradesh in 2004 felt that the water is going waste from the rivers flowing in the states to sea. (Bangala Khatam). To arrest this wastage, state government has planned several projects (Dams) across the rivers Godavari, Krishna etc., which will help to irrigate the dry lands as well as to increase irrigation potential. 47% of the geographical land of Andhra Pradesh is under cultivation. The state is basically agriculture based. 70% of Population derives their livelihood from agriculture. In recent years the share of agriculture has declined in GDP. The people depended on agriculture has become stake for survival. Irrigated land constitutes 40% of the states cropped area and 60% of the total agriculture production. Irrigated agriculture contributes to about 18% of the seed production, 55% of the food crops like Chillies, Vegetables and fruits, 15% on non-food crops such as cotton, tobacco, Sugarcane etc and about 36% other miscellaneous crops. Government felt to increase the irrigational infrastructure by undertaking construction of several dams across the rivers. The reason is taking up the programme of Jalayagnam. The authors discussed the allocations made to irrigation from the time of formation of Andhra Pradesh State to 2004-05.

They also discussed number of dams that are existing in the state under water utilization. However there are faulty designs, poor maintenance, inefficient and uneconomic use of water, absence of drainage
facilities, losses on main and sub canals, lack of coordination between irrigation and Agricultural Departments, Neglect of dry land areas and tank irrigation. Inundation of fertile lands due to lack of proper drainage facilities, problems of displacement of farmers rehabilitation and regional disparities, lack of scientific approach etc have led the inefficiency in the use of irrigation water. They have suggested instead of going for construction of new projects it is better to rectify the above problems and make efficient use of irrigation water. They have not discussed regarding productivity of crops.

Vamsi Vakulabharanam (2004): The author has discussed the state of Agriculture and irrigation in Telangana particularly with reference to growth in irrigation. There has been a growth in irrigation levels in telangana during a period 1970-2001. No doubt in telangana irrigation development but through private capital i.e., well irrigation. The author compared growth rates of irrigation in telangana and Andhra Pradesh. He found that the exponential growth rate of irrigation is more in telangana than in Andhra and Andhra Pradesh. He has also worked out exponential growth rates of irrigation district wise in telangana. During last 30 years Karimnagar district represented highest growth rate during the period 1970-2001 but if we take 1986-2001 it is Warangal district which is highly developed in irrigation. He has also explained net area sown in telangana in
comparison with Andhra Pradesh which he says has decreased in both. He has also compared yield component between telangana and Andhra Pradesh. In all these factors telangana did well. In telangana the irrigated area increased from 17.5 in 1971 to 38% in 2001. Whereas in Andhra Pradesh it has increased from 28.2% to 40.4%. However his study reveals that telangana is not neglected in irrigation development. Thus this paper mainly discusses the regional disparities in irrigation development.

III. Conclusion:

Irrigation is a multifarious subject or multi dimensional subject. Some authors dealt with different source of irrigation and explained the efficient type of irrigation. Some studies have compared the production and productivity in the irrigated and un irrigated lands. Some studies discussed the growth rates of irrigation with specific reference to some projects such as Sriramsagar, Nagarjuna Sagar etc. Still some other authors discussed the advantages and disadvantages of construction of multipurpose dams on rivers.

All the above studies are in one way or other is important. They have put up lot of effort in posing the problem, analyzing the data and deriving the conclusions. No doubt all the above studies cannot help my study directly but we will surely make use of the essence of the above
studies which will help me to pose my problem systematically otherwise it implies that baby is thrown away with both water which we do not want.

**IV References:**


article published in the Indian Society of Agricultural Economics and ISEC, Bangalore.


