Chapter - II

Review of Research Literature

2.1 Introduction

2.2 Review of Research Studies

2.3 Concluding Remarks

2.4 References

CHAPTER - II

REVIEW OF RESEARCH STUDIES

2.1 Introduction:

The present review of literature is based on the detailed information, which was available through research papers, books, Ph. D. thesis, M. Phil. dissertation experts of various committees and study groups. Journals, Research papers and articles published in periodicals websites and other and other published sources etc. This review of literature gives an idea about the previous study studied out of the select topic.

A few studies have focused the environmental problems of dam and most of the studies have focused on other problems of dams like, salinity, water logging, deforestations, decrease water qualities and other related aspects.

Most of the research has covered the multi-dimensional approach. The review of literature of environmental impact of dams involves following of the studies.

2.2 Review of Research Studies

A review of research studies on the present topic of the research are as follows.

Ahmed A. (1999)[1] in his research "The Narmada Water Resources Project implementing sustainable Development focus on economic development" of states and need of environmentally sustainable development. The author has collected the primary data through the interviews from dam area and he also used the secondary data from many different govt. departments. He also used articles, reports reviews references for presentation, author used many charts, maps and tables and pictures etc. In his study, he has observed that Narmada Project along with positive impact and associated with negative environmental

impact like social impact, human health problems, human displacement without resettlement and deforestation. Author focused on agricultural declining production and deterioration of the socioeconomic and cultural environment ecological degradation in the Narmada basin and he suggests importance of environmental impact assessment through this project. He suggested how to control environmental problem with the management of irrigation project.

Tift Bryam, Beaun Ivonne, Daming He (2003)[2], in their research study 'Social impact of large Dam projects'. A comparison of international case studies and implications for best practice. The study is mainly based on primary data, which is collected from large dam area. Authors also used secondary data for the analysis of social impact (STA) and he also used so many books reviews and reports. For presentation, the author collected primary data during the period of 1997-2000.

The study involve two dams, in which first is the Hesotho high dams water project is in Southern Africa and second one is Manwan dam in China. Author has studied the social impact of dam with the links like biophysical, socio-economic and geopolitical effects of dam. The author emphasis that social impact assessment like migration and resettlement of people near the dam sites, changes of rural economy and employment structure, effects on infrastructure and housing impacts on non-material or cultural aspects of life and impacts on community health and gender relation etc.

The author shows that the impact of large dams approximately 20,500 residents in over 120 villages in Malati Mountains projects areas were affected by the construction phase. He concludes his analysis with an overview of lessons learned from the case studies the social impact of large dams. Conducting proper social impact assessment can helps to promote development structures.

Bhat, G. K., Aronear, Revi (1995)[3] in their research work 'Water Crisis in Earthquakes Affected Areas of Marathwada'. The present article focuses on the earthquakes of 30th September 1993 of 6.4 magnitude of

the Richter scale in Osmanabad and Latur district and 8000 people were killed and about 14,000 injured and so much economical losses.

The author collected the primary data in the year 1994-95 through the different offices and departments and for the analysis author used table and chart, diagram etc. Author concluded that earthquake problem in Maharashtra and also studied problems of water and water born diseases and also he focuses on the quality of water and ground water problem. He also studied irrigation dam and it's impact on environment like earthquake water logging, Stalinization, land degradation in dam area mostly in Latur and Maharashtra.

The author has suggested the way. How to control water logging, pollution. He also suggests management of water usages. He shows that effect of high number of bore wells and use of water because last 20 years numbers of increase bore well to govt. how to control water use and related information. This paper becomes the guideline for all to whose research is going on water related problems.

Duflo Esther and Pande Rohini (2007)[4] In their research 'Dams' they stated on irrigation dams studied 90% of Indian large dam and author studied dam construction process and role of geography in determining dam placement. Lastly they were studied the impact of a dam in its catchment area. For this research articles they were used primary data, which was collected in dam area. They also used secondary data, which is collected by many government departments in year 2000. Author used many other references books and published information from different offices. Moreover, for presentation author used central tendency, charts, map, diagram and tables also.

The result of this study show that the role of large dams in reducing dependency on rainfall. Enabling irrigation providing water and hydropower. Second result of this articles that dam significantly increase rural poverty in districts where they were located in construction. Poverty decline in districts downstream from the dam. The Indian water resources ministry estimated that one tenth of the area irrigated by dams

suffered from either water logging or salinity problems. Finally, unaffected land in the catchment area upstream to the reservoir is unlikely to benefits from dam irrigation as lift irrigation is rarely practiced for dams.

Bandyapandhyay J., Malils B., Munded M. (2002)[5] 'Dam and Development' report on a policy dialogue. In this research articles they were studied Indian dam and effect of dam economical and social impact on human life. This article also gives systematic view of dam and its impact. They were collected primary data from dam area and also used so many book reviews and secondary data used by irrigation department.

The paper concluded that the Natural ecosystem have some limited capacity to harvest and store water. These natural capacities for storing water like in aquifers and ponds had come to good use for satisfying the need of human societies. The study show that multipurpose project in flood moderation has often been sidelined owing to conflicting multiple objectives. This becomes literal, when one observation 96% of dam in country catching 42,291 hector irrigation lands that is less than 0.5% meeting flow regulation objectives. They were also studied the growing conclusions of the need for a comprehensive innovative and open approach to the assessment of dam. Moreover, for evaluation to the assessment of dam and for evaluation a new set of criteria and guidelines for decision making on dams control many ways.

Keiser Jennifer, Jurg Utimyer, Mareed Tunner (2005)[6] in their research articles 'The effect of irrigation and large dams on the burden on malaria on Global and Regional Scale'. They have studied World Health Organization Commission burden of water related vector born diseases. An analysis of the fraction, attribution to components of water resources development and management based on this report. Their study for collected the primary data from dam area also author was presented comprehensive review of studied that assessed the impact of irrigation and dam building on malaria, incidence or prevalence stratified by the 14 WHO sub regions of the world. The author estimate that a maximum of 843.3 million people live in the close vicinity of irrigation systems and

19.9 million near large dam sites worldwide. In sub-sahurar Africa which had 87.9% of the current global malaria, burden and only 9.4 million people are living near large dam and irrigation sites.

This report show that every year 300 million people died because of direct causes of malaria. Author concludes that the large dam sites increases number of water born diseases including malaria, dengue, typhoid, etc.

Edmonds Richard Louis (1992)[7] in his research 'The Sanxia Project, the environmental agreement surrounding China's super dam'.

This article presented environmental problem of large dam people emotional opinion of people about dam and brief history of Sanxia dam and lastly the benefit of dam like flood control, irrigation economical and political issues. The author collected primary data in the period of 1991 to 1992. In his study, he has studied history of Sanxia dam and political issues Chinese National People's Congress passed the Sanxia key water control project in April 1992. Author has focused technical uncertainties gives the fact is highly unlikely that the dam will serve its purported functions of flood control, energy generation navigation improvement and increase water supply. He shows that irreparable ecological damage and the economic risk of dam etc.

Gestti Rita, Malik R. P. S. (2008)[8] in their research study, 'Indirect Economics Impact of Dams'. In this article author presently direct and indirect impact of dam both, in the region where they are located and inter regional, national and even global levels. These impacts are generally evaluated in terms of additional output of agriculture commodities, hydropower, navigation, fishery, tourism recreation, prevention of droughts and reduction of flood damages and are referred to as direct impact. He has collected the primary data from the Bhakra dam area, India and Multiplier effects of the high Aswan dam Egypt. Also used secondary data from various sources like references books, articles and from government offices. He concluded his paper and made an attempt of economical benefits of dam. Like increased agricultural production as well

as increased hydroelectricity power in dam area. The author focused on also case study of Bhakra multipurpose dams and its production and consumption induced effect. He also studied estimate regional value added multiplier arising and other impact of dam area and increase employment opportunity of job in dam area etc.

Beck Marcas W., Andrea, Daassen H. B. and Peter (2012)[9] in their research work 'Environmental and livelihood impact of dam : Common lessons across development'. They have studied in this article U.S.A., China, and Southeast Asia to represent development in dam area. They studied bio-physical, socio-economic and geo-political impact. The global increase in construction of dams during the 20th century and the associated negative impact has brought attention through this paper. For this research article, they used primary data from dam area and they used many reviews of articles and books for secondary data.

They also focused on other negative impact of human livelihoods as well reservoir fisheries may be poor substitutes for river fisheries. In their study they have observed that water-borne diseases. Such as malaria, schist mists, etc. Author focus on sustainability development of dam and control environment all problems.

In article entitled, **'Environmental Impact of Macrophytes on some fresh water bodies is Washim District, Maharashtra, India (2012)**[10] researchers, Mukund Dhore, Manik Dhore, Dinesh Dabhaekar pointed out that the fresh water in dam area and impact on environment, and they shown how the impact on large dam impact on environment. In their research article author has collected primary data from Washim district in period 2009 to 2011. He also used many books review and used many other references for his paper.

In this articles researcher recommended that reasons of reducing water storage capacity in the fresh water bodies and also tremendous loss of surface water of the dam through evaporation macrophytes also reduced pond productivity by causing accumulation of sits. Due to excessive growth after pollute the water and impact faced small to the

water bodies in Washim district by vegetable and other mans is creating serious socio-economic problem causes enormous economic loss of water resources explain by author in their paper with detailed information.

Elizabeth, Austin M. (2012)[11] 'Environmental and Social Implication of Dam Removal'. In this article focused on United States and dam important for economical development and hydroelectric power, flood control irrigation, navigation, recreation and scenic beauty etc. In this article author has collected primary data from all dam area. He has used reviews of data from many books. He also collected details scientific data also. Author collected data in period 2010-11.

Finally, researcher concludes that benefits of dam like fishery, boating, birds watching water skilling etc. He also focus on many groups are involved in dam removal decisions local resident, citizens groups, local government agencies business and environment group. Opponents to dam removal rise of dam concerns such as public safety. He also focus on dam removal raise adjustment periods for both the ecosystem and humans involved given the increased ecological dynamics associated with sea level and climate change etc.

Loni, Priya P., Raut, Prakash D. (2012)[12] in their research paper entitled 'Studies on the groundwater quality from six village of Hatkanangale Taluka, Kolhapur district'. It is discussed on groundwater quality from six villages of Hatkanangale taluka and they studied systematic view of ground water quality and importance of water in human life. For this article author collected assessment of groundwater quality with respect to certain parameters was carried out samples from bore wells. Were investigated for parameters such as iron fluoride, chloride content. The samples were collected from the six villages of Hatkanangale taluka in year 2012.

In this article researcher focus on essential clean water for healthy living. Yet there is a scenario that millions of people worldwide are deprived of this due to over exploitation poor management system and by degradation. Lastly, author shows ground water from major sources of

drinking water supply for both urban and rural people in India. It accounts for about 88% safe drinking water in rural areas.

Report of Water Resources Department Govt. of Maharashtra (March 2011)[13] 'Environmental Impact Assessment for the Construction of Uma Barrage Across the River Uma Village Borta in Tehsil Murtizapur, Dist. Akola, Maharashtra.' In this report, Government of Maharashtra checks the Environmental impact Assessment with followed the guideline of the Ministry of environment and forest, Government of India. It includes Air Environment, Water Environment, Land Environmental, Socio-economic impact assessment of Uma dam area. In this report classified differently air, water and land environment and checked in before construction, construction time and after construction period environmental conditions. This report mainly compares the catchment area and area of submergence and the command area of the Uma barrage project.

This report studied also salient features of the project and importance of project in dam area. This report the socio-economic profile of 15 villages falling in the area and study in infrastructure facilities, economy health literacy and cultural and quality of life etc. aspects and studied identification of impact of dam.

Gurjar, R. K. (1994)[14] In this book, 'Irrigational Environmental', has given useful information of history of irrigation of world and in the period of 1983 and also studied so many aspect, management of irrigation systems, development prospects of irrigation and suggested how control water logging, salt problem in submerging area. He has also studied environmental impact assessment for water resources project. He also explained significant of water for animal, wild and human life. Author focused on water logging and salt problem in command area causes and remedies and salination which is characterized by accumulation of harmful salts.

In this book author examined negative effect of irrigation like water logging. Alkalinity and salinity of soil various crops diseases and irrigation and growing of weeds and lastly effects of irrigation of human health. He also had given example of effect of irrigation of surface and degradation analysis direct and indirect socio-economic losses of land & degradation and purpose remedial measures and strategies to avoid the process of land degradation.

Ghosh, G. K. (2002)[15] in his book 'Water of India, (quality & quantity) in his books water of India. Author studied detail sources of water, importance of water use of water (rain, river, ponds) need of water, cause of water pollutions and effects of large dam on environment. Explanation author used statistics methods. He has studied water related problems like salt, deforestation. The surface of land due to raised water table made unproductive.

Author also shows more than 50% of all illness in India are related to water born disease. Such as typhoid, jaundice or diarrhea and dysentery over 70% of all the water in India being polluted the storage of such water in reservoirs and lakes. He has also focus water pollution in lakes and ponds causes and effects. Author also given brief review of forest, rain and water and lastly showed that India's river system and pollution causes in details and how to control pollution in India.

Gupta, K. K. (2008)[16] in his book 'Water Crisis in India' he studied in detail all aspects of water crisis in all over India. Author also focus on demand of water and sources of water in present time and water related problems. He also given information about water report of United Nation World Water Development report. One billion people lack of sufficient access to safe drinking water and 2.6 billion are deprived of basic sanitarian. He also studied the issue of water management is particularly procession in a country where many of state get as much 90% of their rainfall in the four month. Summer, monsoon season, leading drought cycle. Second challenge for India is respect to water crisis is to remove the large in balances in the availability of water among different regions of

country. Author also studied water requirement for the domestic, commercial and industrial sector. He also suggested that water conservation like rainwater, harvesting improving usage efficiency of water in irrigation through better practices. Such as drip-irrigation, sprinkler irrigation and drop rotation, recycling etc.

Author also concluded with need of Maharashtra state water policy because Maharashtra in 1960 large investment has been made in the water sector for development of water storage project. That why increased irrigation potential 2.74 lakh hector to 38 lakh hector.

Dr. Jugale, Vasantrav B. (2011)[17] 'Jal Mulya Nirdharan'. In his book author has studied the various ways of the usage of water and its significance in scientific and systematic manner. Moreover, he studied the valuation of water, revenue of water use value of water and water charges as well as water depreciation in his research book.

In irrigation area, how to charge irrigation charges and the way of implementation, are discussed by author. Also, he suggests some guidelines. The writer has studied the correlation between the environmental support and economics of water. It has been recommended to charge 20 to 25% of the amount be used from the increasing crops productions. He gives detailed account how to charge different types of crops. The book is very useful to the others to understand to know how to use water and how to charge water taxes.

Israelsen, O. W. and Hansen, V. E. (1962)[18] in his book, 'Irrigation Principles and Practices'. He has studied about history of irrigation and he studied importance of irrigation, future growth of irrigation with different countries irrigation. In this book author studied salinity scope of irrigation different method of irrigation and cannels of irrigation with given different counter example and picture. Author also given the details soil-water relation, soil problem and causes of water-logging and other problems of soil. Author focus on sources of salinity in water, tolerances of crops to salinity. He has studied in details water storage efficiency, water use efficiency and water distribution efficiency, consumptive use efficiency.

Lastly author explains sources and sub surface irrigation and given design of surface irrigation systems and different irrigation implements for different types of lands and structures etc. In this book author gives so many examples of effective systems of irrigation like sprinkler, drainage, surface irrigation with photographs.

Konavadekar, Anita V. (2007)[19] in his Ph.D. thesis 'Impact of Water Conservation Scheme : A study of 'Shivkalin Pani Sathwan Yojana in Kolhapur District'.

Author studied that underground water store system and how to develop the irrigation system of underground storage capacity. She also studied Shivkalin water store system and importance of old water system and Indian and Maharashtra water related problem and drought area in India. Author also focus on how to developed water storage facility and how to self-develop water supply for every village in Kolhapur district. She also studied Shivkalin water harvesting system and how to charges water uses tax. Lastly, she shows that feature problem of water and demand of water in future.

Shinde, M. V. (2006)[20] in his M. Phil. Dissertation, Impact of Jangamhatti Project on Agricultural Development of Chandgad Taluka'. He has tried to measure importance of irrigation dam for developed. The agricultural production. He also studied the irrigation development in India since Independence and source of irrigation. He also focus on Indian irrigation project like Major irrigation project, Medium irrigation project, Minor irrigation project and potential and utilization. Author given the review of irrigation all dam of Kolhapur district. He has also given details of all irrigation dams and area irrigable in hectors, area irrigated in hectors, total irrigation land in hectare. Hence, he has studied agricultural economy of Chandgad taluka, land use pattern, rainfall condition, cropping pattern. Lastly, he has focused on production and income of crop in details and how the farmer for cash crops they use more water for more production of crop.

Jauhari, V. P. (2002)[21] in his book 'Environmental & Social Impacts of the Project'. He has studied environmental and social impacts of the irrigation projects. The present study has enlisted the adverse impacts on environment of the irrigation project. The book focus on impact studied of dam has been carried out with exception of aspect of water-logging and salinity. There is no systematic effort made on part of institutions or the government to continuously monitor such happenings in India not many studies of the kind have been reported or available. Few comprehensive studies have been commissioned by CWC which have still not been completed.

Author shows in India 10 million hectors lands were affected of water logging. He has focused water logging and adverse water logging, soil quality, soil salinity and agricultural productivity are closely related and studied causes of water logging, problems of water logging and how to control of water logging problems in dam area.

Battarai M., Barker R. (2007)[22] in their research paper 'Who Benefits from Irrigation Development in India? Implication of irrigation multipliers for irrigation finance'. In this research paper they show that implications of irrigation financing by taking into consideration beneficiaries of irrigation development in India. The present study has estimated both direct benefits and total benefits of irrigation in India. The study has also estimated irrigation multiplier values, which ranged between 3 to 4.5. The study suggested that about two thirds or more of the benefits from irrigation development have been accorded to the non-farm sector in the Indian economy. But the discussion on irrigation financing are mostly farmer centric, neglecting the total benefits and the semi public good characteristics of irrigation system. Author used primary as well as secondary data and they also uses central tendency, tables, chart, diagrams etc.

Bhatia Ramesh, Malik, R. P. S. and Bhatia Meera (2007)[23] have studied direct and indirect economic impact of Bhakra multipurpose dam in India. The study presents 'direct and indirect economic impacts of the

Bhakra dam' in the northern part of India. That has provided direct benefits in terms of hydropower, irrigated agriculture, water supply, flood control and drought prevention. These direct outputs have generated inter-industry resulting in increase in the demand for outputs of other sectors and consumption induced impacts arising out of increases in income and wages generated by direct outputs of the dam. The results on income distribution show that the gains to agriculture labor households from the dam have been higher than the gains to other rural households.

Author shows in his paper significant of Bhakra dam like 100% electrification was achieved in Punjab and Haryana in 1976. The Bhakra system provided electricity to all the villages and towns. Lastly, author shows direct and indirect economic impacts of the Bhakra multipurpose dam in northern India but increase also poor families numbers of percentage after development of dam.

Hussen Intizar (2007)[24] in his research study, 'studies direct and indirect benefits of irrigation'. The study is mainly based on primary data collected from 5400 households in 26 irrigation systems, which examines the benefits and potential disbenefits of irrigation. The results of the study show that benefits vary widely across systems and depend on range of factors including local conditions, system management, irrigation policy, and broader economic and political factors. This study suggests that indirect irrigation benefits could be larger them direct benefits through the multiplier effect.

On the other hand, the paper also suggests that irrigation can also lead to some negative or adverse social, health and environmental impacts. Such potential disbenefits of irrigation include displacement of people as a result of new irrigation development, public health risk from water related disease, irrigation induced land and water degradation, loss of biodiversity and river health risks. Author also studied number of negative impact of irrigation such as; irrigation led. Mechanization of farming that's why increase unemployment in farming sector. And the people displacement and its adverse impact could be on environment.

Lastly author show that every irrigation dam can lead to considerable negative or adverse social, health and environmental impacts.

Tahmiscioglu M. etc. (2005)[25] in his research report, 'positive and negative impacts of dams on the environment'. He has studied enlisted the impacts of dams on the environment. According to the study dam playing the most important roles in utilizing water resources. Dams have a great deal of positive and negative effects. On the environment besides their benefits like controlling stream regimes, consequently preventing floods. Obtaining domestic and irrigation water from the stored water and generating energy. Author focus on positive benefits in details as well as he has also focus on negative impact of dam on environment in details like water borne diseases typhoid, fever, malaria, and cholera, as well as deforestation, temperature of water, salt problem etc. he has also studied dam effects on human life in time construction and after construction period.

A review of above relevant literature shows that in depth study of the environmental problems of Dam, there are some studies that have been carried out but the environmental impact assessment of the development project is missing and least attention is paid to this aspect. It is therefore very much necessary to carry out environment impact assessment of the development project like dam. Much effort has not been undertaken to carry out environmental impact of development project like dam. It is therefore the present research study is taken up which tries to access the environmental impact of the Phatakwadi Dam in details and in depth as well. Hence, the present study exclusively intends to access environmental impact of Phatakwadi Dam, which cover the number of parameters of the environment of some villages from Chandgad and Gadhinglaj Tehsil of Kolhapur District.

2.3 Concluding Remarks:

Now a days environment has played the vital importance in the development of human being. Hence, the study of environmental issues and its various aspects are of the vital importance. Present project is one

of the important projects but affects the environment. Dam is an important development project but it affects the environment. The study considers its various spheres and areas. The present study is an attempt to examine the impact of Phatakwadi Dam on the environment. The impact on dam as environment may be positive or negative. The present study tries to capture this impact of the Phatakwadi Dam on the environment. The present study comes out with important findings and suggestions.

2.4 References:

1. Ahmad Afroz (1999),'The Narmada Water Resources Project India', Implementing Sustainable Development', Ambin Publication, Into. Vol. 28, Page 398 to 405, published by Springer on behalf of Royeel Swedish Academy of Sciences. http://www.jstor.org/stable/ 4314921

2. Titt Bryan, Beaun Yuonne, He Duming (2003), 'Social Impact of Large Dam Project', A Comparison of International Case Studies and Implication for best Practice', Environmental Management, Page 238 to 245.

3. Bhat, G. K., Aronear Revi (1995), 'Water Crisis in Earthquake' Affect areas of Marathwada', Economic & Political Weekly', New Delhi, Vol. 2, Page 1826 to 1830, Published by A Samerksha Trust, www.epv.in

4. Esther Dath & Rohini Pande (2007), 'Dams', The Quarterly Journal of Economics, Vol. 122, Page 601 to 646, Published by Oxford University Press, http://www. jostor. org/ stable/25098885489

5. Bandyapadhya J., Malk B. Mandal M. (2002), 'Dam and Development Report on a Policy Dialogue', Economic & Political Weekly, Vol. 37, Page 4108 to 4112, Published by Economic & Political Weekly, http://www.jostor.org/ stable 441268.

6. Keiser Jennite, Utingee Jury Tanner Marrea (2005), 'The Effect of Irrigation and Large Dam on the Burden of Malaria on Global and Regional Scale', Page 392 to 406, Tropical & Hygiene, Published by World Health Organization.

7. Edmonds, Richard Louis (1992), 'The Sanxia Project, The Environmental Orgament Surrounding China's Super Dam', Global Ecology and Biogeography Letters, Publication, Vol. 2, No. 4, Page 105 to 125, Published Wiley, Stable URL http:// www.ory/stable-2997637

8. Gestti, Rita, Malik R. P. S. (2008), 'Indirect Economics Impacts of Dam', Water Resources Development and Management, New Delhi, India.

9. Beek, Murcus W., Andrea, Hdassen B. & Peter (2012) 'Environmental and Livelihood Impact of Dam', Common lessons across development, International Journal of River Basin Management, Vol. 37, Publisher Taylor & Francis, London.

10. Dhore Mukund, Dhore Manik, Dabhadkar Dinesh (2012), 'Environment Impact of Macophytes on some Fresh Water Bodies in Washim District', International Journal of Scientific and Research, Vol. No. 2, Page 151 to 154, www.jstor.org

11. Elizabeth M. Austin (2012), 'Environmental and Social Implication of Dam Removal', The Encyclopedia of Earth, Washington D. C., http://earth.org/articl/environmental&social

12. Loni, Priya P., Raut Prakash D. (2012), 'Studies on the Groundwater Quality from Six Village of Hatkanangale Taluka, Kolhapur district', Applied Sciences and Engineering, Vol. 1, No. 2, Page 224 to 242, www.jastr.com, Environmental Sciences, Shivaji University, Kolhapur.

13. Report of Water Resources, Department Government of Maharashtra (March 2011), 'Environmental Impact Assessment for the Construction of Uma Barrage, Across the River Uma, Village Bortrin Tehsil, Published by Government of Maharashtra, pp. 1-15.

14. Gurjar, R. K. (Book) (1994) 'Irrigational Environmental', Rawat Publication, Jaipur.

15. Ghosh G. K. (Book) (2002), 'Water of India' (Quality & Quantity), Atlantic Publishers & Distributers Ltd., New Delhi-110027, www.atlanticbooks.com

16. Gupta, K. R. (2008), 'Water Crisis in India', APH Publishing Corporation, New Delhi 110002, www.@mantraonline.com

17. Dr. Jugale Vasantrav B. (2011), Jal Mulya Nirdharan, Published by Center for Social Studies and Research, Sangli.

18. ISRAELSEN O. W. & HANSEN V. E. (1962), Irrigation Principles and Practices, Published by John Wiley and Sons, Inc., New York, London.

19. Konavadekar, Anita V. (2007), 'Impact of Water Conservation Scheme', A Study of Shivkalin Pani Sathavan Yojana in Kolhapur District', (Ph.D. thesis). Shivaji University, Kolhapur.

20. Shinde, M. V. (2006), 'Impact of Jangamhatti Project on Agricultural Development of Chandgad Taluka. M. Phil. Dissertation, Shivaji University, Kolhapur.

21. Jauhari, V. P. (2002) (Book), 'Environmental & Social Impacts of the Project', Publication – A Mittal Publication, New Delhi, India.

22. Bhattarai M., Barker R. (2007), 'Who benefits from irrigation development in India?' Implication of irrigation multipliers for irrigation financing, Irrigation & Drainage 56, Vol. Dol. 10-1002, Page 207 to 225.

23. Bhutia Ramesh, Malik, R. P. S. (2007), 'Direct and Indirect Economic Impacts of the Bhakra Multipurpose Dam, India, Irrigation and Drainage, Published in Online in Wiley Inter Science, Vol. Dol. 10-1002, Page 195 to 206.

24. Hussain Intizar (2007), Direct & Indirect Benefits & Potential Disbenefits of Irrigation : Evidence and Lessons, Irrigation & Drainage, Published Online in Wiley Inter Science-301, Page 179 to 194.

25. Tahmiseioglu, S. M. (2001), Positive and Negative Impacts of Dams on the Environment, Published International Congress or River Basin Management, New Delhi, Page 759 to 769.