

IWMI/GOVERNMENT COOPERATIVE PROGRAMME
TRUST FUND PROJECT WITH GOVERNMENT OF JAPAN

**RESEARCH ON INTENSIFICATION OF
EFFECTIVE WATER-USE POLICY**

ANNUAL REPORT
FY 2004



H032176

Project report

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Research on Intensification of Effective Water-Use Policy

1. Aim of the project

This research project aims to analyze future prospect of rice cultivation, particularly water management of paddy rice cultivation in the world. Also, the project focuses on current state and future prospect of saving water and price of rice.

2. Reporting Period

1st April, 2004 to 31st March, 2005

3. Researches done in FY 2004

In FY 2004, IWMI implemented literature survey continued from 2003, field survey of current water management in China and India in 2004, discussed with researchers, policy makers etc., and collected information including books, reports and documents.

4. Result

The result of the study in FY 2004 is summarized as following document attached.

5. Researches done in FY 2005

In FY 2005, IWMI will conduct additional field survey and will finalizing overall research. IWMI will hold a workshop to discuss about current states of rice cultivation, multifunctional roles and future prospect of rice cultivation, etc.

Result of the Study in FY 2004
“Research on Intensification of Effective Water-Use Policy”

1. Introduction

Although self-sufficient ratio in India used to be more than 100%, now India became a food-importing country owing to the rapid growth of population. It is necessary to increase food production and effectively utilize water resources to stabilize food production are urgent issues in India when it is difficult to halt the increase of population. Here, I would like to outline the current states of agricultural water resources and its management mainly in India so as to contribute future research.

2. Current State of Water resources in India

According to Paranjape S. et al. (2004), usable water resource in India amounts to $1,122 \times 10^9 \text{m}^3$ (billion cubic meter: bcm), and only a half of them ($530 \times 10^9 \text{m}^3$) are used. It means that 875m^3 is used out of the usable water resources per capita of $1,850 \text{m}^3$.

Table 1: Overall Water Resource Availability and Consumption - Current Status.

Items	Volume (bcm)
Annual Precipitation	4,000
Seasonal rainfall (June to September)	3,000
Average Annual Flow in Rivers	1,869
Annual Usable Water Resources	1,122
Surface	690
Ground	432

Source: Sinha, A.K. (2001)

Table 2: Estimated Per Capita Water Availability in India.

Year	Population (millins)	Water Availability (m^3/year)
1951	361	5,177
1955	395	4,732
1991	864	2,209
2000	1,002	1,865
2025	1,393	1,342

Source: Sinha, A.K. (2001)

Table 3: Basin-wise Average Annual Runoff and Usable Flow of Rivers.

River	Average Annual Runoff in the River (bcm) ¹	Estimated Usable Flow Excluding Ground Water (bcm)
Indus (up to border)	73.305	46.000
Ganga	501.643	250.000
Brahmaputra (at Jogigupa)	537.067	24.000
Barak and other rivers flowing into Meghna	59.800	-
Godavari	118.982	76.300
Krishna	67.790	58.000
Cauvery	20.957	19.000
Pennar	6.858	6.858
East flowing rivers between Mahanadi and Pennar	16.948	13.110
East flowing rivers between Pennar and Kanyakumari	17.725	16.732
Mahanadi	66.879	49.990
Brahmani and Baitarni	36.227	18.297
Subarnarekha	10.756	6.813
Sabarmati	3.812	1.925
Mahi	11.829	3.095
West flowing rivers of Kutch, Saurashtra and Luni	15.098	14.980
Narmada	40.950	34.500
Tapi	18.000	14.500
West flowing rivers from Tapi to Tadri	108.618	11.936
West flowing rivers from Tadri to Kanyakumari	89.250	24.273
Area of inland drainage in Rajasthan desert	-	-
Minor river basin draining to Bangladesh and Burma	31.000	-
Total	1,853.494	690.309

Note ¹: The Figures include observed flow as corrected for surface utilization. The effect of actual utilization of ground water draft is not included.

Source: Annon, 1988.

2-1. Development of Water Resources

According to Paranjape S. et al. (2004), the projects shown below were planned and implemented as of 2004.

Tbale 4: Investment in Irrigation within the Five Year Plans in India.

(million Rs.)

Five Year Plan	Large & Medium Projects	Minor Irrigation Projects	Total
1st Plan (1951-1956)	3,762.40	666.20	4,428.60
2nd Plan (1956-1961)	3,800.00	1,615.80	5,415.80
3rd Plan (1961-1966)	5,760.00	4,431.02	10,191.02
Annual Plan (1966-1969)	4,298.10	5,609.31	9,907.41
4th Plan (1969-1974)	12,423.00	11,733.42	24,156.42
5th Plan (1974-1978)	25,161.80	14,095.80	39,257.60
Annual Plan (1978-1980)	20,785.80	9,819.00	30,304.80
6th Plan (1980-1985)	73,688.30	34,168.20	107,856.50
7th Plan (1985-1990)	110,476.40	62,797.80	173,274.20
Total	260,155.80	144,936.55	405,092.35

Source: Government of India, Report of the Committee on Pricing of Irrigation Water (1992).

Tbale 5: Irrigation Potential Created under the Five Year Plans in India.

(1,000ha)

Five Year Plan	Large & Medium Projects	Minor Irrigation Projects			Total Irrigation Potential
		Surface	Ground-water	Total	
Prio to Plans (up to 1951)	9,705	6,401	6,500	12,901	22,606
1 st Plan (1951-1956)	2,486	53	1,777	1,830	6,459
2 nd Plan (1956-1961)	2,143				
3 rd Plan (1961-1966)	2,231	58	4,231	4,289	8,050
Annual Plan (1966-1969)	1,530				
4 th Plan (1969-1974)	2,608	450	3,930	4,380	6,988
5 th Plan (1974-1978)	4,014	538	3,362	3,900	7,914
Annual Plan (1978-1980)	1,895	500	2,200	2,700	4,595
6 th Plan (1980-1985)	3,401	1,697	5,823	7,520	10,921
7 th Plan (1985-1990)	2,900	1,290	7,800	1,090	11,990
Total	32,910	10,990	35,620	46,610	79,520

Source: Government of India, Report of the Committee on Pricing of Irrigation Water (1992).

2-2. Current States and Problems on Water Management Organization

We can list the current states and problems on water management in India.

(1) Water Law

There is no individual law on water resources in India. All rights on rivers and lakes belong to states. Land owners have right to use underground water, and underground water management in the field is carried out on accordance with de-fact rights related to agricultural land and depth, numbers and capacity of the wells. Of course, governments under state level hold many policies, rules and customs on water management, but they are effective only when the water resource is sufficient, and they don't work when the water resource is scarce.

Every state government basically holds all water rights inside the state, so the central government cannot lead nor set guidelines on water resources. The central government can only coordinate inter-state water disputes and has the right to approve projects that could affect environment.

(2) Water Policy

State Water Policy: Water policy in India were set chronically as follows. Water policy released in 1987 and 2002 couldn't answer main issues, such as water economy and water management organization, but they were unique because they had recognized importance of privatization as well as paradigm shift from development to productivity of water resources. (Saleth, R. M., 2004).

According to A.D. Mohile (2005), milestones in Indian water policies were as follows:

1866 - Role of government in irrigation development.

1935 - Transferred "irrigation" to the states.

1950 - Beginning of land development.

1972 - Second irrigation commission report.

1986 - Formulation of National Water Resource Committee (NWRC).

1987 - National water policy (1987).

1998 - Water sector review by GOI and World Bank.

1999 - Report of the commission on integrated water development.

2000 - Water Vision by India Water Partnership.

2002 - National water policy (2002).

Water price policy: The aims of water pricing policy are cost recovery and effective water use. The Committee of Pricing Irrigation Water (CPIW) recommended in 1992 as the cost recovery policy to recover all management cost, one percent of construction cost and several percentages of replacement cost. However, the policy was not in practice because uprising water prices and dramatic change of measurement even the policy was widely agreed.

We can see the large difference between cost needed for irrigation and cost recovery in Bihar State (Table-6).

Tbale 6: Cost Recovery - Bihar Satate (1991).

Items	Cost (million Rs.)
Total irrigation water charges (assessment)	1,840
Actual collection	500
Money spent in collecting assessed charges (Basically staff salary)	1,130

Source: Government of India, Report of the Committee on Pricing of Irrigation Water (1992).

User's participation and privatization: Irrigation management (by public sector) was conducted after the Command Area Development (CAD) was founded in 1974. In 1980s, water resource projects were started with the World Bank (WB) funds, and importance of farmers' participation was recognized. Farmers roles are recognized as management turn-over, such as diverting water at field level, collecting water fee, managing of facilities, and many success stories were reported. However, policy with large participants are conducted only in large irrigation systems. For example, water diversion was limited to Water User Associations (WUAs) in Andra-pradesh and Madi-pradesh.

(3) Water management

Management of water and facilities are conducted by state governments as part of their public projects, irrigation projects and water resource development projects.

Traditional organization: There were unofficial water rights in ancient India. According to Saleth, R. M. (2004), the Pad System of 200 years history was conducted in Panijara River Basin, the Pani-panchayat in Purander in Mahamasyutora State is a water right system managed by users. All farm-lands are shared by all users in the Pad system (Paranjape S. et al., 2004).

Non-transferable long-term water lease system is officially approved in Orisa, West Bengal, Bihar and Madia-pradesh, and water passes of one to six years are issued by Canal Orthorities to farmers in the Shejipari system (Saleth, R. M., 2004).

According to Paranjape S. et al. (2004), there are tank (reservoir) irrigation systems that operation and maintenance (O&M) of water resources are conducted by members of the villages in Tamil-Nadu. In this system, all members pay all the cost of O&M and provide labor-work if needed.

Rental of Irrigation Facilities: Ten percent (10%) of the pumps in India are rental, and 63% of them are dredged wells, chub-wells with electric pump.

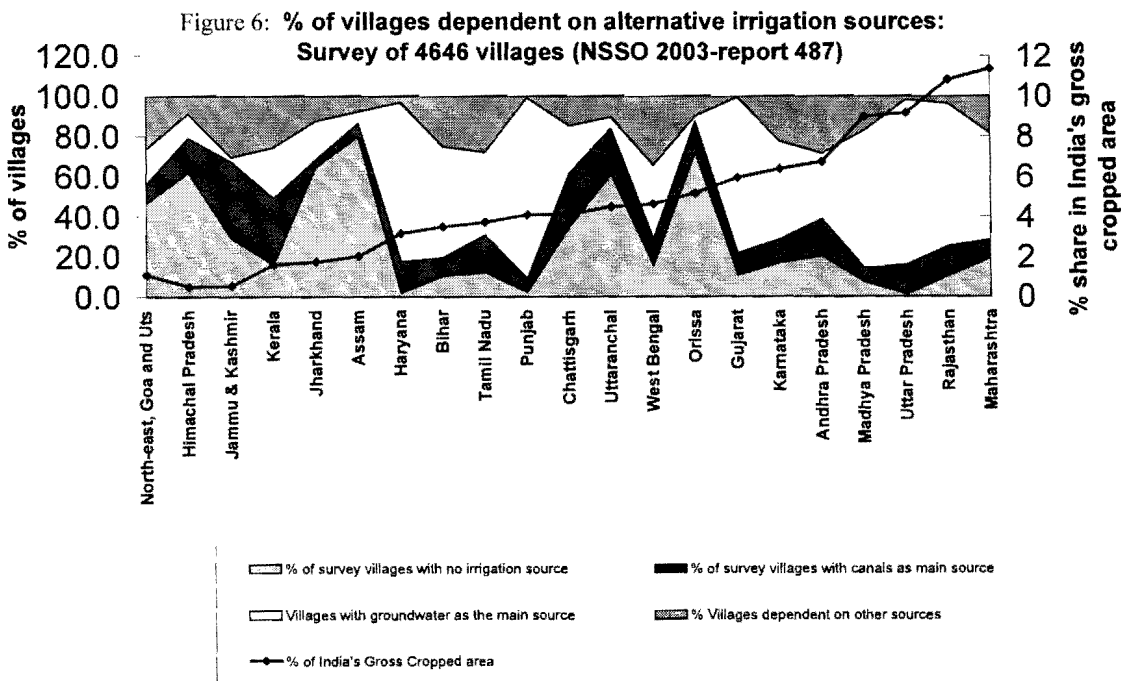
Underground Water Market: Underground water market was commenced in late 1960s. Fifty percent (50%) of the irrigated farm lands are provided irrigation water through underground water market in Gujarat and Uttar-pradesh. There are large gap on active area of water market from state to state, such as 80% of irrigated area in northern Gujarat, 60% in Uttar-pradesh, but less than 30% in Tamil-Nadu. The price of underground water is set several times higher than pump cost, so legal organization as well as local water diversion systems are needed to utilize ground water resources.

Characteristics and Dissemination of Management Evolution: Water Pricing Committee (1992), Private Participation Committee for large and middle scale Irrigation Project (1995), State Comprehensive Water Resource Development and Planning Committee (1997) are funded as state organizations to evaluate water policies and long term development plans. They are related to two policies of private sector participation to development of water resources and paradigm shifts from water development to water delivery management. Management transfer to field level, foundation of independent organizations in basin level and privatization of administrative organizations are main issues in state level, and several activities are conducted from state to state.

According to Shah T. (2005a), PIM isn't successful except in several model areas in India. Barker R. et al. (2004) also stated on future evolution of water management in India, that it would take several years or decades to enhance water rights and organization.

3. Conclusion

Current states of water use in field (village) level in India are as follows. Figure-6 shows the variety of irrigation in village level, such as villages with no irrigation source, villages with canal as main source, villages with groundwater as the main source, villages with dependent



on other sources with states-order sorted by total irrigated area in the states. Figure shows one of the characteristics of water resources in India as individual users are more than a half. Shah T. (2005a) stated on the characteristics that Integrated River Basin Management (IRBM) is impossible in India to apply without any management change on water resources, such as to be controlled by local organization, etc.

Water management in India defers from state to state. Organization and roles of water management is far from systematic, thus, sustainable evolution on organization is needed. Saleth R. M. (2004) pointed out the four reasons why evolution is expected.

First, although the observed changes are slow, partial, and inadequate, their direction and thrust are on desired lines.

Second, the nature and tenor of these changes indicate a clear commitment of the central and state governments to move ahead with the process of institutional change. This commitment is likely to be strengthened further by additional pressures from factors both endogenous and exogenous to the water sector.

Third, as the already initiated reforms begin to yield benefits, strengthen pro-reform constituencies, and reduce the technical and political costs of transacting additional reforms, the incentive balance within the institutional transaction cost framework is likely to move toward further reforms.

Finally, but, more importantly, since the path dependency properties of institutional change will ensure that it is costlier to return rather than to go ahead in the reform path, further reforms are more likely to be undertaken. Although the reform process can be delayed, it can neither be stopped nor reversed.

References

1. Anon (1988). Water Resources of India, CWC Publication No. 30/88, Central water Commission, Government of India, (as cited Paranjape, S. et al. (2004), Water: Sustainable and Efficient Use, p8-9).
2. Barker, Randolph and Molle, Fransoirs (2004). Evolution of Irrigation in South and Southeast Asia, Research Report #5, Comprehensive Assessment of Water Management in Agriculture (CA), IWMI.
3. Berkelaar Dawn (2001). SRI, the System of Rice Intensification: Less Can be More, EDN Issue 70, pp1-8.
4. Fujimoto, Naoya (2004). Diversity of Agricultural Water Management: An Analysis of the Policies in the People's Republic of China. Thesis submitted to the Faculty of Agriculture, University of Tokyo, for the degree of Doctor of Philosophy, Dept. of Agriculture.
5. Government of India (1992). Report of the Committee on Pricing of Irrigation Water, (as cited Paranjape, S. et al. (2004), Water: Sustainable and Efficient Use, p10-12).
6. Hussain, Intizar (2004). Poverty in Irrigated Agriculture: Realities, Issues, and Options with Guidelines, Pro-poor Intervention Strategies in Irrigated Agriculture in Asia, IWMI
7. Mohile, A.D. (2005). The evolution of Union Government policies and programs in water, Presentation at the 4th IWMI-Tata Annual Meet 2005, Anand, Gujarat State, India.
8. Paranjape, Suhas and Joy, K.J. (2004). Water: Sustainable and Efficient Use, Environment and Development Series, Center for Environmental Education, Ahmedabad, India.
9. Saleth, R. Maria (2004). Strategic Analysis of Water Institutions in India: Application of a New Research Paradigm, IWMI Research Report #79, IWMI.
10. Shah, Tushaar (2005). The Nature of India's Water Economy: Fitting Policy Reform to the Context. Paper #7 of Session 1 at the 4th IWMI-Tata Annual Meet 2005, Anand, Gujarat State, India.
11. Shah, Tushaar (2005-2). The Nature of India's Water Economy: Fitting Policy Reform to the Context. Presentation at the 4th IWMI-Tata Annual Meet 2005, Anand, Gujarat State, India.
12. Sinha, A.K. (2001). Sustainability of India's Water resources: Challenges and Perspectives, (as cited Paranjape, S. et al. (2004), Water: Sustainable and Efficient Use, p7-8).