

## **WATER & LAND MANAGEMENT INSTITUTE (WALMI)**

### **Background:**

Water, land and soil sustain life on Earth. These natural resources are integral parts of the environment which needs to be conserved and efficiently managed to enhance productivity, achieve economic growth and promote environmental quality. No nation can afford to squander or pollute these natural resources while using them in crop production or other activities. Drought, flood, cyclone and land degradation have been identified to be the major constraints that limit agricultural production in our country and bring misery to people. Hence increasing agricultural production per unit area and per unit volume of water with scientific management of water, land and soil has been accorded top priority. An integrated approach in sustainable development and management of water and land resources is, therefore, imperative to make success in State's efforts to alleviate poverty and mitigate the hardship of the masses. Under the above compelling circumstances, the necessity of establishing an Institution at State level was felt and as per advice of the Government of India, Water and Land Management Institutes (WALMIs) were established in most of the states during 1980's.

### **About the Institute:**

In Orissa, Water And Land Management Institute (WALMI) was established in the year 1984 and it functioned as an autonomous Institute in 1986 to impart advanced training in the areas of water and land management with a view to enhancing agricultural production. Currently, there are eight Faculty Members in various disciplines, viz. Civil Engineering with specialization in Irrigation



Engineering, Agricultural Engineering and Agriculture with specialization in Agronomy and Soil & Water Conservation and Sociology as against the sanctioned strength of fourteen Faculty Members in the Institute. Besides, there are six Assistant Research Officers in the disciplines relating to Irrigation Engineering and Agriculture to undertake action research. The institute is well equipped with requisite infrastructure, which includes 4 class rooms (2 lecture halls each with a capacity to accommodate 40 trainees and other 2 lecture halls for 80 farmers each), a conference hall for 32 participants, an Auditorium to accommodate 250 persons and a library with a stock of more than 3000 Textbooks, 11 Journals, 20 Periodicals and 10 Newsletters, an indoor Hydraulic Laboratory, Soil Testing Laboratory, Computer Lab and Hostels to accommodate about 200 participants, besides transport and other facilities. The Institute functions under the administrative control of its Governing Council with the Commissioner-cum-Secretary to Government, Department of Water Resources as its President and Director WALMI as its Member Secretary. The Governing Council comprises senior level officers from the Departments of Water Resources, Finance, Agriculture, OUAT, CADA, WTCER, XIMB and

CRRRI. The institute is located at Pratapnagari, about 7 km to the South of Cuttack and 17 km North of Bhubaneswar on National Highway 5.

**Objectives:**

1. To provide inservice training of multidisciplinary nature to the personnel engaged in Irrigated Agriculture.
2. To undertake action & adaptive research pertaining to irrigation project commands on land, water and crop management.
3. Providing consultancy services, publication of literature, holding seminars and workshops etc. and organize farmers' training programmes, especially, the capacity building of Pani Panchayats and other Farmers' Organizations of Orissa.

**Activities:**

The Institute imparted trainings and conducted action research in the fields of (i) Irrigation Engineering and Management (ii) Drainage Engineering (iii) Water Resources Development and Management (iv) Agricultural Planning and Management (v) Watershed Development and Management (vi) Participatory Irrigation Management and (vii) Land Development. Apart from training the Institute has also undertaken micro-planning, entry point activities and action research in adopted Pani Panchayats.

In pursuance of the State Water Policy 2007, strengthening of WALMI was initiated in order to build it as a center of excellence. As per the decisions of the Governing Council the following few steps were taken in this direction.

- (i) The post of Director was filled up through open advertisement and selection by DOWR.
- (ii) WALMI developed collaboration with appropriate NGOs viz. Cooperative Outreach of India (COI), Heifer International, Agragami etc to strengthen social component of training.
- (iii) WALMI also collaborated with other institutions including the Institute of Agricultural Management and extension, Krishi Bigyan Kendras of OUAT, OLIC to achieve the higher target of capacity building of Pani Panchayats of Orissa.

The Institute has also developed linkages with WTCER, CRRRI, OUAT, etc. for successfully carrying out its training, action research and adaptive research on water and land management. Besides, training is also imparted to the stakeholders of PIM through GRAMSAT programme and exposure visit to other States.

**Training**

Categories of training imparted by WALMI with subject matter covered and with duration of training are given in Table-1. During last 25 years (1984-85 to 2008-09), the Institute has imparted trainings to 33,875 persons comprising 15,853 Government officers belonging to Water Resources & Agriculture Departments and 18,022 farmers belonging to different irrigation commands of the State(Table- 2). Out of the above, during 2008-09, 147

training programmes were conducted and 992 employees of Govt. and 3568 office bearers of Pani Panchayats from different irrigation projects including 79 farmers and 20 officers from other States were trained. The details are given in the Table- 3.

**Duration of Training Courses conducted for different categories of stakeholders**

SI No	Type of Training Courses	Duration		
		Officers	Farmers	NGO & Others
1.	Water and Land Management	1 to 4 week	1 week	-
2.	Participatory Irrigation Management (Pani Panchayat)	1 to 6 days	1 to 7 days	7 days
3.	Hydraulic Design of Irrigation Structures	3 to 6 days	-	-
4.	Command Area Development, Micro Dis-net Planning, On-farm Development.	3 to 6 days	3 days	-
5.	Construction Planning & Management	3 to 7 days	-	-
6.	Administrative & Financial Management	3 days	-	-
7.	Performance Monitoring & Evaluation	3 days	-	-
8.	Environmental Management	1 to 3 days	-	-
9.	Operation & Maintenance	1 week	1 week	-
10.	Crop Planning/ Package of Practices	3 to 7 days	4 days	-
11.	Watershed Management & Soil Water Conservation Management/ Catchment Treatment	3 to 7 days	4 days	4 days
12.	Benchmarking of Irrigation Projects/ Diagnostic Studies.	3 to 7 days	-	-
13.	Drainage Engineering & Management.	3 to 7 days	-	-
14.	Enhancing project efficiency, Benchmarking & Water Auditing	1 to 3 days	-	-
15.	Drought and flood management	2 to 3 days	-	-
16.	Personal leadership and communication skill development	1 to 3 days	-	-
17.	Orientation/ Induction training on irrigation engineering, water management and office management including finance	21 to 30 days	-	-

**Year-wise Trainings Conducted By WALMI**

Year	No. of trainings conducted	Govt. Employees (No)	Farmers (No)	Total (No)
Upto 3/93	91	2323	1128	3451
1993-94	18	349	58	407
1994-95	19	437	29	466
1995-96	39	537	32	569
1996-97	48	1115	189	1304
1997-98	46	804	663	1467
1998-99	48	757	538	1295
1999-00	31	415	665	1080
2000-01	79	1394	1507	2901
2001-02	64	965	1409	2374
2002-03	72	1196	1459	2655
2003-04	77	1692	1923	3615
2004-05	53	1703	658	2361
2005-06	03	87	-	87

2006-07	21	188	729	917
2007-08	125	899	3467	4366
2008-09	147	992	3568	4560
Total	981	15853	18022	33875
<b>Target for 2009-10</b>	<b>198</b>	<b>2920</b>	<b>8240</b>	<b>11160</b>

During 2008-09, the Institute organized four Inter-State training-cum-visit programmes. Farmers and Government Officials from Uttar Pradesh and Tamil Nadu participated in the training and visited different irrigation projects and Research Institutes located in the State. Altogether 99 participants were attended in these training programmes. They made interaction with the office bearers of Pani Panchayats on the functioning of PIM Orissa. Besides, 315 newly recruited Junior Engineers of DOWR were trained through Orientation and Induction training programmes. Apart from these trainings, senior level Engineers of DOWR, Agriculture Engineers and Agriculture Officers of Directorate of Agriculture and CADA were also trained on various aspects of Water Resource Development and Management and Sustainable Agriculture. During 2008-09, greater thrust was laid on capacity building of office bearers of Pani Panchayats in order to achieve success in implementation of Participatory Irrigation Management (PIM) in Orissa.

### **DECENTRALISED TRAINING**

During 2008-09, it was decided to impart capacity building training to 20,000 office bearers of Pani Panchayats (PPs) of Orissa. Even with renovation and augmentation of infrastructural facilities, WALMI is in a position to train only about 10,000 office bearers of PPs besides around 3000 Engineers and Agriculture Officers. In order to impart training to the remaining 10,000 office bearers of PPs, it was planned to seek collaboration of other training Institutes of State Government/ Universities viz. Krishi Vigyan Kendras (KVKs) of OUAT and Institute for Management of Agricultural Extension (IMAGE) and Regional Training Institutes for Extension (RITE) under the Department of Agriculture. To achieve the huge target of capacity building of Pani Panchayats of Orissa an integrated approach by DOWR, WALMI and collaborating Institutes have been adopted. In addition to this a faster mode of capacity building of office bearers of Lift Irrigation Pani Panchayats through use of instructional films has been planned.

### **Training in collaboration with KVKs**

In 2008-09 a KVK-wise and month-wise training schedule was prepared to train at least one batch of 30 office bearers of Pani Panchayats (Major, Medium and Minor) in each month in each KVK. For this purpose 15 KVKs and corresponding Major, Medium irrigation circles and Minor irrigation divisions have been identified. The training commenced from February, 2009. In this programme 192 office bearers of PPs were given training on PIM in 8 batches.

### Training in collaboration with OLIC Ltd.

WALMI – OLIC collaborative decentralized training programme has been planned to impart training to office bearers of large number of L.I. Pani Panchayats of the entire State. For this purpose training manual dealing with various aspects of PIM has been compiled and published by WALMI. Three instructional films have been produced covering the topics on PIM, operation and maintenance of L.I. points and technologies for agricultural productivity enhancement through efficient water management. A memorandum of Understanding has been developed and after execution of the agreement between WALMI and OLIC, the audio-visual training in all the L.I. Sub-Divisions of Orissa will commence in 2009-10.

### Achievements made by WALMI, Orissa during 2008-09 and programme for 2009-10

Category of training	Achievements in 2008-09				Target for 2009-10			
	No. of trainings conducted	No. of participants trained			No. of trainings to be conducted	No. of participants to be trained		
		Officers	Farmers	Total		Officers	Farmers	Total
National level training for senior level officers	-	-	-	-	3	90	-	90
Capacity building of office bearers of Pani Panchayats and J.Es	111	390	3297	3687	99	865	6840	7705
Capacity building of WR engineers and agriculture officers of Pani Panchayats and J.Es	18	267	-	267	35	1175	-	1175
Induction/ Orientation of newly recruited engineers of DOWR	6	315	-	315	2	100	-	100
Training for OCTMP (World Bank Asst.)	-	-	-	-	59	690	1400	2090
Training for OIIAWMIP (ADB Asst.)	-	-	-	-	Yet to be finalized			
<b>Sub Total</b>	<b>135</b>	<b>972</b>	<b>3297</b>	<b>4269</b>	<b>198</b>	<b>2920</b>	<b>8240</b>	<b>11160</b>
Inter-state exposure visit & training	4	20	79	99	-	-	-	-

Decentralized training of office bearers of PPs of Major, Medium and Minor IPs through KVKs	8	-	192	192	180	-	5400	5400
Decentralized training of office bearers of L.I. PPs through audio-visual mode	-	-	-	-	560	152	22400	22552
<b>Grand Total</b>	<b>147</b>	<b>992</b>	<b>3568</b>	<b>4560</b>	<b>938</b>	<b>3072</b>	<b>36040</b>	<b>39112</b>

### Action Research Activities during 2008-09

Action research was undertaken in Indravati Irrigation Project (Left), Indravati Irrigation Project (Right), Upper Kolab Irrigation Project (Right), Rengali Right Main Canal and Bhairpur Branch Canal on PIM with the financial assistance received from the Project Authorities. Twenty six Pani Panchayats were formed. The details of status of Pani Panchayat formation are given in the table below.

#### Formation of Pani Panchayats in different projects during 2008-09

	Area (ha) Proposed	Target (No of PPs)	Achievement			No of DCs Formed	Remarks
			Upto 07 - 08	During 08 - 09	Cumulative		
Upper Kolab IP	28392	72	48	19	67	3 Nos	
Upper Indravati IP (Mukhiguda)	22133	53	46	7	53	5 Nos	Completed
Upper Indravati IP (Kusumkhunti)	22000	60	60	-	60		Completed
Bhirpur Branch Canal, Rengali IP	12100	26	26	-	26	1 No	Completed
Left Branch Canal- II, Ph -1, Rengali IP	14600	27	27	-	27	1 No	Completed
<b>Total</b>	<b>99225</b>	<b>238</b>	<b>207</b>	<b>26</b>	<b>233</b>		

### Entry Point Activities (EPA)

Entry Point Activities were taken up in the JBIC assisted projects, such as Upper Kolab Irrigation Project and Upper Indravati Irrigation Project. Accordingly, two Pani Panchayats viz. Radhakrishna Pani Panchayat and Birabhairaba Pani Panchayat were selected on pilot basis for micro-planning and implementation of Entry Point Activities, such as Water Management, Capacity Building, Micro-Credit Mechanisms and livelihood improvement plans through Water Users' Associations/ Pani Panchayats. After successful completion of the pilot schemes, WALMI was entrusted to take up entry point activities of 8 other Pani Panchayats in Rengali Irrigation

Project. Mass awareness meetings in collaboration with the project Authorities along with JICA members have been conducted to finalize the target Pani Panchayats for taking up the programme in Bhairpur Canal Command.

### Adaptive Research

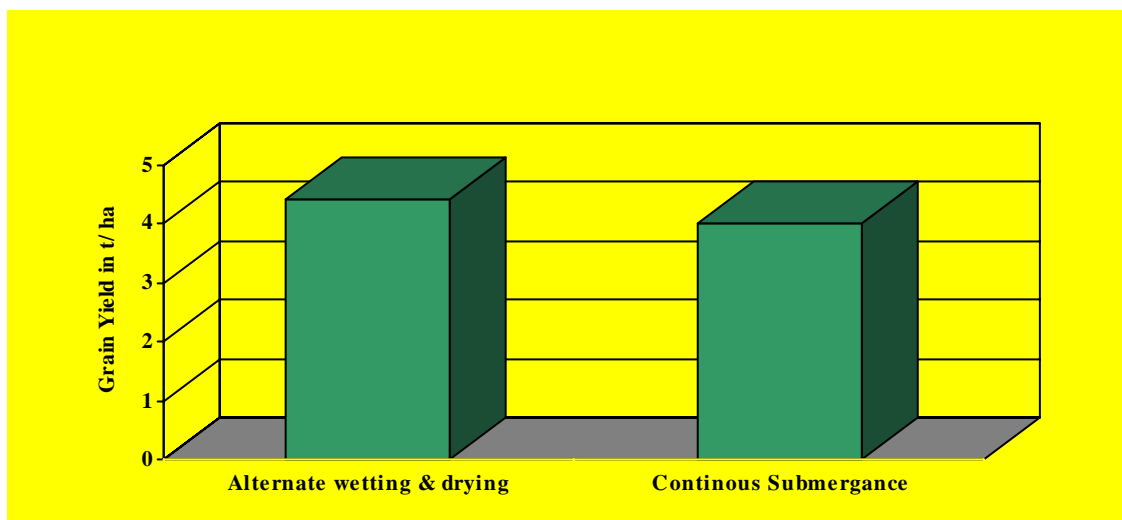
Baseline surveys in four Pani Panchayats of Lift Irrigation Projects namely Gopinath Jew Pani Panchayat, Bahalpada-LIP- III Pani Panchayat, Maa Ambika Pani Panchayat, Bawaja Pani Panchayat have been completed. Further, soil samples were collected from these adopted L.I. Projects and analyzed in WALMI laboratory for balanced application of fertilizer in crop to be grown in the command areas.

### Research & Demonstration

During 2008-09, six field experiments and demonstrations were conducted in the farm of WALMI both in Kharif and Rabi seasons. Highlights of the research results are given below.

1. **Effect of water and fertiliser nutrient management on water productivity and yield of hybrid rice (Kharif season of 2008 -09).**

**Fig 1. Effect of Water management practices on yield of hybrid rice**



- There occurred a 10% rise in rice productivity with alternate wetting & drying over continuous submergence. (Fig.1)
- In the practice of alternate wetting & drying there was also a saving of 4cm of irrigation water. (Table 5)

### Results of field experiments on water saving technology in hybrid rice (Kharif 2008-09)

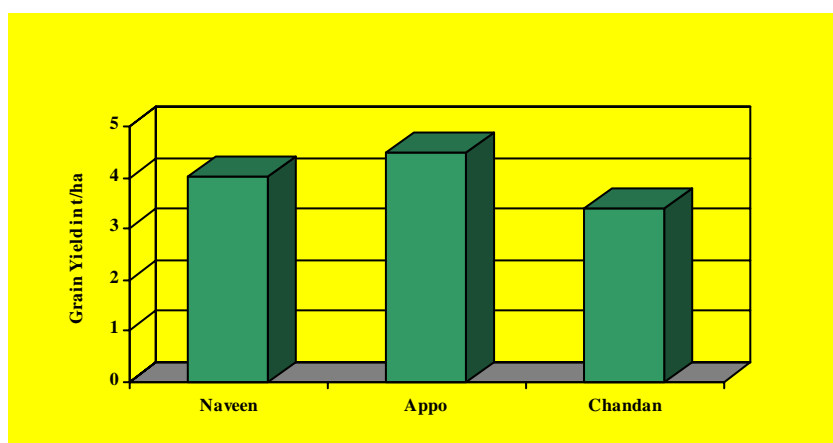
Treatment	Rainfall (cm)	Irrigation applied (cm)	Total
Continuous submergence	62.0	9.0	71.0
Alternate wetting & drying during dry-spells	62.0	5.0	67.0

- Among the fertilizer treatments, highest grain yield of 4.74 t/ ha was obtained with balanced application of nitrogen, phosphorus, potash, sulphur, zinc and farmyard manure which was immediately followed by the treatment receiving nitrogen, phosphorus, potash, sulphur, zinc, and green manure.

## 2. Demonstration of aerobic rice cultivation (Kharif 2008-09).

- Rice variety, Naveen took 115 days, Appo 110 days and Chandan 125 days to mature under the aerobic rice cultivation practice.
- Among the varieties the IRRI variety Appo produced the highest yield of 4.5 t/ha with a rainfall of 90.7 cm received during the crop growth period (Fig 2). No supplementary irrigation was required as the rainfall was adequate.

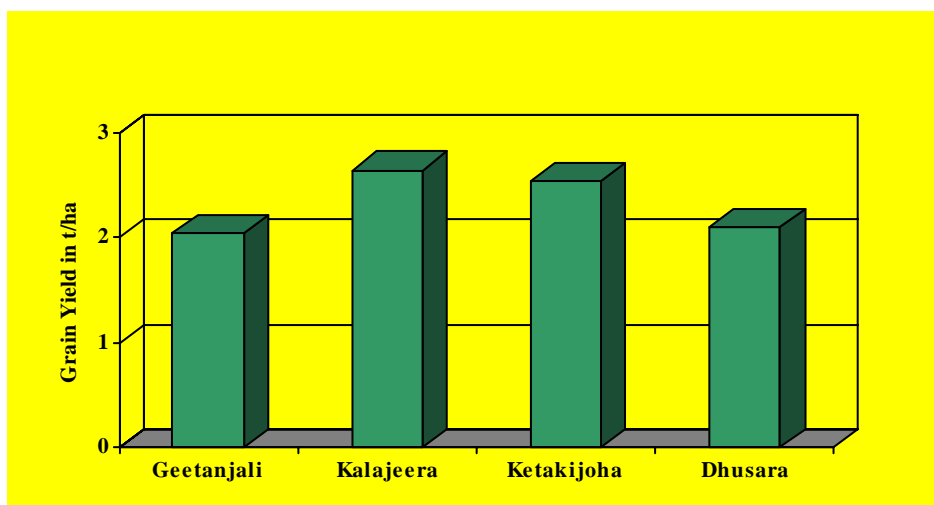
**Fig 2. Comparative efficiency of different high yielding varieties of rice grown with aerobic rice technology**



## 3. Demonstration of organic scented rice cultivation (Kharif 2008-09).

- Dhaincha crop accumulated 73.5 Kg N/ ha from 3 sources viz. soil, farm yard manure (10t/ ha) and biological nitrogen fixation from air and ultimately after incorporation into soil, it provided nutrition to organic scented rice.
- Scented rice variety Geetanjali took 135 days, Kalajeera 155 days, Dhusara 155 Days and Ketakijoha 155 days to mature.
- Among the four scented varieties grown under organic farming practice, Kalajeera gave the highest yield of 2.65 t/ ha ( Fig 3).

**Comparative efficiency of different scented rice varieties grown under organic farming technology**



**4. Effect of Water and nutrient management on water productivity and yield of sunflower in Rabi 2008-09**

- There was a marginal rise in seed yield of sunflower cv. Suryarekha with the irrigation given at 10 days interval over the irrigation provided at critical stages of crop growth i.e. at presowing, 20 days after germination, buttoning, flowering and seed setting. There was however a saving of 5.6 cm of water with the latter practice.

**Results of field experiments on water saving technology in hybrid sunflower (Rabi 2008-09)**

Treatment	Rainfall (cm)	Irrigation applied (cm)	Total (cm)
Irrigation at 10 days interval	0	16.8	16.8
Irrigation at critical stages of crop growth	0	11.2	11.2

- Among the fertiliser treatments, highest seed yield of 1.41 t/ha was obtained with balanced application of recommended doses of nitrogen, phosphorus, potash, sulphur and boron which was immediately followed by treatment receiving nitrogen, phosphorus, potash and farmyard manure.

**5. Experiment on development of water saving technologies in rice (Rabi rice 2008-09).**

- There was a saving of 9.7 cm of water with System of rice Intensification (SRI) practice over the normal practice of transplanted rice cultivation, the yield difference between these two practices being non-significant under the condition of sandy soil texture.

**6. Demonstration on Dhaincha green manure – rice – black gram – sesamum multiple cropping with organic farming**

- It was possible to grow all the four crops in a sequence during the year 2008 – 09. No supplementary irrigation was required for dhaincha green manure crop and rice for which rainfall received during Kharif season was adequate. For Black gram 10.5 cm and for sesamum 19.5 cm water was applied. So with the limited supply of irrigation water it is possible to raise four such crops even in light textured soil.

**FINANCE**

During the year 2008-09, the Institute received Rs.235.33 lakh under Non-Plan and Rs.450 lakh under Plan Head as Grant-in-Aid from State Government to meet the expenditure on Establishment, Training, Action Research, field experiment on water management, infrastructure development and maintenance of the Institute. In addition to the above, WALMI received funds from other organizations such as Ministry of Water Resources, Government of India and Irrigation Project Authorities of Orissa Government by taking up specialized national and state level trainings, research oriented work such as Performance Evaluation Study, formation of Farmers' Organisations and Entry Point Activities of selected Pani Panchayats.