

NEED FOR ON THE JOB TRAINING FOR IRRIGATION ENGINEERS

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1. HUMAN NEEDS

The social scientist A.H.Maslov (1954) has divided human needs into two sectors, the basic or primary i.e. living needs and the secondary i.e. human development needs. Some of the basic needs which are felt by every living being throughout the life span are hunger, thirst, sleep, safety and security. Directly or indirectly water has become the life chord of human existence satisfying all the mentioned needs. The science of water on the earth i.e. hydrology thus persist to meet our needs. It is important to note that hydrology plays an important role in preservation of life.

2. POPULATION PROBLEM

It is a common knowledge now-a-days that our country's population shall cross one billion mark in the beginning of coming century and with our present resources and stage of development we can not sustain such a big population. The irrigated agriculture had so far been our main stay and the frontiers of new cultivated land on which we were depending hitherto, are getting exhausted in response to our ever increasing and competitive other demands of population industry and modern housing projects. This necessitates substantial increase in the agricultural production within limited land with better irrigation processes.

3. PRODUCTION DEMAND

A study has already been carried out in India by Brookling Institution, Washington, D.C. of U.S.A. which has indicated that average yield of irrigated wheat and rice the principal food grains must rise by nearly 70% i.e. from present yield of 1.6 to 1.7 Tonnes/Hectare to 2.7 to 2.8 Tonnes/Hectare as required in the year 2000 A.D. in order to mitigate hunger of the then population. Besides the cropping intensity under the irrigated agriculture should also rise from the present 125% to atleast 160%. This is a challenge and calls for renewed thinking in the direction of better utilisation of our water resources. The precepts are already available in our own country and we do not need to import new technology. In some parts of Punjab where better hydrological concepts are practiced almost double the average yield of the country has already been obtained. The countries which constantly upgrade their hydrological skills e.g. Japan and South Korea have done better by obtaining 3 times of our average yield.

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4. WATER UTILISATION

Ours is still a developing country as far as water utilisation is concerned. Only 40% of our national resource have so far been tapped by the irrigation projects. Setbacks in our irrigation development projects are caused by inter-state disputes, for-mulation of incomplete projects-all on hydrological grounds and also meager water resources spread over large areas. It is imperative therefore, that to increase the utilisation we need complete knowledge of hydrological technology. but also spreading durable knowledge of hydrology.

5. UTILISATION OF CREATED IRRIGATION POTENTIAL

Our present status of hydrological technology cannot be commended. The following table will readily indicate that till end of VI Plan we have incurred a lag of 5.2 million hectare at the utilisation end against the created potential of 31 million hectares from the surface water schemes.

TABLE - I

All figures in million hectares

Plan	Potential created to end of plan	Utilisation to end of plan	Lag in Utilisation.
1	2	3	4
SURFACE WATER SCHEMES			
Preplan	9.7	9.7	-
I-Plan (51-56)	12.2	11.0	1.2
II-Plan (56-61)	14.3	13.0	1.3
III-Plan (61-66)	16.6	15.2	1.4
Annual Plan (66-69)	18.1	16.8	1.3
IV-Plan (69-74)	20.7	18.7	2.0
V-Plan (74-78)	24.8	21.2	3.6
Annual Plan (78-80)	26.6	22.6	4.0
VI-Plan (80-85)	31.0	25.8	5.2

It is to be noted that initial lag of 1.2 million hectares, which was created at end of I plan persisted till end of the year 69 and thereafter from IV plan onwards there is a spurt in the lag. This situation is clearly indicative of a set back at our hydrological technology level, which discipline might have been overlooked at some level.

The total potential created from all sources i.e. surface and underground till end of VI plan is reckoned as 68.0 million

hectares and utilisation 60 hectares giving thereby a lag of 8.0 million hectares. This calls for fresh thinking for improving the situation at the utilisation end.

6. STATUS OF IRRIGATION PROJECTS

The necessity of imparting training at periodical intervals is being felt and stressed in various forums, planning commission etc. as most of the projects have not been managed in a proper manner due to lack of knowledge. By way of 'ILLUSTRATION' the position obtaining in the country is given in the following table.

TABLE - II

DESCRIPTION	POSITION	
(a) Projects taken up prior to VI Plan	(i) Major	205
	(ii) Medium	916
(b) Projects completed prior to 1980	(i) Major	29
	(ii) Medium	469
(c) Projects spilling over to VI Plan	(i) Major	176
	(ii) Medium	447

Amongst the major projects 11 continue from I plan, 13 from II plan, 24 from III plan, 30 from IV plan and the rest from V Plan.

Despite the above backlog country commended 150 major projects and 265 medium projects during VI plan itself.

It is implicit therefore that if these projects are to be successfully completed a better hydrological input is needed through training.

7. STATUS OF IRRIGATION ENGINEERS

It is estimated that there are some 1,60,000 irrigation engineers in India today, most of whom have received little or no 'on the job' training since entering their departments. Consequently most irrigation projects have suffered from deficiencies, poor designs, inadequate constructions and less better operations which situation could easily be remedied by proper 'on the job' training. Lack of knowledge leads to hazards and hazards not only incur huge losses which can be avoided but also 'will to work'.

To quote Dr. Sheodore Scottz statement here, 'the most important economical resource of irrigation development may not be financial capital or new schemes but the acquired abilities of the people to do the job properly, their knowledge, skills and professional commitments'.

Weimen (1976) also felt that 'Irrigation not only requires much larger capital input than other agricultural methods but also the heaviest inputs in trained and experienced human resource. The most critical resource in the low income nations are not only money, even talent of professional and sub-professional manpower'.

8. ON THE JOB TRAINING

On the job training of Irrigation Engineers at various levels may be divided into A, B and C type courses.

A. FORMAL EDUCATION PROGRAMMES

This is necessary to meet the long term professional needs. This may be imparted in:

- a) FOUNDATION COURSES in which modern theories and practices of hydrology should be apprised so as to bridge the gap between the field and academic Institution.
- b) SPECIAL SUBJECT COURSES for developing their skills, attitudes and their knowledge. It should be updated periodically by arranging follow up courses and providing literature by post.

B. REFRESHER COURSE

In order to apprise engineers with latest innovations and changing techniques and also to brush up their earlier knowledge these need to be arranged. The participants should be encouraged to share their field experience so that they make a worth while contribution at the field and develop better procedures.

C. APPRECIATION COURSES AND SPECIAL COURSES from experts of the country should be arranged for senior level officers and policy making level officers who need to develop better appreciation of situations, long range and short term effects of decision, multi-disciplinary effects etc.etc.,

9. INSTITUTIONS TO DO ON JOB TRAINING

In this part of country the State Engineers' Academy in U.P. established in 1980 is already conducting foundation courses and Refresher courses in which expert faculty is invited. Attempt is made to make the programme practice oriented. Faculty is solicited from Research Institutes and Institutions like W.R.D.T.C., University of Roorkee, National Institute of Hydrology so that full advantage may be taken by user of technology. In such courses the knowledge and experience at the field level is also getting transferred to the invited faculty which can modify improve or innovate the technology to varying needs.

However the responsibility of organising special courses and appreciation courses can be better discharged by prestigious institutions like National Institute of Hydrology, Roorkee.

10. AREA TRAINING

It can easily be appreciated that performance of several projects would have improved if a thorough prior technological study done and basin wise development resorted to instead of taking projects in isolation. It is also observed generally that operational practices do not respond to evolving agricultural patterns as well as ever changing conditions and requirements. The areas of on the job training in hydrological sciences may therefore be chosen from.

I. At Project Conception, Investigation Planning and Formulation Stage:

- (a) Determination of realistic estimates of seasonal and annual inflows, floods, Analysis of past data and formulation of futuristic estimates, Models etc.
- (b) Storage Studies - Storage should be economic and dependable and should be able to cater requirements of water supply irrigation, flood control etc. adequately.
- (c) Structural designs of hydraulic structures.
- (d) Hydrological consequences of Irrigation development, impact on social objectives conjunctive use etc. etc.
- (e) Operational studies. Causes and effects of operation on irrigated land use to sudden changes in demand due to flood drought, rainfall etc. as well as evolving multiuse pattern by system studies.

II. At Constructional Technology Stage

The experiences, of hydrological problem handling in (i) foundations (ii) river diversion (iii) floods (iv) dewatering and developing appropriate techniques.

III. At Maintenance Stage

- (a) Conveyance improvement
- (b) Dynamic regulation and arranging matching supply to crop requirement and also updating with changing requirement.

11. DETERMINATION OF TRAINING NEEDS

A training need exists where there is a gap between the current performance and the described project objectives.

This calls for skill analysis of the Engineers entrusted with projects. The problem felt these days is due to untrainable top, a confused middle and frustrated bottom. Too often training institutions have been opened simply because other departments are doing i.e. organisations tend to immitate one another. This faddish nature of training can be cured by systematically determining the training needs and periodically be carried out by very senior and experienced professionals who have actual experience on the job and who can distinguish grey areas.

Indira Ji had correctly recommended that the measure of plan is not intention but achievement, not allocation but benefits. The 7th plan therefore, correctly lays emphasis on training i.e. sensitising governmental personnel at all levels for development of required attitude, soft ware development, use of various media such as correspondence courses, news paper articles, television to take training to door step of trainees and appreciation of effort by public.

12. ACKNOWLEDGEMENT

This paper has freely utilised information from learned deliberations at S.E.A, Kalagarh and WALMI, Okhla, which are thankfully acknowledged.