

REPORT
OF THE
WORKING GROUP
FOR FORMULATION OF
FOURTH FIVE YEAR
PLAN PROPOSALS
ON
MINOR IRRIGATION



MINISTRY OF FOOD & AGRICULTURE
DEPARTMENT OF AGRICULTURE
GOVERNMENT OF INDIA

LIST OF CONTENTS

	PAGES
Report	vi—viii
PART I	
SCOPE, PERFORMANCE AND PROSPECTS	
Constitution—Constitution and proceedings of the Working Group	1—5
Irrigation—Concept, Scope and Benefits	6—10
Irrigation Schemes—Salient technical features and scope	11—21
Progress	22—63
for further development	64—72
PART II	
TECHNICAL AND ORGANISATIONAL ASPECTS	
Investigations	73—78
Implementation—Technical considerations	79—87
Implementation—Administrative measures	88—95
of Completed Works	96—103
of Irrigation Potential	104—108
of Irrigation Benefits—Methodological Problems	109—117
PART III	
TARGETS	
for the Fourth Five Year Plan—in the perspective of the 10-Year's period	118—141
of financial assistance to Minor Irrigation Schemes in the Fourth Year Plan	142—147
.	148—150
.	151—153
water exploration	154—158
materials	159—166
plant and Machinery	167—176 1.00
in which necessary	177—181 2.50
APPENDICES	
Territory-wise detail of the programme proposed for the Fourth Five Year Plan	9.50
of the All India Mines Irrigation Commission in the Report.	

SUMMARY OF THE

SCOPE OF MINOR IRRIGATION (I & III)

Minor irrigation comprises 22 different types of schemes classified in Chapter I. Besides irrigation schemes, the programme also includes items, such as, drainage, flood protection, anti-sea water intrusion and water conservation-cum-groundwater recharge schemes. The scope and the technical features of the schemes are described in Chapter III.

PROGRESS (CHAPTER IV)

The progress attained on minor irrigation during the First and the Second Five Year Plans and anticipated achievement during the Third Five Year Plan according to the present trends has been analysed in Chapter IV, State-wise into various categories of benefits, such as, new irrigation, Old irrigated area over which irrigation is improved or made more certain, areas benefited by non-irrigation items, etc. The figures are given below:—

	First Plan	Second Plan	Third Plan
(Rs. in crores)			
<i>Financial outlay</i>			
(i) G. M. F. Sector	85	95	249
(ii) C.D. Sector	45	57
(iii) Cooperative Sector (Land Mortgage Banks)	50
TOTAL	85	140	356
(in million acres)			
<i>Physical progress</i>			
(i) New irrigation			
(a) Surface water	2.30	2.20	2.48
(b) Ground-water	2.20	3.00	6.70
TOTAL	4.50	5.20	9.18
(ii) Old area over which irrigation is improved	1.50	1.80	2.05
(iii) Area benefited by water conservation-cum-groundwater recharge schemes	1.00	0.70	0.81
(iv) Area benefited by drainage flood protection and anti-sea water intrusion works	2.50	1.30	0.9
GRAND TOTAL	9.50	9.00	9.94

Estimated at Rs. 45 crores.

as
ior
as
si-
ies
si-
ing
tion,
be
s for
of
erat-
tems
hat
oup
ame
t the
and
the
een
plan
red at
a
C).
their dis-
es
on
s
ical pump-
extended;
here cheap
illion acres
1.2 million
s in the GMF
crores from the
Mortgage Banks.
the Fourth Five Year
estimated at Rs. 45 crores.

PROSPECTS FOR FURTHER DEVELOPMENT (CHAPTER V)

Technological prospects for further development of minor irrigation have been worked out in Chapter V as exhaustively as possible under the present state of investigations, data and information available. The study places the long-term potential for minor irrigation development as 75 million acres (gross), 30 million acres from surface water and 45 million acres from groundwater sources. The actual level of development expected to be reached at the end of the Third Five Year Plan is 49·84 million acres, 24·10 million acres from surface water and 25·74 million acres from groundwater.

TECHNICAL AND ORGANISATIONAL ASPECTS (CHAPTERS VI TO XI)

The various technical and organisational aspects of the minor irrigation programme have been discussed in detail in Chapter VI to XI. The up-to-date position obtaining in different States has been indicated. The most important measures or directions in which concerted efforts are required to be made by most of the States are as under:—

1. Strengthening the existing organisations for surveys and investigations, particularly for assessing groundwater potentialities and opening out fresh groundwater worthy areas and preparing basin-wise integrated master plans—formulating specific schemes for surveys and investigations;
2. Imparting greater technical bias in planning and implementation of minor irrigation schemes by (a) intensifying research and training programme (b) undertaking preparation of technical manuals and literature on minor irrigation schemes and arranging increased dissemination of technical knowledge on the subject, and (c) follow-up action on all important technical recommendations on various schemes that have been made from time to time and are summarised in Chapter IX;
3. Strengthening the existing organisations for providing technical guidance on groundwater schemes, particularly on such items as design, size and spacing of open wells and tubewells and selection of water lifting appliances;
4. Entrusting the work of planning and preparing annual State plans on integrated basis and according to phased priorities indicated in the long-term master plans, only to one technical agency at the District level and ensuring full cooperation of other technical agencies in preparing these plans;
5. Improving arrangements for maintenance of completed irrigation works—need for departmental maintenance of small group works until they are transferred to the Panchayats and the Panchayats are equipped with financial, statutory and technical requisites for carrying out the maintenance;
6. Improving assessment of irrigation benefits—adopting standard classification of schemes; clear appreciation of various terms used; undertaking regular sample surveys or evaluation of yardstick adopted; improvement in collecting and reporting Land Utilisation Statistics.

TARGETS FOR THE FOURTH FIVE YEAR PLAN (CAPTER XII)

Recognising the need for development of minor irrigation facilities as quickly as possible, it has been desired that the physical target for minor irrigation during the Fourth Five Year Plan should be set up as high as is considered feasible from the techno-economic and organisational considerations. The scheme-wise targets for different States and Territories for the Fourth Five Year Plan have been formulated, taking into consideration the following factors:—

- (i) the administrative and organisational arrangements obtaining in various States for surveys and investigations, execution, maintenance and utilisation of minor irrigation works;
- (ii) the directions in which fresh or increased efforts need to be made to strengthen and gear up the existing organisations for taking up the Fourth Five Year Plan;
- (iii) Tempo of the programme likely to be built up at the end of the Third Five Year Plan;
- (iv) Appropriate rate at which the tempo may further be accelerated during the Fourth Five Year Plan keeping in view items (i) and (ii) above.

Considering the organisational problems and the volume of efforts that would have to be made for effecting improvements, the Working Group is of the view that pace of acceleration of the minor irrigation programme during the Fourth Five Year Plan should not be too fast in order that the organisational efforts need may catch up with the accelerating tempo and technical and administrative control is assured in implementation of the programme.

From techno-economic considerations, special emphasis has been given on the following schemes in framing the Fourth Five Year Plan targets:—

1. Renovation of derelict tanks which still remain unrestored at the end of the Third Five Year Plan;
2. Construction of open wells;
3. Boring and deepening of existing wells to augment their discharge;
4. Installation of power pumps, particularly the electrical pump-sets in areas where cheap hydro-electric power is extended;
5. Construction of small tubewells;
6. Lift irrigation from rivers and streams in areas where cheap hydro-electric power is available.
7. Groundwater recharge schemes.

The total all-India target for minor irrigation comes to 16 million acres made up of 14·8 million acres under the GMF Sector and 1·2 million acres under the C.D. Sector. The target of 14·8 million acres in the GMF Sector would be linked up with the provision of Rs. 460 crores from the Governmental source and Rs. 125 crores from the Land Mortgage Banks. Under the C.D. Sector, the anticipated outlay during the Fourth Five Year Plan on the basis of the schematic budget is estimated at Rs. 45 crores.

The total target would include 12·06 million acres of new irrigation (3·60 million acres from surface water schemes and 8·46 million acres from groundwater schemes), 1·92 million acres of irrigated area over which irrigation is improved, 1·02 million acres benefited by water conservation-cum-groundwater recharging schemes, 1·00 million acres of area benefited from drainage, flood protection and anti-sea water intrusion works.

INCREASED ACCENT ON GROUNDWATER DEVELOPMENT (CHAPTER XII)

There has been increased emphasis on groundwater development under the minor irrigation during the Third Five Year Plan. Whereas during the Second Five Year Plan the groundwater schemes accounted for 33 per cent of the total physical achievement, the percentage is likely to increase to 51·60 during the Third Five Year Plan. This trend is accounted for mainly by the facts that the overall potentialities for development of minor irrigation are more from groundwater than surface water and that the lift irrigation from groundwater has certain advantages over flow irrigation from canals. It is expected that the trend towards increased groundwater development would continue during the Fourth and the subsequent Five YEAR PLANS.

PATTERN OF FINANCIAL ASSISTANCE PROPOSED FOR THE FOURTH FIVE YEAR PLAN (CHAPTER XIII).

Considering such factors as (a) expansion in targets proposed for the Fourth Five Year Plan, (b) rise in the cost of pumping equipment, (c) increase in the cost of diesel oil due to imposition of excise duty, (d) comparatively unfavourable economics of lift irrigation in general due to high recurring cost, (e) need for providing greater incentive to cultivators for realising the increased targets, and (f) urgency for intensifying surveys and investigations, a more liberal pattern of financial assistance is proposed for the schemes during the Fourth Five Year Plan as indicated in Chapter XIII. The main points recommended are that :—

- (i) 25 per cent subsidy should also be extended for schemes of diesel pumpsets, persian wheels, tube-wells, lift irrigation from rivers and streams;
- (ii) the quantum of subsidy should be increased to 50 per cent in backward areas;
- (iii) Central subsidy should be re-introduced for survey schemes at the rate of 50 per cent of the total cost; and
- (iv) 100 per cent Central grants should continue to be given for the schemes of research and training.

PROPOSED RESEARCH AND TRAINING PROGRAMME (CHAPTER XIV & XV).

Two schemes, one on research and other on training of minor irrigation and water use were initiated during the Third Five Year Plan. With increased emphasis on minor irrigation and irrigated agriculture, it is proposed to intensify both these schemes during the Fourth Five Year Plan. In addition, it is proposed to initiate an additional training programme for imparting training on the subject of surveys and investigations for groundwater utilisation. The financial requirements for research and training programme during the Fourth Five Year Plan are estimated at Rs. 1·50 crores, Rs. 90 lakhs for the training programme and Rs. 60 lakhs for the research.

PROGRAMME FOR GROUNDWATER EXPLORATION (CHAPTER XVI)

The exploratory programme in the Fourth Five Year Plan will be directed towards assessing the groundwater resources in the semi-consolidated and consolidated formations and also in the left-over alluvial tracts including bouldery terrain (intermontane valleys). For this purpose the fleet of drilling equipment on hand is proposed to be replaced and reinforced as found necessary. A Geophysical Wing is proposed to be set up in the Organisation. The Exploratory Tubewells Organisation will also take up field investigations with regard to rehabilitation of State-owned sick tubewells and on the job training of drillers and groundwater technicians. The estimated expenditure on the Exploratory Tubewells Organisation in the Fourth Plan is expected to be of the order of Rs. 400 lakhs gross, out of which a sum of Rs. 140 lakhs may be recovered from the State Governments the sale of successful exploratory wells. The net expenditure may thus be of the order of Rs. 260 lakhs.

The Organisation also proposed to undertake construction of 1,500 production tubewells in the Fourth Plan on behalf of the State Governments. This involves an initial outlay of Rs. 140 lakhs on establishment, for purchase of equipment, etc. The operational charges are recoverable from the State Governments concerned.

Negotiations are being made with the U.N. Special Fund for the establishment of a Water Resources Basin Management Training Institute. It is likely that a provision of Rs. 100 lakhs would be needed on this account.

REQUIREMENT OF KEY MATERIALS AND EQUIPMENT (CHAPTERS XVII & XVIII).

The requirement of cement for realising the proposed target works out at 44 lakh tonnes, of coal 26 lakh tonnes, of steel 1.5 lakh tonnes and of diesel oil 3 million tonnes. The requirement of equipment and machinery comprising drilling rigs 400 Nos., air compressor units 425 Nos., moving 370 items including scrapers, power shovels, dozers and tractors 200 lakh running feet; electric motors 3.1 lakhs in Nos. and diesel engines 2 lakhs in number. The total equipment would involve a foreign exchange component of Rs. 16.50 crores.

IMPORTANT MEASURES FOR URGENT ADVANCE ACTION (CHAPTER XIX).

The Fourth Five Five Year Plan proposals envisage about 2—4 times acceleration on the following schemes which would contribute to 5.7 million acres of new additional irrigation out of the total target of 12 million acres (new additional irrigation).

Sl. No.	Name of the scheme	Third Plan estimated achievement	Fourth Plan target
1.	Boring of wells (Nos.)	1,25,687	2,07,920
2.	Deepening of wells (Nos.)	99,549	1,99,000
3.	Electric motor pumpsets (Nos.)	72,960	2,40,580
4.	Diesel engine pumpsets (Nos.)	76,306	1,27,960
5.	Private tubewells (Nos.)	11,925	38,880
6.	Lift irrigation from rivers and streams (acres)	2,75,990	4,46,500

In order to ensure that the proposed target is fully realised, urgent advance action is necessary in implementation of the following important measures :—

1. Fast acceleration of tempo of surveys and investigations, particularly on groundwater schemes with a view to (a) delineating new groundwater-worthy area, (b) establishing full potentialities of the already proven areas so that over-draft of groundwater and the consequent lowering of the water table and failure of wells is avoided, (c) preparing basin wise/district-wise integrated master plans which would enable to take up the programme on a priority basis and in coordination with different categories of schemes, so that there is integrated development of irrigation resources without any duplication of efforts, and (d) collecting hydrological and geological data and preparing contour maps for enabling projection and preparation of designs and construction details of the individual schemes—preparation of specific survey schemes for the purpose by the States and making available 100 per cent grant-in-aid for these schemes by the Centre during the remaining period of the Third Five Year Plan;
2. Expeditious strengthening of the technical organisation in the States for undertaking accelerated programme of boring and deepening of wells, installation of pumpsets and advising the cultivators on location, size and design of open wells and choice of water lifting appliances including pumpsets;
3. Stepping up the tempo of the training programmes;
4. Providing incentive to the cultivators for taking to lift irrigation works by (a) liberalising terms and conditions for sanction of electric power to the irrigators and charging concessional or subsidized rates for the electricity consumed as recommended in Chapter VIII, (b) extending benefit of subsidy to schemes of pumpsets, tubewells and lift irrigation from rivers and streams as recommended in Chapter XIII, and (c) increasing the quantum of subsidy in the backward areas to help the poorer cultivators in taking up the work as suggested in Chapter XIII.
5. Undertaking of adequate steps with the industrial sector to ensure that the increased requirements of key materials, equipment and machinery, diesel engine, electric motors, pumps, pipes, etc. for achieving the Fourth Five Year Plan targets as detailed in Chapters XVII & XVIII would be fully met with;
6. Ensuring timely release of foreign exchange for meeting phased requirements of equipment to be imported from abroad for achieving the targets as indicated in Chapter XVIII;
7. Integrated planning of lift irrigation, small scale industries and rural electrification programme with a view to ensuring maximum coverage of agricultural area under lift irrigation for taking up lift irrigation schemes (Chapter VIII);
8. Improving technical standards in planning, designing and execution of works by much more increased emphasis than hitherto given on (a) research and training programmes, (b) production

of technical manuals and literature on various minor irrigation schemes and increased dissemination of knowledge on the subject, and (c) follow-up action on all important technical recommendations on various schemes that have been made from time to time and are summarised in Chapter VII;

9. Undertaking measures suggested in Chapters IX to XI for proper maintenance and utilisation of completed works and improving assessment of irrigation benefits.

PERSPECTIVE FOR THE FIFTH FIVE YEAR PLAN

The Working Group is of the view that notwithstanding the various problems and shortcomings confronting the minor irrigation programme, as a result of implementation of the organisational and technical measures recommended for the Fourth Five Year Plan, it would be possible during the Fifth Five Year Plan not only to maintain the tempo of development attained at the end of the Fourth Five Year Plan but also to accelerate it further. Against the overall target of 16 million acres set for the Fourth Five Year Plan, the Working Group visualises a target of 18—20 million acres for the Fifth Five Year Plan. This would include about 14-15 million acres of additional new irrigation.

On the basis of the above projection, the following picture emerges for the perspective development of minor irrigation during the Fourth and the Fifth Five Year Plans:—

Period	Gross irrigated area (Million acres)		
	Surface water	Ground water	Total
1950-51	19.91*	16.14*	36.05*
1960-61	22.86*	20.21*	43.07*
Third Five Year Plan anticipated achievement	2.44	6.71	9.15
<i>Deduct</i> depreciation for 5 years at 1 per cent per annum over averaged irrigated area per year during the Third Plan	1.20	1.18	2.38
Net addition during the Third Plan	1.24	5.53	6.77
1965-66	24.10	25.74	49.84
Target for Fourth Plan	3.60	8.46	12.06
<i>Deduct</i> depreciation for 5 years at 1 per cent per annum over average area irrigated per year during Fourth Plan	1.30	1.50	2.80
Net addition during the Fourth Plan	2.30	6.96	9.26
1970-71	26.40	32.70	59.10

Period	Gross irrigated area (Million acres)		
	Surface water	Ground water	Total
Projected target for the Fifth Plan	3.80	10.70	14.50
<i>Deducting</i> depreciation for 5 years at 1 per cent per annum over averaged irrigated area per year during period 1971-76	1.42	1.90	3.32
Net addition during the Fifth Plan	2.38	8.80	11.18
1975-76	28.78	41.50	70.28

*NOTE.—These figures have been obtained from the Land Utilisation Statistics, reckoning the area from all the different sources except Government canals under minor irrigation and calculating break-up of gross irrigated area from break-up of net irrigated area on proportionate basis.