ANNEX - 5

REHABILITATION PLANS AND PRELIMINARY DESIGN

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1. PRESENT CONDITION OF THE IRRIGATION SYSTEMS

1.1 Present Service Area

Present service area (expressed in the irrigated areas in rainy seasons by gravity irrigation) under the 13 target irrigation schemes in Kathmandu, Bhaktapur and Lalitpur districts are summarized below according to the data provided by each District Irrigation Office (DIO) and inventory survey results by JICA study team during the study period in Nepal. Accordingly, the figures given below are different from those by each DIO.

Name of Schemes	Present Service Areas in ha.(Estimated irrigated areas)				
Kathmandu District					
Biswambhara (AK-04)	100				
Boshan (AK-05)	168				
Dakshinkali (AK-07)	80				
Indrayani (AK-14)	112				
Shali Nadi (AK-25)	240				
Sub-total	700				
Bhaktapur District					
Bidol (AB-02)	48				
Katunje (AB-10)	72				
Kutdhal (AB-12)	118				
Mahadev Khola (AB-14)	360				
Sub-total	598				
Lalitpur District					
Kotkhu (AL-10)	356				
Lubhu (AL-13)	132				
Thika Bhairaw-I (Al-19)	480				
Thika Bhairaw-II (A-20)	320				
Sub-total	1,288				
Total	2,586				

Note: 1/ Original figures for the above were provided by each DIO and they were modified through the field survey by JICA study team with the help of counterparts and the maps with a scale of 1/10,000. It may be mentioned here that the above-mentioned service areas include the areas which are not fully irrigated by present irrigation systems.

1.2 Water Distribution

1.2.1 Present Irrigation Systems

All the target irrigation systems in Kathmandu, Bhaktapur and Lalitpur districts are relatively old and damaged due to floods and landslides which occur frequently. Some of them were constructed more than 30 years ago by the Department of Irrigation (DoI) or by the assistance of the Government of India. Typical irrigation system observed is that with an intake facility and irrigation canals which carry water by gravity. Usually, the intake facility consists of a fixed weir made of concrete or stone/brick masonry. Generally, the irrigation canals are lined with stone/brick masonry only for a limited portion, usually upper portion of the canals. Under these situations, usually, irrigation water does not reach the terminal irrigation facilities, resulting in water shortage in agricultural lands to be irrigated. This situation calls for rehabilitation of those irrigation systems as quickly as possible with proper technical as well as monetary assistance.

1.2.2 Diverted Irrigation Water

Under the target irrigation systems, river flow/natural stream is dammed up by a fixed weir and there, the water is diverted into the main irrigation canal(s) located along the river bank. And the water is further diverted into secondary and tertiary canals through the gates up to the on-farm level canals. However, control and measurement of diverted irrigation water has not been done for long time due to damages to gates and canals as well as due to lack of attention to water management. Accordingly, no data on the amount of diverted irrigation water of the target irrigation systems are not available. This situation makes it difficult to correctly analyze how much irrigation water has been consumed under each target irrigation scheme during irrigation. Also this situation makes it difficult to analyze the repeating use-ratio of the irrigation water. This condition will be improved through implementation of the project, which will equip adequate water-measuring devices on the irrigation canals to divert the irrigation water according to designed water discharge required in each irrigation block.

1.2.3 Water Rights

Water resources in Kathmandu Valley, i.e., surface water and ground water are being used for irrigation, drinking water, hydropower generation, industry etc. In the water resources development in the Valley, the government of Nepal has put its highest priority to the development of water resources for drinking water supply. However, it seems that further adjustment in water resources allocation among other sectors is needed. Originally, the water resources in the Valley have been developed by the farmers and used mainly for irrigation since ancient time. With this background, the water resources developed by the farmers have become to be considered as their historical properties, which is now called as "water rights". However, prevailing water resources condition in the Valley, which shows that water resources including surface water and ground water are not sufficient, does not allow to use the water freely by any sectors. At present, the water rights for irrigation is assured by the government, however, at the same time, the government of Nepal is also requesting all the sectors to utilize limited water resources in the Valley through the cooperation among the sectors.

Accordingly, in rehabilitation of the target irrigation systems, water-saving canal systems have been taken into account, although the "water rights" for irrigation of the target irrigation schemes was assured by DoI in the meeting held between the Officials of DoI and the study team in October, 1994.

2. PROJECT FORMULATION

2.1 General

The target irrigation schemes (13 existing irrigation schemes in the Valley) will be rehabilitated according to the priority identified mainly from economic evaluation on each scheme with the following concepts.

- (1) To establish safer irrigation systems against floods and other natural hazards and more water-saving irrigation canal systems, through which contributing to stabilize crop cultivation as well as to expand, where possible, irrigated agricultural lands through the project.
- (2) To establish more farmers-friendly irrigation systems, especially with respect to operation and maintenance (O&M) and water management also, considering that the rehabilitated irrigation schemes will be handed over to the farmers and maintained by the farmers themselves as is stated in "Irrigation Policy of the Government of Nepal".
- (3) To provide up-graded irrigation facilities, enabling the farmers to control the irrigation water easily.
- (4) To promote farmers' participation in O&M, water management and other related activities through the farmers' training programs scheduled to be held under the project. To attain this, it is planned to establish water users' associations by the farmers which will have more advanced functions to be controlled and observed by the farmers as is given in the O&M Manual.
- (5) To encourage district irrigation offices in Kathmandu, Bhaktapur and Lalitpur district offices so that they can so that they can play more important roles in guiding the farmers who will face the problems at the different stages of the project with the help of more facilities and equipment, through which the farmers under the rehabilitated irrigation schemes can receive more advanced training on O/M, water management and agricultural techniques etc.

As a whole, the project intends to rehabilitate the target irrigation schemes according to the priority identified and to establish the water users' associations and other related organizations as described in the O&M Manual attached to the report, which will consist of all the benefited farmers through the project, to maintain the rehabilitated irrigation schemes by the farmers themselves as well as to realize more aggressive activities in water management by the farmers themselves, as is recommended in the "Irrigation Policy". And, it is expected that implementation of the project will contribute to change the nature of the government-developed irrigation schemes into more farmers-oriented irrigation schemes with the combined efforts by the government officials and the farmers. It may be specially noted here that [Request Forms] for proceeding with establishing the WUAs have been submitted to DoIs from the farmers who belong to 6 target irrigation schemes out of 13 target irrigation schemes. Sample request form is attached to this report as Attachment-1.

2.2 Project Plans

2.2.1 Diversion Works

Existing diversion works of the target irrigation schemes will be improved/replaced with new ones according to their present condition, which differs from each other. The schemes to be improved /replaced with new ones have been identified as follows.

Name of Schemes to be Improved

(1) Biswambhara irrigation scheme in Kathmandu district *(minor improvement / gate replacement only)

(2) Mahadev Khola irrigation scheme in Bhaktapur district.

(3) Kotkhu irrigation scheme in Lalitpur district.

(4) Thika Bhairaw-(I) irrigation scheme in Lalitpur district. (No.2 diversion only)

Sub-total 4 diversions

Name of Schemes to be Replaced with New Ones

Kathmandu district

(1) Boshan irrigation scheme

(4 diversions)

(2) Dakshinkali irrigation scheme

(upper scheme only)

(3) Indrayani irrigation scheme

(4) Shali Nadi irrigation scheme

Sub-total 7 diversions

Bhaktapur district

(1) Bidol irrigation scheme

(2) Katunje irrigation scheme

(3) Kutudhal irrigation scheme

Sub-total 3 diversions

Lalitour district

(1) Lubhu irrigation scheme

(2) Thika Bhairaw-I irrigation scheme (No.1 diversion only)

(2) Thika Bhairaw-II irrigation scheme

Sub-total 3 diversion

Total 4 diversions to be improved 13 to be replaced with new ones.

As a result, out of 13 target irrigation schemes (18 diversions in total), existing 4 diversion works will be improved and 13 diversion works will be replaced with new ones. Remaining 1 diversion (Dhakshinkari Lower Scheme) will not be rehabilitated because it is well maintained. The diversion works to be improved/replaced with new ones will equip more upgraded functions and the diversion works will be made of concrete with sluice ways. As to the detailed plan for improvement/replacement with new ones, see Section 4 (Plan and Design) of this Annex-5.

2.2.2 Improvement of Distribution Systems

Under the project, existing distribution systems of the 13 target irrigation schemes have been planned to have the following improved and up-graded functions.

- (1) Unless otherwise specified, the existing distribution systems, namely, existing main, secondary and tertiary irrigation canals have been improved to have concrete-lined section considering presently observed poor conditions of these canals. The required canal section to carry the design discharge has bee decided based mainly upon Manning's formula.
- (2) In the improved distribution systems, gates and turnouts with simple water measuring devices have been provided as much as possible, considering prevailing poor water distribution and water control in the existing irrigation canal systems. With provision of these equipment, it is expected that the project will realize more water-saving irrigation water management by the farmers after they have received technical training especially for O&M of the irrigation facilities.

(3) In addition, to establish safer irrigation canal systems against natural hazards, hydraulic structures such as steel-made pipe siphons, cross-drains, concrete-made aqueducts, landslide protection works by gabion etc. have been provided in the improved distribution systems. However, in the layout of the canal locations, existing canal routes have bee respected as much as possible to avoid additional land acquisition. And another reason for respecting the existing canal routes is that they are considered to be more stable than the routes to be made along the hilly slopes of the Valley.

2.2.3 Improvement of Drainage Systems

Improvement of the existing drainage systems under the 13 target irrigation systems has been considered as one of the most important components of the project. As stated in many places of the reports on the project, it can be said at present that there are no systematic drainage networks under the target irrigation systems in the Valley. And it is obvious that lack of proper drainage networks have caused damages to the existing irrigation canals, roads, and other related facilities. Of course, this situation justifies to call for early provision of proper size of drainage networks. However, provision of such net works requires much investment which may not be economically justified under the project. Accordingly, it may be suggested here that provision of the drainage net works should be done utilizing existing natural river system as much as possible, dividing the areas to be drained into small blocks to keep the scale of such drainage networks as possible as small. And, provision of such drainage networks should be made after completion of rehabilitation of the target irrigation schemes after co-observing flooding condition of the schemes by the farmers themselves and the assistant engineers of the concerned district irrigation offices. And, then, minimum size of the drainage networks consisting of small earth canals, which can be excavated easily by the farmers. In this connection, the assistant engineers of each DIO are requested to help the farmers decide the locations of the drainage canals to be excavated. The excavated canals should be connected to the nearest existing natural streams to avoid enlargement of required section of the drainage canals to be excavated.

2.2.4 Improvement of On-Farm Facilities

Unless otherwise specified, the target irrigation schemes will be rehabilitated up to tertiary canals. However, improvement of the existing on-farm level facilities will not be taken care by the project. Since it is considered that most of the on-farm facilities consist of small farm ditches in the agricultural lands to be irrigated. These farm ditches should be maintained by the benefited farmers themselves and if necessary, those farm ditches should be re-excavated by the farmers according to the change of canal alignment proposed in the project.

2.2.5 Extension Area Development

Under the project, the areas to be irrigated under each rehabilitated irrigation scheme have been decided based upon the design discharge with 80 % probability, which means that there is a possibility that even the areas thus decided may not be fully irrigated once in five years. Accordingly, it seems that there is little room for the extension area development under the project if we strictly follow this criterion. However, if we consider the irrigation for ordinary years, there will be some room for extension of the irrigated areas (20 % of the total areas) development under the project. However, since irrigation facilities including canals are not planned for these areas, the irrigation for the extended area will have to depend upon rainfalls, which will cause order-less expansion of the cultivated areas without supports by necessary infrastructures. This situation should be avoided under the project. In this sense, it may be suggested here that there will be less potential for extension area development under the project.

2.3 Strengthening of O&M Capability

2.3.1 Procurement of O&M Equipment and Building Facilities

To realize the strengthening of O&M capability described in the O&M Manuals attached to the report, it is recommended to reinforce the equipment necessary for the intended O&M activities by the farmers. Because, at present, the district irrigation offices as well as the farmers who are expected to be the members of the water users' associations for O&M and water management in the rehabilitated irrigation schemes, do not have any equipment to be mentioned for O&M and water management.

With this background and survey for present availability of the equipment for O&M and water management possessed by the farmers and DIOs, it is recommended to at least procure the following equipment to realize high performance in O&M activities described in the O&M Manual.

(1) Equipment to be Procured for DIOs

	Name of Equipment	Quantities
(a)	Jeep	3 (1 x 3)
(b)	Pickup Truck	3 (1 x 3)
(c)	Motor Cycle	6 (2 x 3)
(d)	Bicycle	9 (3 x 3)
(e)	Audio Visual Set for O&M Training	3 (1 x 3)
(f)	Survey Equipment (Transit, Level, Poles, and Staffs)	3 (1 x 3)
(g)	Tools Set for Maintenance of Gates and Measuring Devices	3 (1 x 3)
(h)	Potable-type Concrete Mixer	3 (1 x 3)

^{***:} Above-listed equipment should be kept at and maintained by each DIO.

(2) Equipment to be Procured for WUAs (13 WUAs)

	Name of Equipment	Quantities
(a)	Shovel (To be distributed in proportion to the irrigated area)	300
(b)	Bamboo-made Basket for Carrying Wastes and Deposits	300
	(To be distributed in proportion to the irrigated area)	
(c)	Sickle	300
	(To be distributed in proportion to the irrigated area)	
(d)	Tools Set (Hammer, Chisel, Monkey Wrench, Nipper, Pliers, Saw)	26 (2 x 13)
(e)	Wooden Tamper for Consolidating Soils	26 (2 x 13)

^{***:} These equipment will be kept and maintained at each WUA and will be used by the farmers for O/M activities.

(3) <u>Building Facilities</u>

	Name of Equipment	Quantities
(1)	Brick-made office building for WUAs A building with space of 50 m ² in average will be considered as accommodate 3 persons in average, consisting of the chairman, techr staff. And the above-mentioned equipment to be used by the farmers kept at this office. For construction of the buildings, land acquisition of the buildings.	ical assistant and administrative for O&M activities will also be

(2)	Typewrite for Documentation	13 (1 x 13)
(3)	Desk and Chair	39 (3 x 13)
(4)	Mimeographing Machine for Printing Communication Papers	13 (1 x 13)

2.3.2 System's Communication Networks

"The system's communication networks" discussed here mainly means the communication among the farms who belong to the same WUA. It is considered necessary for the farmers who belong to the same WUA to obtain at least the following information each other.

- (1) Decisions made by the committee of the WUA.
- (2) Working schedule for O&M activities and water management for the coming month and the requested activities to be carried out by the farmers.
- (3) Price movement of agricultural products in the markets.
- (4) Training programs and its schedule.
- (5) Monthly budgetary report of the WUA.
- (6) Any opinions by the farmers who belong to the same WUA etc.

These information must reach the farmers quickly so that they can discuss and exchange opinions each other for better agricultural activities and O&M performance. To attain this, brief papers written in Nepalese language which include the above information shall be monthly published by each WUA and distributed to all the farmers under the same WUA free of charge. A sample paper for the said purpose is attached to the O&M Manual. For additional communication among the farmers, for example, information on the decisions in the general assembly of WUAs, it shall be communicated by publication of additional papers to the farmers. Other than this, no facilities for the communication networks shall be considered under the project.

3. WATER MANAGEMENT PLAN

3.1 General

Water management by the farmers under the rehabilitated irrigation is considered as of the most important components of the project. Establishment of proper water management is urgently required in consideration of the efficient use of water in irrigation as well as sharing the limited amount of water in the Valley among the different sectors. As general concepts of irrigation (water) management, it may be said that, in the last two decades, newer concepts of irrigation management have evolved. A fundamental change which has taken place in the concept of soil-plant-water relations, leading to a more dynamic approach, is now perceived to be a unified system in which all processes are interdependently linked as in a chain. This change calls for much attention and high performance in water management, With this understanding, the water management under the project aims to achieve the following:

- (1) Water management under the project should be carried out under the leadership of the farmers of each irrigation scheme to be rehabilitated;
- (2) In consideration of limited availability of water resources in the Valley, rotation irrigation method will be considered as the basis of the water management under the project, especially, proper rotation irrigation during land soaking and land preparation period, where maximum demand of irrigation water will occur, should be realized among the farmers; and
- (3) To save the irrigation water consumed in the rehabilitated irrigation system as much as possible, it is necessary for all the farmers under the rehabilitated irrigation schemes to fulfil their duties in water management described in the O&M Manual.

3.2 Water Management schemes

3.2.1 Irrigation Water Requirement

The calculation of irrigation water requirements for the target irrigation schemes was carried out by referring to the general guidelines described in the "Design Manuals for Irrigation Projects in Nepal M-3 Hydrology and Agro-meteorology Manual 1990". The calculation was conducted on a semi-monthly basis.

(1) Potential evapotranspiration

Reference crop evapotranspiration (ET_0) and open water evaporation (E_0) were calculated by the Penman method recommended by Food and Agriculture Organisation of the United Nations (FAO) using the meteorological data at Kathmandu airport, following the above mentioned Design Manual. Since the original data at Kathmandu airport were compiled on a monthly basis, they were converted into the semi-monthly basis for calculation of the water requirements as shown below:

											Uni	it : mm
	Jan(E)	Jan(L)	Feb(E)	Feb(L)	Mar(E)	Mar(L)	Apr(E)	Apr(L)	May(E)	May(L)	Jun(E)	Jun(L)
ET _o	1.73 2.30	1.93 2.55	2,40 3,00	3.05 3.85	3.80 4.65	4.40 5.25	4.75 5.70	5.23 6.10	5.50 6.40	5.60 6.55	5.15 6.00	4.65 5.60
	Jul(E)	Jul(L)	Aug(E)	Aug(L)	Sep(E)	Sep(L)	Oct(E)	Oct(L)	Nov(E)	Nov(L)	Dec(E)	Dec(L)
ET _o	4.45 5.35	4.30 5.17	4.20 5.05	4.05 4.90	3.85 4.70	3.70 4.50	3.45 4.25	3.10 3.90	2.55 3,35	2.05 2.75	1.80 2.37	1.60 2.15

(2) Consumptive use

Consumptive use by crop is estimated by the product of crop factor (Kc) and potential evapotranspiration (ET_0). On the basis of the values recommended by FAO, crop factors (Kc) used for estimation are given in Table 3-1.

(3) Field irrigation water requirement

Field irrigation water requirements are assessed with consumptive use and other requirement such as land preparation (puddling water) requirement, percolation loss in the paddy field and nursery water requirement for the paddy.

a) Percolation loss in the paddy field

In the calculation of percolation in the paddy fields, the value of 5 mm/day recommended in the manual was used, considering the soil conditions and the fact that the paddy fields under the schemes to be rehabilitated have been irrigated for many years.

b) Puddling water for land preparation on the paddy field

Puddling water requirement for land preparation on the paddy field consists of soil saturation requirement and submergence water. Soil saturation requirement is assessed by soil depth to be saturated and soil porosity. Assuming effective soil depth of the paddy field and soil conditions are as follows, puddling water requirement is estimated at 150 mm, with a condition that after land preparation same percolation rate as mentioned above and evaporation rate from water surface (Eo) which are estimated as mentioned above will be applied.

Soil depth to be saturated:	300 mm
Porosity of soil in above depth:	50%
Vapour phase in soils after puddling:	3%
Soil moisture before water supply:	12%
Bulk density of soil:	1.2 kg/lit
Soil saturation requirement	J
$= 300 \times (50 - 3 - 12 \times 1.2)/100 =$	98 mm
Standing water depth after puddling:	50 mm
Total	148 mm say 150 mm

c) Nursery water requirement for paddy

The water requirements for nursery beds of the paddy are estimated at 1/20 or 5% of puddling water requirement estimated as above.

(4) Effective Rainfall

a) Rainfall Data

The target irrigation schemes are located in a relatively flat and central area of the Valley and on the slopes of the surrounding mountainous area. Accordingly, rainfall patterns in both areas are different from each other (the former has less rainfall compared to the latter). Therefore, the areas were divided into two patterns; Zone-A and Zone-B by the amount of annual rainfall, i.e., by the isohyet of 1,500 mm as shown in Fig.4-4 in Annex-4. Based on this, different rainfall data were applied for calculation of rainfall, in the areas where the target irrigation schemes are located as shown below:

	Zone A Central Area	Zone B Surrounding Area	
Patter of isohyet	R < 1,500 mm	1,500 <= R < 2,000 mm	
Meteorological Station	No. 1030	No. 1059	
5	Kathmandu Airport	Changu Narayan	
Annual Rainfall	1,403 mm	1,677 mm	
Schemes belong	AB-10 Katunje	AK-04 Biswambhara	
	AB-14 Mahadev Khola	AK-05 Boshan	
	AL-08 Khokana	AK-07 Dakshinkali	
	AL-10 Kotkhu	AK-14 Indrayani	
	AL-13 Lubhu	AK-25 Shali Nadi	
	AL-19 Thika Bhairaw-I	AK-27 Tokha	
	AL-20 Thika Bhairaw-II	AB-02 Bidol	
		AB-04 Dhunge Dhara	
		AB-12 Kutudhal	

b) Effective Rainfall (Re)

Effective rainfall (Re) was estimated for each case given below using rainfall data with an 80% probability (R₈₀) modifying the method recommended in the manual:

For paddy:	Potential Re (R ₀)	Effective Rainfall
$R_{80} \le 5 \text{ mm}$	$R_0 = 0$	$Re = R_0$
$5 \text{ mm} < R_{80} <= 100 \text{ mm}$	$R_0 = R_{80} \times 0.85$	-
	If $R_0 \ll T_{loss}$, then	$Re = R_0$
	If $R_0 > T_{loss}$, then	$Re = T_{loss}$
$R_{80} < 100 \text{ mm}$	$R_0 = R_{80} \times 0.70$	
	If $R_0 \ll T_{loss}$, then	
	If $R_0 > T_{loss}$, then	$Re = T_{loss}$
For upland field crops:	$R_0 = R_{80} \times 0.70$	
-	If $R_0 \ll T_{loss}$, then	$Re = R_0$
	If $R_0 > T_{loss}$, then	$Re = T_{loss}$

Where; T_{loss} : Total crop water requirement (in the case of paddy, percolation is added, but land preparation requirement is not considered.)

(5) Irrigation Efficiency

In the calculation, the values of field efficiency recommended in the manual were adopted. The recommended values seem to be relatively small. However, they are thought to be acceptable considering the prevailing field conditions in Nepal. Regarding the water transportation efficiency of the canal, the manual recommends that relatively lower values of 49% to 64% be used considering the water leakage from the canals and inadequate water management. However, in the calculation, the following values were used, under the conditions that the canals for the Project will be lined and water management will be improved.

Field eff	iciency:	
1)	Danna	44. 6.14.

1)	For paddy fields;	85%
2)	For upland crops:	60%
Water tra	ansportation efficiency in the canals:	
1)	For selected schemes for rehabilitation:	80%
2)	For existing schemes:	60%

Diversion Water Requirements (6)

Based on the above assumptions, the consumptive use, field irrigation water requirement and diversion water requirement for not only respective crops proposed for the target irrigation schemes but also major crops prevailing in the Valley were calculated on a semi-monthly basis as shown in Tables 3-2.1 to 3-2.18. The unit field irrigation water requirements and unit diversion water requirements by respective crops in each zone are summarised in Tables 3-3.1 and 3-3.2, and Tables 3-4.1 and 3-4.2, respectively. diversion water requirements for typical cropping pattern proposed for selected schemes in each zone are shown in Tables 3-5.1 and 3-5.2. Irrigation water requirements for each model scheme in respective zones are shown in Tables 3-6.1 and 3-6.2.

As for reference, Tables 3-7.1 and 3-7.2 show irrigation water requirement for prevailing present cropping pattern in each scheme in respective zones with a conveyance efficiency 80% (after improvement) and Tables 3-9.1 and 3-9.2 show the same with a conveyance efficiency 60% (present conditions). Tables 3-8 and 3-10 show irrigation water requirement for cropping pattern proposed in Kotkhu Water Supply Project with a conveyance efficiency 80% and 60%, respectively.

Design Discharge (7)

From the following assumption, design discharge of the facilities are decided:

1) For water balance study:

Diversion water requirement of respective schemes estimated in Tables 3-6.1 and 3-6.2 for the proposed cropping pattern.

Peak water requirement are 0.653 lit/sec/ha (5.64 mm/day)

in both Zones-A and B

Diversion water requirement for present cropping pattern for existing system estimated in Tables 3-9.2(4/4) and 3-10, this result were used for water abstracted in upstream reaches of proposed schemes in water balance study.

Peak water requirement are 1.275 lit/sec/ha (11.02 mm/day) in Zone-A

and

1.182 lit/sec/ha (10.21 mm/day) in Zone-B

For design discharge of the intake and upstream reaches of main canal: Diversion water requirement of respective schemes estimated in Tables 3-7.1 and 3-7.2 for prevailing cropping pattern, considering that introduction of the proposed cropping pattern will takes some period and that in these period farmers will continue prevailing farming. Peak water requirement are 0.986 lit/sec/ha (8.52 mm/day) in Zone-A

and

0.933 lit/sec/ha (8.06 mm/day) in Zone-B

For design discharge of the terminal facilities such as tertiary canals and down stream reaches of secondary or main canals of small scale schemes: Diversion water requirement of paddy estimated in Table 3-2.1, as all area will be cultivated with paddy.

Peak water requirement are 1.306 lit/sec/ha (11.29 mm/day)

in both Zones-A and B

3.2.2 Diagram of Proposed Irrigation Systems

Diagram of irrigation system for each scheme is proposed based on existing canal alignment and canal structures. These diagrams are shown in Fig.3.2-1 to 3.2-13.

3.2.3 Water Management

(1) Main Canals and Laterals

The water management in main canals and laterals shall be carried out on the basis of the following.

- As the first step, the turnout leaders of each irrigation scheme shall collect information from the respective farmers on irrigation schedule for land soaking, land preparation, areas to be irrigated and kind of crops to be irrigated etc. Based upon this, the turnout leaders shall, in collaboration with technical staffs and Association Organizers (AOs) of DIOs, decide the amount of water to be diverted, timing of water diversion etc. And the turnout leaders shall inform the farmers of the decisions made by them for the above so that the decided rotation schedule should be kept by the farmers in a cooperative manner.
- (b) Based on the schedule, the turnout leaders shall estimate the required manpower and its service period by the farmers of each irrigation scheme. And the turnout leaders shall appoint required numbers of water issuers to be selected from the farmers for operation of the gates provided in the main and lateral canals.

(2) Farm Level

On farm level water management shall be carried out on farmers own initiative. However, at the initial stage of the on farm level water management, initiative shall be taken by the farmers who have received the training for water management under the project. The on farm level water management will include operation of small gates (timely opening and closing gates in consideration of maximum saving of water) and maintenance of on -farm level canals (to keep the shape of the canals, desilting and weeding) by the farmers.

(3) Rotation Irrigation Method

Rotation irrigation method may be partly needed for distribution of irrigation water in the rehabilitated irrigation systems, especially, this method shall be applied during land soaking and land preparation in which much water is required within a limited time. Rotation of irrigation water for a designated irrigation scheme during this time should be completed within one month at latest paying attention to growing period of rice and others. It is recommended that the rotation irrigation should be carried out on the basis of the farmer-irrigators' groups which will consist of 20 to 30 farmers with total areas of about 5.0 ha to be irrigated. To carry out the rotation irrigation smoothly among the farmer-irrigators' groups, it is recommended to have meetings several times among the farmers and discuss and decide the water distribution schedule for each farm plot to avoid conflicts among the farmers.

(4) Water Measuring Devices

Water measuring devices under the rehabilitated irrigation systems consist of the gates with simple measuring meters on and at the head of the main, secondary and tertiary canals. These gates can also function as measuring devices by reading opening of the gates with provision of opening vs. discharge curve which is particular to each gate before hand. Also the drop structures which are to be provided in the main and secondary canals will also function as the water measuring devices because it is definitely anticipated that critical flow will occur on these structures. Then the discharge can be easily obtained by measuring the depth of the critical flow and substituting it to an appropriate hydraulic formula for obtaining the discharge. It is considered that measuring the discharge in the canals and keeping the records on the discharge can be

done by the farmers after several on the job training by the technical assistant engineers from DIO.

3.3 Water Management Training Program

The water management training program under the project should be prepared and carried out with the understanding that the water management by the farmers under the rehabilitated irrigation schemes would play a vital role in the project. Eventually, success of the water management largely depends upon how the farmers participate in it in a friendly and cooperative manner with the understanding that effective water management will contribute to increase the agricultural products and by saving water through the water management in a organized way, it will also contribute to the other sectors which also need water badly. Also, it is considered very important that the training program should guide the farmers so that the farmers can recognize that the irrigation water is no longer obtained free of charge, and the water has become common asset to be possessed by the people equally. Accordingly, the water management training program under the project should include the following and the training opportunity should be widely opened to many farmers, aiming at self-reliant water management by the farmers.

- (1) Since the water management under the project is closely related to O&M activities by the farmers, as the first step towards better understanding of water management by the farmers, it is recommended that 3 to five farmers selected from the farmer-irrigators' groups should receive the orientations organized by Association Organizers (AOs) from each District Irrigation Office (DIO) as described in Section 3.7 of the O&M Manual attached to the report. Basically, such orientations to the farmers shall be given at each DIO according to the schedule and timing described in the said manual.
- (2) The orientations will consist of (i) initial orientation to the farmers, (ii) intermediate orientation to the farmers and (iii) final orientation to the farmers. Regarding the detailed contents of the programs at each stage of the orientations, see the Section 3.7 of the O&M Manual. Through these training programs, it is expected that the farmers can learn the nature of the project, expected farmers' roles in the project, necessity of O&M of the irrigation facilities, operation and control of gates, maintenance of the canals in a organized way, necessity of record keeping and collection of water charge according to the irrigation policy highlighted d by the government. The understanding for the above by the farmers will definitely contribute to the water management by the farmers.
- (3) In addition to the above, the water management training programs should include the rotation irrigation method. Such rotation irrigation method shall be fully applied for distribution of the irrigation water in the rehabilitated irrigation systems, especially for the period of land soaking and land preparation in which much amount of water is required within a limited time. The rotation irrigation method to be trained to the farmers will be based on the method described in the clause 3.3 of Section 3 of Chapter 3 of this Annex-5.

3.4 Formation of Farmer-Irrigator's Group

Under the project, farmer-irrigators' groups shall be organized for each irrigation scheme for smooth water management by the farmers as well as for equal irrigation water distribution under each irrigation scheme. The unit farmer-irrigators' groups shall consist of 20 to 30 farmers who have an average agricultural land of about 0.3 ha, totalling to about 5.0 ha in average. And this unit will be considered as the minimum unit of the farmers groups. Water management and O&M activities by the farmers shall be carried out on the basis of this organization. And each farmer-irrigator's group shall appoint 3 responsible persons to

undertake duties described in the O&M Manual. The number of the farmer-irrigators' groups under each irrigation scheme shall be as follows.

Name of Scheme	Number of Farmer-Irrigators' Groups	
Biswambhara Boshan Dakshinkali Indrayani Shali Nadi	18 24 14 20 30	
Total Kathmandu District	106	
Bidol Katunje Kutdhal Mahadev Khola	6 8 8 22	
Total Bhaktapur District	44	
Kotkhu Lubhu Thika Bhairaw-(I) Thika Bhairaw-(II)	49 26 99 18	
Total Lalitpur District	192	
Grand Total	342	

PLAN AND DESIGN

Survey and Mapping 4.1

4.1.1 General

Topographic survey with a scale of 1/5,000 covering the command areas of the 13 target irrigation schemes was conducted during January to February 1994 by the topographic survey team dispatched by JICA. In March 1994, JICA study team conducted additional field survey for the 13 target irrigation schemes with the help of the said topographic maps. The information obtained from the said maps was fully utilized for the improvement and rehabilitation plan of the 13 target irrigation schemes. The topographic maps cover about 2,800 ha of the areas. In addition, during March to May 1994, JICA study team conducted supplemental survey (plane table survey and levelling survey) for the existing intake facilities as well as the main canals of the existing 13 target irrigation schemes to obtain additional information necessary for establishment of the improvement and rehabilitation plan of the target 13 irrigation schemes.

4.1.2 Control Survey

As stated earlier, during March to May 1994, JICA study team conducted control survey for the intake sites of the said 13 target irrigation schemes to obtain additional information necessary for design and improvement of the same. The survey included topographic survey for the intake sites and dimension survey for the existing structures at the intake sites.

4.1.3 Canal Survey

In parallel to the above survey, JICA study team conducted supplemental levelling survey along the main canals of the 13 target irrigation schemes, survey for the existing structures on the main canals and cross-sectional survey of the main canals. The results obtained from these survey were fully utilized in the course of preparation of the rehabilitation plan for the target irrigation schemes.

4.1.4 Topographic Survey

As stated above, during January to February 1994, topographic survey with a scale of 1/5,000 was carried out by a survey team dispatched from JICA. The survey included the topographic survey for the areas of about 2,800 ha of the target irrigation schemes.

4.2 Design Criteria

4.2.1 Design Discharge Modules

As mentioned in Section 3.2.1, design discharges of facilities has been estimated as below:

For intake and upstream reaches of main canal:

Zone-A: 0.986 lit./sec./ha. Zone-B: 0.933 lit./sec./ha.

For downstream reaches of main canal and terminal facilities (secondary and tertiary canal) : 1.306 lit./sec./ha.

Classification of upstream reaches and downstream reaches is shown in the proposed diagram of irrigation system (Fig. 3.2-1* to 3.2-13) and design discharge of each scheme is summarized in Table 4-1.

4.2.2 Diversion Works (Intake)

JICA study team surveyed 18 diversion sites in total. Within these 18 diversion sites. replacement of the intake is proposed for 13 sites, improvement of the intake is proposed for 3 sites and minor improvement of the intake is proposed for 1 site. And no rehabilitation of the intake is proposed for Dhakshinkari (Lower scheme). Design criteria for newly replaced diversion works are summarized in Table 4-1.

4.2.3 Canals

Canal works are classified into 3 categories, i.e., main canal, secondary canal (branch canal) and tertiary canal (main farm ditch) in the planning. For main and secondary canals, 8 types of canals have been proposed as follows.

Type	Discharge(max.)	В	Н	,
	(m ³ /sec.)	(m)	(m)	
Type-1	0.023	0.40	0.30	
Type-2	0.040	0.45	0.35	
Type-3	0.068	0.50	0.40	
Type-4	0.104	0.55	0.45	
Type-5	0.150	0.60	0.50	
Туре-б	0.268	0.70	0.60	
Type-7	0.430	0.80	0.70	
Type-8	0.530	0.85	0.75	

Notes: Shape of section: Rectangular

Design slope of main canal: 1/400

Manning's roughness of coefficient: n=0.017

The thickness of side wall and base slab shall be 10 to 15 cm with reinforcement. Generally, 80 kg of reinforcing bar per 1m3 of concrete should be used.

4.2.4 Canal Structures

Basically, canal structures are proposed to be replaced at the same locations of the existing structures.

a) Field Diversion (Diversion structure for tertiary canal (main farm ditch))

There are several field diversion points with difference of 2 to 5m in elevation between canals and field. In such cases, to keep out waste water and protect erosion of the fields, field diversion structures with small shoots have been proposed instead of normal type.

Type-1: Normal type

Type-2: Integrated small shoot type

b) Canal Diversion

Presently, simple canal diversion structures without water control equipment are observed. They have a function of flushing obstacles like gravel, etc. In the rehabilitation plan it has been recommended to put sluice gates to control diversion water for canal diversion structures. Canal diversion structures are classified into 3 types depending on the size of canal.

Type-1: for Type-1 to Type-2 canals Type-2: for Type-3 to Type-5 canals Type-3: for Type-6 to Type-8 canals

c) Escape (Side spillway type)

Few escape structures are provided in the existing irrigation schemes. Accordingly, escape structures of the following 3 types should be additionally constructed.

Length of spillway(m)

Type-1: for Type-1 to Type-2 canals
Type-2: for Type-3 to Type-5 canals
Type-3: for Type-6 to Type-7 canals
2.0

d) Drainage Crossing (Super passage)

There observed problems of erosion by drained-water at the downstream of drainage crossings. Accordingly, additional drainage crossings have been proposed to solve the above problems.

e) Catch Drain

Presently, no catch-drains are provided in the existing irrigation systems. Accordingly, additional catch drains with a function of escape have been proposed in the planning.

f) Drop

Drop structures should be replaced with new ones at same the locations where the old drops exist, because it is difficult to acquire additional land for newly planned drop structures.

g) Aqueduct (Open type)

Water leakage is observed from the existing aqueducts. And the length of the existing aqueducts is mostly 3 to 5m. In several schemes (Biswambhara, Shali Nadi, Kutudhal, Thika Bhairaw II), middle size (10-20m) aqueducts are constructed.

In the rehabilitation plan, concrete made aqueducts have been proposed.

h) Road Crossing

Typically, 3 types of road crossing have been proposed depending on the length.

Type-1: 3m length Type-2: 5m length Type-3: 7m length

i) Others

There exists 1 siphon structure in Bidol irrigation scheme. Presently, this structure is out of order and needs replacement with new one.

4.2.5 On Farm Facilities

Field diversion box has been newly proposed at an interval of 50m (average) along the tertiary canals (main farm ditches) in the field to control irrigation water in slope area and to divert irrigation water to farm ditches. These farm ditches (small earthen ditches) should be constructed by the farmers.

4.3 Rehabilitation Plan

Rehabilitation plan for 13 schemes is shown in Tables 4-2 and 4-3.

5. PROJECT ORGANIZATION AND IMPLEMENTATION

5.1 Present Organization

At present, district irrigation offices are considered as one of the most important government organizations which are responsible for construction of medium to small scale irrigation schemes in the Valley as well as for rehabilitation of the irrigation schemes with the said scale. And these district irrigation offices are implementing and rehabilitating many small to medium scale irrigation schemes in the Valley and even outside the Valley under the Irrigation Sector Programs (ISP). with the aid of Asian Development Bank, of which first stage started in 1989.

Note: Irrigation Sector Program (ISP) is included in the Irrigation Sector Project. The total project cost is estimated at US \$ 47.1 million. The project cost consist of a loan from ADB of US \$ 36.3 million, contribution of US \$ 4.7 million by HMGN, contribution of US \$ 4.4 million by farmers in cash or by labour and grant of US \$ 2.01 million by United Nations Development Program (UNDP) for consulting services and training. In the program, priority is given to rehabilitation, extension, and upgrading of the existing framers-managed irrigation schemes as well as to construction of new small and medium-scale gravity irrigation schemes. Originally, as stated earlier, the first phase of the program started in 1989 and is scheduled to be completed by December 1994. Negotiations for the second phase of the program are in progress between HMGN and ADB.

However, at present, these district irrigation offices are suffering from shortage of technical staff and budget allocation especially for O&M of the completed irrigation schemes. These problems are summarized below.

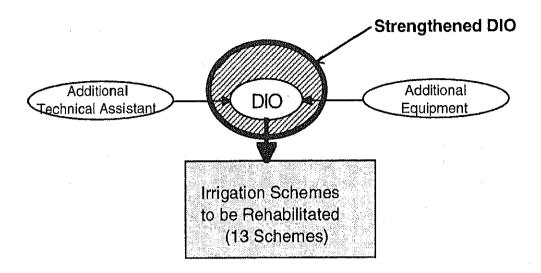
- (1) It has been observed that the district irrigation offices in Kathmandu, Bhaktapur and Lalitpur districts do not have enough staff. Usually these offices have 15 to 20 staff including administrative and service staff. However, the technical staff at each DIO are few, usually consisting 3 to 4 technical staff. And these technical staff are now taking care of many medium to small scale irrigation schemes in the Valley. Accordingly, these technical staff should be reinforced by additional man power allocation of 3 technical staff at each DIO in consideration of implementation stage of the project.
- In addition, it may be pointed out that these Dols do not have enough equipment to implement or rehabilitate even small scale irrigation schemes in the Valley, although some kind of heavy equipment for construction, such as bulldozers, dump tracks, power shovels etc. may be borrowed from Department of Irrigation. However, other than these heavy equipment, it seems necessary that these offices should have such light equipment as jeeps pickup trucks, motor cycles, audio visual sets, survey equipment, tools etc. aiming at improvement in the performance of construction, rehabilitation and O&M of the irrigation facilities.

As a result, it is considered necessary that these district irrigation offices in Kathmandu, Bhaktapur and Lalitpur districts should be reinforced with respect its equipment and technical staff immediately. The recommended equipment to be additionally provided at each DIO are listed in Section 2.3 of Chapter 2 of this Annex-5.

5.2 Proposed Organization for Implementation

Basically, rehabilitation of the 13 target irrigation schemes under the project shall be carried out under the leadership of DIOs which will have more reinforced functions through the project. Accordingly, the said DIOs are considered as main executing government agencies of the project. And they will implement the project in collaboration with Department of Irrigation and the farmers who will receive the benefits from the project. To support the technical staff at each DIO during implementation of the project, it may be recommended to provide a foreign senior technical staff at each DIO from the initial stage of the project. And his main assignment to the project shall be management of the project at various stages. And he will be well-

cooperated with other technical staff of each DIO. To achieve this, it is recommended to provide 3 technical assistant engineers at each DIO additionally. The proposed organization for implementation of the project is shown below.



5.3 Proposed Organization for O&M

In principle, under the project, O&M of the rehabilitated or improved irrigation facilities shall be maintained by all the farmers who will belong to the rehabilitated irrigation schemes. As to the proposed organization for O&M, see Section 3.3.7 of Chapter 3 of the O&M Manual. The basic ideas for the proposed organization are summarized below.

- (1) As the basis of the proposed organization, farmer-irrigators' groups (unit organizations) shall be organized under each irrigation scheme and they will consist of 20 to 30 farmers with total agricultural areas to be irrigated of about 5.0 ha. And O&M of the rehabilitated irrigation facilities and water management in the rehabilitated irrigation schemes shall be conducted on the basis of these unit organizations.
- (2) These unit organizations shall be guided by the turnout leaders who will be selected from the farmers as is seen from the figure given in the said Section of the O&M Manual.
- (3) And these unit organizations shall be combined into a committee of the respective WUAs as is seen from the said figure.

With these basic considerations for organizations for O&M, the O&M and water management under the project shall be carried out, and the committee of WUA is considered to be the top decision-making organization in handling O&M and water management in each irrigation scheme.

5.4 Implementation Method

Implementation of the project shall be made on the following concepts.

(1) The implementing agencies of the project shall be 3 DIOs in the Kathmandu, Bhaktapur, and Lalitpur districts, which are to be reinforced through the project with respect to its equipment and technical staff.

- During implementation of the project, DoI as well as the Central Regional Irrigation Directorate (CRID) shall provide necessary assistance to the technical staff of DIO whenever necessary including renting out the heavy equipment possessed by DoI to each DIO. The rehabilitation/improvement works for the project shall be carried out from the intake facilities up to the tertiary canals on the contract basis by the prequalified contractors. And the farmers will take part in construction of all the irrigation facilities after the tertiary canals with proper technical guidance by the assistant engineers of DIOs, for which no payment to the farmers shall be basically made.
- All the farmers who will receive benefits from the project shall participate in the various stages of the project, i.e., (i) preparatory stage of the project, (ii) construction stage of the project, (iii) handing over stage of the project and (iv) O&M stage of the project. At preparatory stage of the project, the farmers shall receive necessary information and lectures on the project from AOs, the Mobile Irrigation Team (MIT) and assistant engineers of each DIO for smooth implementation of the project and formation of the organizations of different levels which are specified in the O&M Manual.
- (4) At the handing over stage of the project, final training and lectures for O&M and water management shall be given by AOs, MIT, assistant technical engineers of DIOs and other senior advisors to the responsible farmers selected from each irrigation scheme. At the same time, on the job training accompanied by the assistant engineers especially for O&M and water management shall be also carried out for the selected farmers.

With these concepts, the project should be implemented under the technical and administrative leadership of each DIO in collaboration with DoI, farmers, AOs, MIT, and other technical staff where necessary.

5.5 Implementation Schedule

Implementation of the project shall be carried out according to the following schedule for each irrigation scheme as proposed below.

Schedule -1	Biswambhara, Katunje,	Dhakshinkari, Kutudhal,	Indrayani, I Mahadev Khola, I	Bidol, Lubhu
Schedule-2	Boshan, Thika Bhairaw I	Shali Nadi, I	Kotkhu,	
Schedule-3	Thika Bhairaw I			·

Implementation Schedule

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6 COSTS ESTIMATES AND DISBURSEMENT SCHEDULE

6.1 Assumptions

In the cost estimates, the following have been taken into account.

(1) Exchange rate

Following exchange rates have been used: US\$ 1.00 = NRs.49.0 = \$100.0, NRs.1.00 = \$2.04

(2) Labour's costs

Labour' costs are based on "Labour's Cost of Bhaktapur District. (F.Y. 1994-1995)". Main labour's costs are shown in Table 6-1.

(3) Unit Price of Construction Materials

Unit price of construction materials are based on the prevailing market prices as of May, 1994 as shown in Table 6-2.

(4) Unit Price of Civil Works

Unit price of civil works is estimated based on "Construction Works Rate Analysis Norms, Design Manuals for Irrigation Project in Nepal" prepared by DIO in February, 1990.

6.2 Direct Construction Cost

The direct construction cost includes construction/rehabilitation of intake facilities, canals and other related structures, and temporally work cost. The direct construction cost of each irrigation scheme is summarized as follows and breakdown of the cost is shown in Table 6-3, 6-4 and 6-5.

Direct Construction Cost

	(unit: NRs.1,000)					
Item	L.C.	F.C.	Total			
Biswambhara	8,798	6,466	15,264			
Boshan	10,348	7,672	18,020			
Dhakshinkari	8,026	6,045	14,071			
Indrayani	8,287	6,024	14,311			
Shali Nadi	13,517	9,328	22,845			
Bidol	6,858	2,890	9,748			
Katunje	4,112	3,087	7,199			
Kutudhal	5,644	4,105	9,749			
Mahadev Khola	14,413	10,645	25,058			
Kotkhu	23,500	16,736	40,236			
Lubhu	14,614	10,337	24,953			
Thika Bhairaw I	60,432	41,296	101,728			
Thika Bhairaw II	15,422	10,907	26,329			
Total	193,973	135,538	329,511			

6.3 Land Acquisition

Though land acquisition is not necessary for the construction/rehabilitation works of intake facilities, canals and other structures, it is necessary for the office building for O&M activities.

Land price and required area for the office building are as follows:

Unit Price:

NRs.200,000/ropani (= 0.05ha or 50m²)

(based on average price by the Inventory Survey)

Required Area:

650 m² in total (50m² for each office building for 13 schemes)

6.4 Operation and Maintenance Cost

(1) O&M cost for procuring O&M equipment

O&M cost for procuring O&M equipment is summarized as follows and breakdown of the cost is shown in Table 6-6.

			(unit : NRs.1,00	0)
Item	L.C.	F.C.	Total	
Equipment for DIO	5,367	10,006	15,373	
Equipment for WUA	224	605	829	
Building Facilities for WUA	5,129	1,517	6,646	
Total	10,720	12,128	22,848	

(2) Annual O&M Cost

Daily O&M activities will be carried out by the farmers themselves and O&M cost (Water Charge) for the O&M activities will be collected from the farmers.

Disbursements for the O&M activities are as follows:

Maintenance cost for facilities:

1% of direct construction cost of each scheme

per year

Salary for office staff:

2-4 members for each O&M office

(Engineer, Accountant)

(number of office staff should be decided

depending on the scheme volume)

Material cost for

monthly information paper:

Paper for print, ink, etc.

Fuel for vehicles:

for patrol and maintenance work (2 vehicles)

Amount of the water charge is estimated from the total amount of O&M cost for the above-mentioned items. And recommendable amount of water charge is proposed as follows:

NRs.100/0.3ha farm land (=1 unit) / month (= NRs.1,200/0.3ha/year)

Annual O&M costs are summarized as follows and breakdown of the annual O&M costs are shown in Table 6-7.

				(unit: NRs.)
Scheme	Area (ha.)	Nos of unit	Total amount of collected water charge	Total amount of annual O&M cost
Biswambhara	115	383	460,000	316,635
Boshan	153	510	612,000	350,802
Dhakshinkari	84	280	336,000	251,315
Indrayani	126	420	504,000	309,017
Shali Nadi	196	653	784,000	454,528
Bidol	40	133	160,000	200,435
Katunje	50	167	200,000	176,683
Kutudhal	54	180	216,000	202,879
Mahadev Khola	140	467	560,000	418,921
Kotkhu	308	1027	1,232,000	647,911
Lubhu	163	543	652,000	421,870
Thika Bhairaw-I	621	2070	2,484,000	1,317,251
Thika Bhairaw-II	110	367	440,000	426,415
Total	2,160	7,200	8,640,000	5,694,662

6.5 Other Works and Items

(1) Administration Cost

Administration cost is estimated at 15% of direct construction cost.

(2) Engineering Cost

Engineering cost is estimated at 7% of direct construction cost.

(3) Physical Contingencies

Physical contingencies are estimated at 3% of the total of construction cost.

(4) Price Escalation

Price escalation is estimated at 12.0% for the local currency and 3.9% for the foreign currency.

6.6 Disbursement Schedule

Disbursement schedule has been prepared depending on the implementation schedule (see Section 5.5) and is shown in Table 6-8. Total project costs are summarized in Table 6-9.

Tables



Crop Coefficient (Kc) for Selected Crops

Table 3 - 1

Month	J.	Jan.	Ľ	Feb.		Mar	Apr.	Ľ.	May	ž.	Ę		国		Aug.		Sep.	_	ğ	_	Nov.		 26 27	Growing	Irrigation
Period	Early Late	Late	Early Late	Late	Early	Early Late	Early Late		Early Late		Early Late		Early I	Late E	Early Late		Early Late		Early Late	-	Early Late		Early Late	Репос	Period
Paddy		! 										ţ,	**	1.10	1.10	1.10	1.10 1.05		1.05 0.95	56'0 56	# 5			120 days	105 days
Paddy (L)														<u>ئ</u> ر	1.10	1.10	1.10 1	1.10	1.05	1.05 0.95	5 0.95	## S		120 days	105 days
Wheat	0.65	1.05	1.15	1.15	1.15	06:0	0.40	0.00	0.00	**												**	0.43	150 days	105 days
Legume	0.75	0.95	1.05	1.05	96:0	0.00	#									-,					**	9. 6.	0 0.50	120 days	90 days
Legume (L)	0.50	0.75	0.95	1.05	1.05	96.0	0.00	*					4000									#	0.40	120 days	90 days
Mustard	0.82	1.08	8.	0.72	80.0																	0.40	0 0.40	90 days	75 days
Potatoes	0.66	0.96	1.13	1.10	0.98	3 0.79												//www.v.v.				#	0.44	105 days	75 days
Early Potatoes 1	1.08	0.82																			0.46	6 0.84	н 1.13	75 days	60 days
Early Potatoes 2	1.13	1.08	0.82																			0.46	6 0.84	. 75 days	60 days
Late Potatoes		:		34.	0.84	1.13	1.08	0.82												·····				75 days	60 days
Maize										#	0.45	0.60	0.80	1.05	1.05	1.05	08.0			ļ 				105 days	90 days
Summer Vegetables	səlc																							· · · · · ·	
S. Vegetable 1							#	0.34	2,0	0.93	1.05	1.05	2	0.91	*									105 days	105 days
S. Vegetable 2									#	0.34	0.54	0.93	1.05	1.05	1.04	0.91	##							105 days	105 days
Winter Vegetables	Sa																			·				······································	
W. Vegetable 1	0.38	99.0	0.92	0.95	5 0.90	*								-								**	0.28	90 days	90 days
W. Vegetable 2	**	0.28	0.38	0.68	3 0.92	2 0.95	0.90	#:																90 days	90 days
W. Vegetable 3						-					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				*	0.28	0.34	0.54	0.86	0.95 0.	0.95 0.89	# 68		105 days	105 days
W. Vegetable 4	*			Married Company	salent transcolor makene												#	0.28	0.34 0	0.54 0.	0.86 0.95		0.95 0.89	105 days	105 days
W. Vegetable 5	0.94	0.95	68:0	**					m=	***									*	0.27 0.	0.32 0.42		0.62 0.86	5 150 days	120 days
1.0	***	de pool of	101	300		1	֓֞֜֜֜֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	- idad	idad hafara	12.06	100	1) popul	Chouse to #	4										

Note 1: Where less than 1/3 of cropping area will be provided before indicated cropping period (shown in #), same coefficient of next period shall be used.

2: Similarly, after cropping period (shown with #), crop coefficient of previous period shall be used.

3: Crop coefficient of paddy is after transplanting.

Table 3-2.1 Irrigation Requirement for Paddy Irrigation Efficiency, etc.: Deep percolation rate for paddy = 5.0 mm/day | Conveyance Efficiency = 80.0% | Field Efficiency for Paddy = 85.0% | Irrigation Efficiency for paddy = 68.0%

Conveyance Efficiency = 80.0% Imigation Efficiency for paddy = 68.0%

Field Efficiency for Paddy = 85.0%	r Paddy = 85.		E I	gation El	fliciency f	Imgation Efficiency for paddy =	68.0%				}													
Period	Early Late	Earl	y Late	Earl	v Late	Ē	Apr.	Early 1	May	Farty I	1 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Fark I	I ate Early	AUE.	17	Sep.	0	- I	Nov	1	Det	\neg		
		1		1	-	┥ .	4		_'_		+-	- -	╫		╌	<u> </u>	3	_	_L		_	T'ATE	Annual Kemarks	<u>اي</u>
:		:				-			ĮŹ.	Mursery	K		-		-	-		1	_					
Cropping Pattern									<u></u>	Land Preparation	ration	<u>e/</u>	ransplanting		Paddy	>	/	Prair	7/	Harvest				
		- 1			.		ŀ					1 1	1.				1							
Ħ	1.73	1.93	3.05	3.80	98	475	5.73	S S	9.5	5.15	4.65				Li	ľ	ı		2.55	2.05	1.80		3.64 mm/day	
KC Padder	70.0	П	1	١	1	1	-	82.5	89.6	113	- 1	- 1	- 1	ŀ	Į			il	383	30.8		25.6	1,328 mm	
							,					- 1							0.95	0.95		•	Paddy	
+														١.		l	l	Į.	2 #2	195		_		
,																			36.34	29.21			578 mm	
Leep rencolation P (mm)										75.00	7.0027	75.00 8	80.00 75.	75.00 80.00	00.27 00	00.27 00	75.00	80.00	75.00	75.00			915 mm	
11000 - 51 + 5 (11011)										4	- 1	_	_	_	_	_			11.3	104.21				
Field imgalion Requirement												ĺ	l									-		
5			-										75% 100	100% 100%	% 100%	£ 100%	9001	75%	25%					
										- 1	-			1					9.1				436 for Paddy	
(mm) JT																	ļ							
Net I D (mm)												\$												
The Late of the La										- 1		i						- {					150 mm	
Ħ														ĺ								<u> </u>		
(min) Justi		ĺ	1			Ì					- 1	i		-			-						540 mm	
rotendal Eo min day	3 5	255 5.00						9.70	6.55					5.05 4.90	04.70	70 4.50	4.25	3.90	335	2.75	2.37	2.15		
(min)	3	55 45.0U	57.72	5 69.75	78.75	5 85.50	81.50	88								_			5025	41.25			1,5% mm	
paredaid sary										νη •	88.	Š,	35.											
3											- 1	ŀ	19.4			į							85 mm	
	5		٠					!																
Detected Differs Daine 11 (com)	0. 1 0							45.10	유 당 당										0.00	0.00	0.00		1,215 mm	
	‡ ^c	160 161	Ä	2	C.	21.48	ñ	3834								•			900	8	0.00	0.00	905 mm	
to be in		٠.					-	>	5	16.70	200.57	25.55 13.55	137.27 107.10	.10 80.71	1. 8 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	7 45.65	37.8	5.70	0	0	0	0	729 mm	
Net Re (mm)	,			1															25%				i i	
政										1	1	- 1	- 1	-1	1		1		,	,		+	NA IIII	
(mm)	٠						,	٠	,														(C)	
,,	85.0% 85.0%	0% 85.0%	% 85.0%	2 85.0%	% 85.0%	% 85.0%	85.0%	85.0%	85.0%	1	1	i	1	Ŧ.	ľ	1	1	1		85.0%	8 200 8	24 US	OZI UMII	
Field Requirement (mm)	•				•		•	•	,	15.1	104.1	135.4	22.8 43.8	3.8 83.0	.0 63.2	100.1	068	9	10.7))	730 mm	
(mm/day)	•		,			,		,	•											•	,	,		
-	- 1	•	- 1	- E		F		٠,												•		-		
Conveyance efficiency 80.0%	80.0% 80.0%	80.0%	\$0.0%	80.0%	% 80.0%	3008 %	80.0%	80.0%	80.0%	ı	ı		1	1	1	1	1	1		80.0%	80.0%	80.0%		
Diversion Requirement (mm)	,		1				•	1	•													· ·	913 mm	
(mm/day)		1			,	•		•	٠											•	,		for Paddy	
							•	•	•			1.306								•		- ;	in Zone-A	
Monthly average (Us/ha)		1	i		į	ı	٠		•		0.575									0.052		·		_
Zone - B														•								-		
	1.30 7.	7.90 10.80	020	0 11.10	0 11.30	0 7.70		39.90											8	8	ç		1.000	
Potential Effect Rainfall (mm)							28.56	33.92	4437	83.05	76.16 11	116.62 14	7 4 12 13 27	3 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	93.0	3 5	2 5	8 8	3 8	3 8	90	3 5	1.504 mm	
Effective Rainfall Re (mm)	0	0	0	0	0	0		0											9	2	3 0		2,007 mm	
Area to be irrigated																		ř	250	>	>	>	THE THE	
Net Re (mm)	•				,	,	•	•	٠										,				, mm	
Total Net (Et + LP + P + Eo - Re)										1		1	1	1	1	1	1		' 			1	300	
	- 1	- 1							1											•		•	5.50 Hill	
	85.0% 85.0%	0% 85.0%	% 85.0%	\$ 85.0%	% 85.0%	% 85.0%	85.0%	85.0%	85.0% >	ı	ı	1	ı		1	ı	ı	1	ı	85.0%	85.0% 8	85.0%		
rieid Kequirement (mm)		1	,				•	•	•													-	642 mm	
(muniday)				,			•	•			8 .9									•	,	ï		
-1		1	- 1	- 1	ſ	- 1	- 1	٠.۱	- 1	. !	- 1	- 1	- 1						- 1	•		,		
Diversion Requirement (mm)	30.0% 30.0%	40.00 	20:02 20:02	80.0% 8	% 80.0% %	8 0.0 0.0	80.0%	80.0%	80.0%										80.0%	80.0%	80.0%	80.0%		
Ē									. ,										13.4 4 8	•	•	- -	802 mm	
	!			•			•		. 1	0.136	100.	1306	0.206 0.251	51 0.295	25 0.539	9 0.827	0.862	0.585	0.103	٠.	٠,	, ,	in Zone-B	
Monthly average (Us/ha)										-	0.5570	٩	- 1	1	- 1			ì		0.052		-]

Irrigation Requirement for Paddy (L)

William ...

Table 3-2.2 Irriga Irrigation Efficiency, etc.:
Deep percolation rate for paddy = 5.0 mm/day Field Efficiency for Paddy = 85.0%

Month	-	Jan.		£	Mar	ľ	Apr	_	May	_	lin,		1	4110	ļ	c.	_	5	-	Nov	-	1	-	
Period		Early Late	Early	Late	Early Late		Early Late	1	Early Late	te Early	y Late	Early	Late	Early Late	-	Early]	Late	Early La	Late Early	ly Late	Earty	Late	Annual	Remarks
	٠.																-					_		
Cropping Pattern	-			•								Nuisery Land Pre	Cursery	- E-	Transplanting		Paddy (L)		<u> </u>	Drag	Harves	11 /		
	-	- 1	1	- 1				- 1	- 1			ŀ	- [<u> </u>		1 1		1 I		l t		- [ŀ	
Eto	muriday	1.73 1.93	2.40	3.05	88.	9	57.	533	5.50	5.60	5.15 4.65	55 4.45	5 4.30		4.05	- 1	- 1	- 1	- 1	ı	- 1	1.60	l.	ımiday
Ke Paddy (1.)			İ	Т	27.0	+77	2	ı	ı	1	-	1	1	L_	7 7	- 1	- 1	- 1	- 1	1	- 1	Į	L	1,326 mm Padder (1)
- Kex Flo	mmiday													463	446			ŀ	- 1	- 1	- 1	, ,		(T)
Ð					-									69.30	71.28							- vo	463 1	4
ч	(HIII)						· .			•	ļ	75.00	00.08	75.00	80.00	75.00	75.00	75.00 8	80.00	75.00 75	75.00 75.00	0	840 mm	ш
Tions = Et + P (i	(III											75.00			151.28	- 1	***	٠.١				55		
Field Irrigation Requirement	- 1													ě	500	3000					ş			
Area to be impated	Saled													Š ;	8 6	100%		885	186 186 187	700. 800. 800.	χ.		ş	
					-								- [-	713	63.5	- [ı	-	-	4.6		88	388 for Paddy (L.)
ء . کا .	Ê											8 1												
Cana Desparation area			J.									አዸ											5	
٠.			-									1,	ı	1		2000	- 1		ł				R	
Net P	(mm)											ñ			38	15 K	2007 1207	250	2 S	27.5 27.5			5	
E	100%	230 255	300	385	465	\$2.5	W. 5	6.10		t	1		1	}	8	4.70	1	1	1	-	1	1		
		(*1	4	41		87.5	85.50		. 88 88 88 88	98.25 90.00	84.00		-		8 E	70.50					41.25 35.55	32.25	1,596 mm	H
Ē.	barred											5%	50%	80%										
я В В												4.											81 mm	
																-								
Provable Ramfall R80 (1					6 8	8.5				55 E	68.20 119.80	86 142 20 25 25 20 25 25 20		15.00	11530	121.10				0.00	0.00 0.00	9 S	1,215 mm	a
		177	769	, 0	8	27.5	31.48	25 25 25 26 27	88 84 64						20.5	1 5 6 Kg								a .
be ii.	eated				>	5	>	>	>	5			200		100%	100%	100%	1 20	100%	5 200%				note:
Net Re	(H)	•			٠	•	•	,		4		3.8		107.1	80.7	84.8							- 403 mm	mu
Total Net (Et + LP + P + Eo - Re)	- Re)	:												i i	1		1	Į					<u> </u>	
	_1	- 1	- 1		'	- 1	- 1	- 1	- 1	•	- 1	ı	- 1	- 1		- 1	- 1	- 1	- 1	- 1	- 1	1	- 757 mm	nnr
		85.0% 85.0%	82.0%	85.0%	85.0%	82.0%	85.0%	85.0% 8	85.0% 85.		320%										98 85.0%	% 85.0%		
Freid Requirement ()	(ii)	•		1		1	1	•				. 13.									7;		mm 168 -	щ
	(I/s/ba)		1 1		1 1	г .	1 1					0.30	5 1535	9.17	9.0	2 6	0.70	0.837	1976	0.670	0.133			
ľ	ــــــــــــــــــــــــــــــــــــــ	80.0% 80.0%	20.08	80.0%	80.0%	80.0%	80.08	80.0%	80.0% 80.	80.0% 80.0%	35 80.0%	1		1		1	1	1	1	1	80.08	\$ 80.0%		
	(mm)			•	•	•	٠	,															- 1,113 mm	E
변	(mm/day)		,		•	1	•			•		- 1.13									4 5	,		for Paddy (L)
	(Fisha)					I ,	ř.	,				- 0.13									0.166			in Zone-A
Clage	S III			'									1.00		0.00		0.010		905	5	777			
Zone - B Provable Ramfall R80 ((mm)	130 790	10.80	06.6	11	1130	7.7	33.60	39.90						176 40	130.00		05.04						£
Zainfall		0.00				19.6	કુ			4437 83.	83.05 76.16		2 142.87		133.55	91.00		34.60	000	900	000	0.00	1,007	
Effective Rainfall Re ((mm)	0 0	0	Ö.	0	0	0	0	0	0	0	0 75.0			123.55	91.00								mm
. 🗷	galed											Š	% S	100%	81	20%	100%	2003	100%	100% 5	50% 50%			
(mm) SA ROY SA				-		-	-	-	-			ا ا	-	- }	12.0	21.0	- 1	e H					1	E .
3 + 3 + 3				٠.	•	•	٠	•		٠,	,	- 11				47.5					4.6	,	- 697 mm	uu uu
	85.0%	85.0% 85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0% 8	85.0% 85	85.0% 85.0%	36 85.0%	l				85.0%	1	1	1	ı	85.0% 85.0%	\$ 85.0%		
Field Requirement ((mm)			.'	•	٠	•	,				. 13,				55.9					7.2		- 820 mm	mm
1	(mm/dav)	•			1	1	1		1	,		90.				3.73			17.6		15			-
1	(US/ha)	11			•	•	- 1		ı	- 1		٠,	- 1	- i		0.431					0.133	- 1	<u>-</u>	
Diversion Requirement		80.0% 80.0%	8. 'S	80.08	80.08	80.6	85.038 85.038	80.0%	8008 8008	80.0% 80.0%	5.08 80 '	76 80.0% 14.0	80.0% 0.66.6	80.0%	80.0%	30.08	80.0%	80.0%		80.0% 108 A 80.1	0.0% 80.0%	% 80.0% **	200	
į	(maniday)			•	, 1	, ,		, ,				= 1				4					H 1		<u></u>	for Boddy, (1)
	(l/s/ba)			•	'	1	1		•	1	,	0.131				65.0			1.405		96.			in Zone-B
Monthly average (E)	(Ls:ha)	•	,	•		ı		•		•		,	1.030								0.502			

	Annual Remarks	3.64 mm/day 1.328 mm	Wheat 316 mm	0 mm	268 for Wheat	0 шш	1,215 mm 850 mm	50 mm 39 mm	228 mm			475 mm for Wheat		1,364 mm	1,007 mm 49 mm	42 mm	226 mm	37.5 mm			470 mm for Wheat	
	Tate /	1 + 1	0.69	11.01	75%	-;-	8,00		j	i	•	17.2		3.20		İ			0.86	1.	17.2	
	Early Dec	1.80	0.77	11.61	25%	•	000	25%	l	1	0.32		0.047	220		25%	1	%0.09 4.8	0.32	1	0.40	È.
	ist.	30.8)		1	0.00	0	,	%0'0 9		80.0%	• '		9.0 0	'		%0.09	' ' '	80.0%	•	' '
	Early T	38.3		1			0.0	0	'	60.0%	′ '	80.0% ' '	•		9.00	•		%0.0 %		80.0%	, ,	'
	ate	3.10				1	6.70	0	•	%0.0 %	' '	80.0%	• •	3.60	0.00 0.00	'	-	60.0%	• •	80.0%	1 1	' '
	Oct. Early 1	3.45				'	41.10	0 '		%0.09	' '	80.0%	•	40.70	34.60 0	'	'	60.0%	• •	80.0%	1 1	'
	ate	3.70					53.70 53.70	0		%0.0%	' '	80.0%	• '	71.00	60.35	- 1	'	60.0%	,	80.0%	, ,	'
	Sep.	3.85		-		1	121.10	0 '	,	20.09	٠ ،	80.0% - ,	•	130.00	91.00 0	,	. '	20.09		80.0%	١.,	۱
	Late	4.05					11530		•	60.0%		80.0% '			123.55 0	•	•	20.09		80.0%	•	٠ - ا
	Early Early	63.0					153.00	ο '		%0'09 *	. ,	80.0% - '	,		122.221 0		•	250,03		80.0%	• •	.
	Late	4.30				,	196.10		,	. 60.0%	- 1	%0.0% - ,	• •	204.10		٠ ،	•	20.09		80.0%	• •	٠ :
	Jul. Early	4.45		ļ, 		,	142.20		l				•		116.62	٠,		%0.09		80.0%		٠
	Late	4.65					119.80	· ·	l	60.0%	- 1	%0.08 ' '			76.16 0	. 1	,	60.09		80.0%	i 1	٠
	Jun Early I	5.15				,	68.20 1			60.0%	1		4	1	83.05 0			%0.09	k di i	80.0%	• •	٠
	98 /	5.60	0.00				50.40		١	- 20:09				52.20		: ,	l i	%0.09		80.0%		١.
heat	May Early I	5.50	8				45.10		'	60.0%		80.0% ''']	33.92 0	,		960.09		80.0%		٠
for W	ate	5.23	0.00	-		-	30.40		٠	9 %0.09		80.0%8	0.038	33.60				60.0%		80.0%		0.044
1 1	Apr. Early L	4.75	28.50 50.50	28.50	25% 7.1		13.50		1	7.9				į .		25% 1.6	5.5	l	0.61	- 1	0.76	0.0888
Iremo	rigation E	4.40	``	1	75% 47.5	,	17.90		1	1	3.97 0.460 (0.575 (- {			4.20			0.755
igation Requirement	Mar Early Late	3.80	. ~	1	100% 65.6	1	04.9			98.3				11.10	*	9.4			624			20.50
ion F	Late Es	3,05	~	i :			6.60	12	ŀ	•		80.0% 84 85.4 1 6.57		9.20		100% 1 7.8		60.0% 64		80.0%		0.609
igat Imperi	Early L	1	2.76 41.40	i i	l i	1	8.20		1			80.0% 88 743 4.95		•		100% 1	32.2			1	67.1	- 1
ITTI	Late E	-	2.03 32.42 4	32.42 4	100% 1	,	8.90		1	43.7				7.90		100% 1		٥	2,68		3.35	- 1
	Jan. Early L	1.73	"	1	100% 1		6.46 84.88		!		0.159			130		100% 1		60.0% 60			35.1 2.34 2.34	- 1
Table 3-2.3 ris, etc.: iciancy for upland crops		mm/day (mm)	mm/day 1	l	1		(mm)		100					(mm)			(mm)					(Leg.pa)
Table fency, etc.: Tificiancy for ut		in in	 	4P (squirement sa to be irrig Net Et (Area to be imigated Net P (mm)	R80 (8 =	(mm/day) (Us/ha)	cy 80.0% in (mm) (mm/day)	.		FEE	Area to be imgated Net Re (mm)		35	(mm/day)		멸	3 건
fficier ild Eff	attern			lation Joos = El	tion Requ Area I	Area	infall feet Rair	ainfall Area I Ne	E + P - R	ency		e efficien lequirem	erage	ainfall	ffect. Rai ainfall	Ara	Et + P - R	ency		e efficien	kequirem	'crage
gatto	Month Period Cropping Pattern	Eto	Et = Kc x Bto W	Deep Percolation	Field Irrigation Requirement Area to be irrigated Net Et (mm)		Zone - A Provable Rainfall R80 Potential Effect Rainfall	Effective Rainfall Are	Total Net (Et + P - Re)	Field Efficiency Field Requirement		Conveyance efficiency Diversion Requirement	Monthly average	Zone - B Provable Rainfall	Potential Effect. Rainfall Effective Rainfall Re		Total Net (Et + P - Re)	Field Efficiency		Conveyance efficiency	Diversion Requirement	Monthly average
		<u> </u>	<u>4</u> [파	Ω	<u>E</u>		<u> </u>	<u> </u>	<u>F</u>			υA	Σ	NE	<u>a ii</u>		F _	<u>Æ tī</u>		ľÖ	<u>α</u>	

Table 3-2.4 Irrigation Requirement for Legume Imagnion Efficiency, etc.:

Field Efficiency for upland crops = 60.0% Introduce for unland crops = 48.0%

| | Each of the first | 00 Effects 10 | | 1.10 11.2 11.2 11.2 11.2 11.2 11.2 11.2 | 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.1 13.0 13.0 | | |
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Table 3-2.5	3-2.	∨	Irri	gatio	n Re	quir	emen	t for	Legi	Irrigation Requirement for Legume (L)	[]														
Intranstructury, etc.: Field Efficiency for upland crops = Conveyance Efficiency =	pland cro	ps = 60.0% y = 80.0%		rigation I	Theiene	y for upla	Irrigation Efficiency for upland crops =	48.0%																	
Month	-	뒖		ę		Mar		1 12 1	1	May	Jun		늴	H	129	П	탕	h!	Oct.	L	Nov.) 25 D		
Репод	<u>n</u>	Early Late	Early.	3	Early	Late	Early	Jate	Early	Late	Early	Late	Earty	Late	Early 12	Late Ea	Early La	Late Early	y Late	Early	, Late	Early	ig.	Annual	Remarks
Cropping Pattern	3	Legume (L)			1/	Terminate Irrigation	/ _. §	Harvest														<u> </u>			
Eto mm/day		1.73 1.93	3 2.40	1	ı	1	1		3.50	1		4.65	4.45					1		ı	1			3.64 mm/day	, A
н)	(mr			39.7	27.0	ΙI	!	3 78.5		89.6	77.3	8'69	8.99	8.89	63.0	64.8	878	55.5 5	51.8 4	49.6	38.3 30.8	.8 27.0	25.6		
Kc Legume (L)	ļ		5 0.95	- 1			6 0.00															9.4	П	Legume (I	ne (L.)
£ (3		0.8/ 1.45 12.98 23.16		41.63		2 5 2 5 2 8 5	N 90															0.72	•		
Deep Percolation P (m Tloos = Et + P (m	(IIII)	12.98 23.16	6 34.20	l	58.65															ļ.		- 08.01		0 1111	
15	Т	ı	ı	1	1	1																10.0	Т		
Area to be irrigated Net Et (mm)	~	100% 100% 13.0 23.2	5 100% 2 34.2	31.2	25%	18 C																25%	ë 75%	127 for Legume (L)	:gume (L)
Area to be imgated Net P (mm)	E G	•				,	1				•		•				,		,					0 10 10	
Zone - A	L_																								
ainfall R80		6.40 8.90	0 8.20	6.60	9.40	0.271	0 13.50	30.40	45.10	50.40	68.20	119.80	142.20		153.00 11			53.70 41	41.10 6.	6.70 0.		0.00 0.00	050	1,215 mm	
											47.74			137.27 10 0		80.71	84.71 13.00 13.00				0 00 0				
a to be im		-		75%))	Ì		.	,	•	,	,		,	25%	2 75%		
2	(mm)	4.5 6.2	2 5.7	1	1.6	9				•	•	,	1			,	,			1	,	,		22 mm	
r- ke)	(mm)	8.5 16.9		27.8	133	m	ı	,	•	•	•	,	٠		ı					,	,		CL 1	105 mm	
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Ħ												•	•	•				,				ार्ग 		176 шш	
(mm(tay)	_					30		, ,				()	. ,						. ,			- 0.30	_	~	
Conveyance efficiency 80.0%	١.	80.0% 80.0%	85	80.0%	œ	% 80.0%	% 80.0%	% 80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0% 80	80.0% 80	80.0% 80	80.0% 80.	80.0% 80.0%	26.0%	% 80.0%		1		
∄		1.18 2.20	395		1.85	- v o							, ,								1 1	ν. Θ	100	215	mm for Legume (L.)
(Us/ha) (Us/ha)		0.137 0.255	5 0.457	0.515	0.214	4. 0.00	· r			• •	•	1 1	ij		Ü	1 1	ī	1 1			•	- 0.043			ne-A
								1	1	}	1						1	1	1		1.				
Provable Rainfall R80 (m Potential Effect Rainfall (m		130 7.90		920	11.10	0 11.30	6.7.7 6.7.7 6.8.7	0 8,86 8,86	39.90	\$2.20		108.80	999	204.10	174.60 17	176.50 13		71.00 40		3.60	000	0.00 2.20	0 3,20	1364 mm	
		~									9.0	07'07	110.02				9 6		3 0						
to be in			20078									•	•	S								25%	75%		
Total Nat Act to Day		ď	-	-			,			-	١	•	,		,	-						,		- 24 mm	
		- 1	_ ,	- 1	12.6	- 1					•	•	•						."			- 2.7	7 7.7	7 103 mm	
Field Efficiency 60.0	90.0% (mm)	216 274	50.0%	60.0%		80.0% 90.0%	% 60.0%	8 60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0% 6	80.0%	60.0% &	60.0% 60	0% 60.0%	0% 60.0%	56.0%		٥	100	
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Conveyance efficiency 80.0		27.0 343		80.0%		%0.0%	% 80.0%	5 80.0%	%0.0%	80.0%	\$0.0%	80.0%	80.0%	80.0%	80.0% 84	80.0% 8	0.0% 84	80.0% 80	80.0% 80.0%	.08 80	3%	왕0.08 상	% 80.0%		
5						ט גֿע					ı ı	ı I		. ,				. ,			. ,	0.38		+ 17	nun for Legume (L.)
(Us/ha) Monthly average (1s/ha)		209 0.248	8 0.402	0.470	0.203	. 0.101			, .		•	• •	•			, ,					1		3 0.116		E 2

Table 3-2.6 Irrigation Requirement for Mustard
Inigation Efficiency, etc.:
Field Efficiency for upland crops = 60.0%

State Stat	Jan Early	ale T	2	Late at	Mar	1	ы		ğ		91		ᆲᆜ	Eart	음]	Early	l.		Late	8 🗀		ᅜᆛᆛ		
Partial Market		٠.						-			4			ᅱ		Early	Late			_	+			
	•	+	- 1	4-	ľ	ł	╛																	
This bound This T	Mustard				Jarvest atk/Inigat	ion																		
This collision This							1	1	ļ	١	İ	Ì	1	١	١	ļ	C.	ı	101.0	1 55	200	50	L	2 6/ mm/day
12 12 12 12 12 12 12 12	L	200	25.0	202	385	100	0.15		-	1	1					1	55.5		30.0	38.3			1	328 mm
125 125		25	0.00	33.1	37.0	*0.	(77)	1	1	1	1	ı		1	1	ļ	3		2	3			L	Maretand
1.22 1.22		3	1.00	0.72	9.0																1			N TOTAL STATE
13 13 13 13 13 13 13 13		30.88 88.98	8.99 8.99	5 % S %																!		_	10.24	138 mm
11.83 10.84 10.8	L						١.		.			,	,						•			١.	ļ.,	0 mm
Care 100% 100% 100% 100% 20% 110% 1		30.88	36.00	28.55																			10.24	
State Lamber Lambor La																								
No. Common Comm		300%	100%	50% 11.3%																			10.2	118 for Mustard
Net Class		•		!	,		L	,					,			•	,	'	'	,			-	
Fig. Campaigned Campaigne		4																	}				_	O mm
No. Control				1 3		1			١.										Ş	5	8	5	- 6	115 mm
Charmon 1.58 2.47 3.13 1.20) (4)	2 ×	8 5	9 8	3 5													5 G	3 8	3 2	8 6	8 8	mm 028
5.5 10.0%		មិ សិ	5.74	462	9 0	0										Š	0		٥	0	0		0	21 mm
(mm) 4.5 (4.2 5.7 2.3 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2	_	100%	100%	S.																			2001	ç
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6.0778 6.076 6.076 6.076 6.078 6.078 6.076 6.076 6.078 6.078 6.079		747	30.3	12.0	٠	. '	•	,	,	,		,				•	•	٠	•		,	5.4	10.2	田田 66
(willing) 13.6 13.9 13.0	Φ	950.09	80.09		1			1		١.	١.		l_	1.	١.		60.0%	60.0%	60.0%	1	l l		0.0%	
Chemical 1.55 2.57 3.55 1.1		41.1	\$0.4	19.9		•		•	•			,	•			•	•	1	•	٠		0.6	17.1	166 mm
Stocks S		2.57	336	£ 5	•	•	•	1	1		,		1				,	1	•	•			107	
(mm) 2.35 51.4 6.20 1.32	ľ	670	60.00	0.178	1	-1	- 1	- 1	- 1	1	ı	- 1	1	1	-	Л.	1	20 Oct	80 08	ł		1	20.00	
(Hischa) 0.270 0.371 0.486 0.222 (Hischa) 0.770 0.372	ð	200	50.00	277															, '				213	207 四皿
(Ushia) 0.770 0.371 0.486 0.222 0.154 0.087 0.154 R80 (Ushia) 0.321 0.321 0.322 0.321 0.323 0.00 0.00 0.00 0.00 0.1031 R80 (Ushia) 1.30 7.90 1.08 9.20 11.10 11.30 7.70 3.60 9.20 1.10 1.30 7.70 3.60 0.00		3.21	4.20	132	•	•	,	•			ı	,				•	•	•	'	•	,		1.33	for Mustard
Clischa O.521 O.522 O.524 O.522 O.524 O.		0.371	0,486	0.222	٠	•	•	•	•		,	,				•	•	٠	•	•	•		0.154	in Zone-A
R80 (mm) 130 750 1088 9.20 11.10 11.30 7.70 33.60 39.90 52.20 97.70 108.80 166.60 244.10 174.60 175.50 130.00 71.00 40.70 33.60 0.00		0.321		0.354				1				,					'				٠		0.121	
R89 (smm) 130 759 1080 920 1110 1130 7.70 55.00 59.90 92.70 108.00 10.00 0.00 0.00 0.00 0.00 0.00						;	i												5	5	5	Ş		1364
(mm) 0.00 6.715 9.18 7.62 9.44 9.50 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		8.	10.80	07.5	11.10	9	2.70												8 8	3 8	3 5	27.0		1,504 EEE
termigated (imm) 21.3 24.2 26.8 10.4 5.4 10.2 98 (imm) 21.3 24.2 26.8 10.4 60.0%		6.715		7.87	‡ °	<u> </u>	e c												9.0	90	0			24 mm
(cmm) (xmm) 21.3 24.2 26.8 10.4 5.4 10.2 98 (mm/dsy) 21.3 24.2 26.8 10.4 60.0%		1001		8	,	,			ı		ļ.												100%	
(4mm) 21.3 24.2 26.8 10.4 60.0% 60.0		6.7	92	3.9		,	1	1	•	•	ı			,			'	•	•	'	'	,	•	20 тт
Color Colo		;	0.50	7 9					,			. '		,			•	•	•	•	•	5.4	10.2	EH 86
(mm/day) 23.5 40.3 44.7 17.3 17.3 17.3 16.4 (mm/day) 23.6 2.52 2.98 1.33 2.95 2.52 2.98 1.33 2.05 2.52 2.98 2.34 2.52 2.98 2.35 2.52 2.98 2.35 2.52 2.98 2.35 2.52 2.98 2.35 2.52 2.98 2.35 2.52 2.98 2.35 2.52 2.98 2.35 2.52	1	60.0%	. i	%0 09					l,s			1					1	1	60.0%	1	١.	1	%0.00	
(mm/day) 2.36 2.52 2.98 1.33 0.60 1.07 (Is/ha) 0.274 0.291 0.345 0.154 0.007 80.0% 80.0		7		173			•	,	•	•						'	•	•	•	•	•		17.1	164 四四
(48/ha) 0.274 0.291 0.345 0.154 (48/ha) 0.274 0.291 0.345 0.154 (48/ha) 0.3274 0.291 0.345 0.154 (48/ha) 0.3274 0.291 0.345 0.154 (48/ha) 0.327 0.345 0.154 (48/ha) 0.327 0.345 0.315 0.325 (48/ha) 0.328 0.335 0.		2.52		1		•	•	1	•	•				•			•	1	1	•	•		5.5	
Hency 80.0%	- 1	0.291	1	0.15	- 1	- 1	- 1		١,	- [- 1	- 1		- 1	- 1	- 1	- 1	- 1	. 00	. 20	- 1	1	27.0	
Comparison Com	١.	80.0%		80.0%					æ										85.08	80.03			SU.U8	305
(minoay) 2.70 3.12 3.72 1.00 0.087 0.154 (15ha) 0.342 0.331 0.192 0.087 0.154		7 Y		21.6	•	1	•	•			1	ı	•	•			. 1		• 1	, ,			7 -	for Miserard
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Table 3-2.7 Irrigation Requirement for Potatoes

Integration Efficiency, etc.:
Field Efficiency are efficiency = 80.0% Irrigation Efficiency for unland crows = 48.0%

Conveyance Efficiency = 80.0% Irrigation Efficiency for unland crows = 48.0%

Column C	Early Early	•	i	Ž		5	-1	31	Ť°L		뒴		Aug.		jep.	1	٦	ומו		ادو	_	
Products Products	Cropping Pattern Eto mm/day 1.73 Eto mm/day 1.73 Et = Ke x Eto mm/day 1.73 Et = Ke x Eto mm/day 1.73 Deep Percolation P (mm) 17.13 Field Irrigation Requirement Area to be irrigated Net Et (mm) 17.13 Field Irrigation Requirement Net P (mm) 2.00% Net Et (mm) 17.13 Field Effect Rainfall R80 (mm) 6.40 Potential Effect Rainfall (mm) 4.48 Effective Rainfall Re (mm) 4.48 Effective Rainfall Re (mm) 4.48 Field Efficiency 60.0% 60.0% Field Efficiency 60.0% 60.0% Field Requirement (mm) 21.11 (Ishha) 0.163 Conveyance efficiency 80.0% Diversion Requirement (mm) 26.3 Diversion Requirement (mm) 26.3	+	П			ı		ŀ	•									1				
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Particular 17.13 25.64 40.08 45.05 55.85 55.62 1.15 1.	Tioos = E+ P (mm) 17.13	l								'	٠							,		l		0 mm
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Participate 1779	100% 100%														-							
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P.	(mm) 6.40 (mm) 6.40 (mm) 4.48 (mm) 4.48 (mm) 4.48 (mm) 4.60 (mm) 4.5 (mm) 12.6 (mm) 12.6 (mm) 12.1 (mm/day) 1.41 (fisha) 0.163 (mm/day) 1.41 (fisha) 0.163 (mm/day) 1.76 (mm/day) 1.41 (fisha) 0.163 (mm/day) 1.76 (mm/day) 1.76 (mm/day) 1.76 (mm/day) 1.76 (mm/day) 1.76 (mm/day) 1.76 (mm/day) 1.76 (mm/day) 1.76 (mm/day) 1.76 (mm/day)	ł							-	-	ı			ı		-		1	,			
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124 344 345 352 123 348 345 345 352 123 348 345	(mm) 12.6 60.0% 60.0% 6 (mm) 21.1 (mw/day) 1.41 (ls/ha) 0.163 (80.0% 80.0% 8 (mm) 1.76				•	•	,	,	'	'	,	'	-		,		'	,	١	٠	-	22 mm
Charles Stocks Charles Charl	(mm) 21.1 (mw/day) 1.41 (lis/ha) 0.163 (lis/ha) 0.163 (lis/ha) 0.163 (lis/ha) 0.163 (lis/ha) 2.63 (mw/day) 1.76				1			,		٠	•		,				•	٠		3.0	4.	124 mm
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Lange Lang	K80 (mm) 1.30							_		108.80								0.00	0.0			364 111
ter imigated 100% 100% 15% 25% 75% 25% 75% 25% 75% 25% 75% 25% 75% 25% 75% 24 24 24 25% 75% 25% <th< td=""><td>(mm) (mm)</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>4</td><td></td><td>76.16</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>000</td><td>900</td><td></td><td></td><td>,007 mm 43 mm</td></th<>	(mm) (mm)		-					4		76.16								000	900			,007 mm 43 mm
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(Jinha) 225. 382 52.5 44.7 193 (mm/day) 1.90 2.39 3.50 3.44 1.29 (Jinha) 225 4.38 6.56 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.	(mm)																					101
(mm) 28.5 38.2 52.5 44.7 193 5.0 14.1 202 (mm/day) 1.90 2.39 3.50 3.44 1.29 0.33 0.88 0.149 0.202 0.340 0.405 80.0% 80.0	60.0% 60.0%	1	1	1	, SO 09			. ا .	-	-	-	ı	ı	1	1.	1		•	1.	1	1800	171 1111
(mm/day) 1.90 2.39 3.50 3.44 1.29 0.33 0.88 (1.5ha) 0.220 0.276 0.405 0.396 80.0% 80.0	(mm) 28.5																				1	202 mm
(Us/ha) 0.220 0.276 0.405 0.398 0.149 0.200 0.276 0.405 80.0% 80.0	(mm/day) 1.90				•	,		,		•	,	•	,	,		,		٠	,		0.88	
80.0% 80.0%	(l/s/ha) 0.220	- 1									•	,					•	•	•		7.102	
(imm) 35.7 47.8 65.6 55.9 24.2 - 6.2 17.6 253 (imm/day) 2.38 2.99 4.38 4.30 1.61 - 6.4 17.0 253 (imm/day) 2.38 2.99 4.38 6.0.498 0.187 - 6.0.48 0.127 (imm/day) 0.275 6.0.498 0.187 - 6.0.48 0.127 (imm/day) 0.275 6.0.498 0.187 - 6.0.48 0.127 (imm/day) 0.275 6.0.498 0.187 - 6.0.48 0.127 (imm/day) 0.275 6.0.498 0.187 - 6.0.488 0.187 - 6	80.0% 80.0%		Γ.	8	80.0%]_	ı			_	ŀ	_				80.0%	20	œ	0.0%	
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(16/18/1) (12.12) 0.240	7 78	`		,	•	•				•	•		•			•		1		٠	01.1	for Potatoes
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Table 3-2.8 Irrigation Requirement for Early Potatoes-1 impation Efficiency, etc.:

Field Efficiency act.:
Field Efficiency act.:
Field Efficiency Efficiency for upland crops = 48.0%
Irrigation Efficiency for upland crops = 48.0%

Conveyance Efficiency = 80.0%	e Efficienc	7= 80.0%		Impation Efficiency for upland crops =	nency Ion	מאסנות יי	1 2 2	20.0		-		ľ			-	100	-	į	-	XIO.Y	-	500		
Month		Ħ١	76 L				8.1	-+	Ngg.					an i		-	200	<u>ار</u> - الج	Į Į		EST	46.7	Armiai	Remarks
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		-																						
			Nan-																	7	; 1 		_	
Cropping Pattern	Ear	Early Potatoes-1			-															3	Harry Polatoes-1	- S		
)		Tebr	Terainate Irrigation	trion																				
						L		- 1			- 1					- [ı		1	1	١	3.64 manidae	
Eto	mm/day 1			3.05	3.80	-	4.75	5.23	SSU	5.00		4.4	3	4.20	9	3	00	0.40	3.10	1	3 0	ĺ	1	
		26.0 30.9	36.0	39.7	57.0	70.4					77.3 69.8		١	63.0	¥.	١	-	1	-	1	ı	2.0	070'1	
Early P	L.				:															0.40	φ. Ω	-		Jean Co-1
Et = Kc x Eto mm	L	1.87 1.58																		50				
		~																	-	14.15	5 22.68	3 28.93	=	
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E + P		28.03 25.32																		14.15	5 22.68	3 28.93		
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ricia marganon nequinement		10002 5000																		8	% 100%	2001 9	F8-	
THE POOR IN		8 6 6 6 6 6	٠.																	7.1				99 for Early Potatoes-1
Net Et		777																			Т	1		
.6	gated	į	•		•	, i	i	1		•					•			•					E C	
Net P	(mm)										ļ												7	
Zone - A																								
Septial Per	(mm)	640 890	0.8	9	9.40	17.90	13.50	30.40	45.10 50	50.40 68	68.20 119.80	0 142.20		133.00	11530	121.10	53.70 4	41.10 6	6.70 0.0	0.00	0.00 0.00	050	بر	
ninfall				463	8																00.00			
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e	(HH)	4.0	•	-	•		-		•															
LOBI Net (EI + F - KC)			-										. (٠	٠	•			•	,	7.1	7 28.9	92 mm	
1324	(mm)	200	200.00	200	0000	2000	200 07	200.02	2000	200 65 200	2000	200 07	20.03	20 02	2000	60.0%	60.0%	60.0% 60	80.0% 60.0%	8	%0.09 %	٥		
					2.5				3												11.8 37.	8 48.2	2 153 mm	
Field Requirement		39.2 15.9	•	•	•		١.			ı.										: ¿;	0.79 2.52			
ij. 		207 707		•	•	•			•	•				•	•			١		- 0.091		_	0.	
	ĿĽ	l'		- 1		. 00 00	. 200	. 200	00 00	00.	200 00 000	200 000	200 085	200 08	20 OS	80.0%	SO 08	80 0%	80.0% 80.0%	[~	1		球	
		1 5	90.U%	20.02	SC.52									2									3 191 mm	
Diversion Requirement			•	•	•	•				1			•	•)	,	ı	ļI		Ċ				for Early Potatoes-1
E			' .	•	1			ı					•	•				, ,		i	٦			4
		0379 0.144	٠.	•	•	•	•		•		r		•	•		•				1000				
Monthly average ((E/S/Jps)	0.261	_	'		•							'		٠					2.0	5		2	
Zone - B		· ;																						
Provable Rainfall R80	(mm	130 7.90	-		11.10	1138			••		_								3.60 1.00	0.00	0.00	2 2		
汉			2 9.18	7.82	4.6	9.61	6.55		•		83.05 76.16	116.6	428	122	13.55								3.	
Effective Rainfall Re		0 6.715	c)	0	0	٥	0	0	0	o	0	•	0	0	0	٥.	0	0	0	0			1 1 1	
7		20% 20%																		₩.	50% 100%	2 100%		
O to N				•	1	•	•	•		•				•	•	•					•		3 mm	
	(EE	28.0 9.3		•		,	•	•	•	,	•		•	•	•						7.1 22.7	7 28.9	mm 96	
Held Efficiency	ľ	12	2000	80.09	80.09	20.09	80.09	60.0%	60,0%	60.0% 60.	60.0% 60.0%	20.09	20.09 9	60.0%	60.0%	60.0%	9 %0.09	60.0% 60	%0.09 %0.09	20	9			
										,		,	•	٠	•	٠				•			.2 160 mm	
ricia Acquirement	(100)		' .	•						•				•	•	٠	•			ď	0.79 2.52	52 3.01	<u> </u>	
				•	•	•	١.						,	•	•	٠	,			, 0.0		_	6	
-	_[- 1	- 1	1 00	. 20	, 200		ľ	00 00	00 00. 00 000	200 002	200 045 2	90 0g	200.08	20 08	80.00	80.0%	20 08 20 08	ı	80.0% 80.0%	1	8	
Conveyance efficiency		7 6	% 30 .0%	80.0%	20.02				•					200	200								200 mm	
	(HH)		4		1	•	•			,				•	•			•					3	for Early Potatoes-1
<u></u>			٠ ويا ا		1		r		•		,										0114 0365			T.
		0.451 0.140	· 	f	•		•		•		•			1	•	,		ı		Ž		0070		1
Monthly average	(l/s/ha)	0295	اء					-		.			1		•					5	į	5	2	
		İ																						

Table 3-2.9 Irrigation Requirement for Early Potatoes-2

Field Efficiency, etc.:

Field Efficiency for upland crops = 60.0% Irrigation Efficiency for upland crops = 48.0%

Month Ja		Jan.	_	Ĩ				i.L	j	/ Late	Early	12.5	Early	1	i C		÷	-+	Early L	Late	Early Late	Towns.	띭.	Т	
Period	Early	ty Late	+-	Early Late	te Early	dy Late	te Early	V	•							afte	Farity	7 7 7		_			100		Amenani
					4				-			-{	-	┥ .	4	ł	4	-1	4	-1			-		
		_	/	Harvest	est																	/	-	Γ	
Cropping Pattern	E A	Early Potatoes-2		_	, ,																				
		- -		Terminate Irrigation	Irrestion	~																	\downarrow	1	
Flo	mm/day:	1.73		ľ	1	2 001				١		1	1	4 20	7	20.	200	2	į	9	1	-	-]	
-	1		20.05	24.4	30.7	Ì	4 7	713 78 5	7 6	90.00	5.15	303	0.77	U. 63	07.4	4.05	3.83	3.70	3.0	3.10	2.33	2.05	08.	1.60	3.64 mm/day
Ke Farly Potatoes-2	L		1				ı	ı	1		ł	1	ł	000	2.00	õ	0,7,0	1		44.0		1			mm 875'1
- Ke x Eto		ı	300	6																			0+70	į.	Early Polatoes-2
×-2	• • •	***		29.52																		- 12	•		126 mm
4	(mm)	١,									'		ľ	,											110
.E+P	îmu	29.32	3335 2	29.52										1	•	ı	1	•	•	,	,		12.42 21	21.50	
Field Irrigation Requirement		1																						-	
₽.				80%																		~'		200%	
N N N N N N N N N N N N N N N N N N N		29.3	33.4	14.8	ļ																	i		21.5	105 for Early Potatoes-2
	gated	•	1 -	ı			•		1	•			•		•					٠				ŀ	
) H	(III)																								0 mm
	٠				1					20.40		_	•					52.70	41.10	6.70	0.00	0.00		0.50	1,215 mm
								21.2	31.		47.74	8	8		107.10	80.71			28.77	4.69					850 mm
Effective Kamiall Re				5.74	0	0	0	0	0	0		•	0	0	0	0	0	0	0	0	0	0		0	16 mm
ij				20%																		•	50% 10	100%	
ų,		5	6.2	2.9			,		-		•	<u>'</u>	'	•	•	'		-					1	1	14 mm
1 of all ver (E1 + F - Ke)	· (iii)	0.70		9		1																		-	
Held Efficiency	V	-	T.	ŀ	20.02	2000	20 02 20 03	100 00	20000	2000		200 00	1 00		- 1	ı	- 1	- 1		- 1	- 1	- 1	- 1	21.2	72 mm
Ę	> 		5												25.00	80.0%	90.U.09	90.00 00.00		9.5. 5.76	% 0.0.00	96.00c	ъ	2,0%	
				3.6		. ,									•	•	1				,		1 6	55.6	Dim cci
		_	0	0.153			•					•	, ,	٠,		٠.	•				, ,	, ,		250	
l	80.0% 80.0%	ı	1	1	80.0% 80.0%	.0% 80.0%	30.0%	%0.0%	% 80.0%	80.0%	80.0%	80.0%	80.08	%0°C8	80 0%	80.0%	2002	\$0.0%	80 0% B	80.0%	80.0% 88	80 0%	1	200	
·		51.8		24.8			,																12.9	1 2	191 mm
um)				1.65		ı			1	,		•	•	•	•	•		٠						2.80	for Early Potatoes-2
		0.399 0.		0.191	,				,	•		1	•	•	,	•	,	1	ı	•		Ģ,	0	0.324	in Zone-A
Monthly average (1	(lis/ba)	Ö	0.404	ö	0.096		,		1	•		•		•		•		•		1		,		0.212	
Zone - B																i									
			_														130.00		40.70	3.60	0.00		2.20	3.20	1,364 mm
eria (88	8	4	83.05	76.16	116			123.55	91.00	60.35	34.60	0.00					.007 四四
Effective Kannall Ke				9.18	0	٥,	0	0		0			Q	0	0	0	0	0	0	0	0	0		0	16 四四
Area to be unigated		300%	900.	8 4																		••	50% 10	100%	
				2	,				-			1	'	-	-	٠	,	-		,		۱.		1	1i thm
	(mm)	29.3	26.6	10.2	,	,				'	•	,	•	٠	,	•	٠	,	,			,	62	21.5	E
	60.0% 60.0%		9 %0.09		60.0% 60.	60.0% 60.1	60.0% 60.0%	%0.09 %0	% 60.0%	20.09 9	60.0%	60.0%	60.0%	60.0%	20.09	20.09	60.0%	60.0%	9 %0.09	9 %0.09	60.0%	60.0% 60	120	20.09	
Field Requirement				17.0		,						•	•	•		•	٠	٠		1	,			35.8	156 四四
uat)	,			1.13	1	•				•			•	•	•	•	•	•	•	t		•		2.24	
1	(BS/BB) U.3	- 1	0.521	- 1	П	. [. 1	- 1	١.	- 1	ы	ı	•	- 1		- 1	ſ	. !	- 1	- 1	- 1	. I	0.080	0.259	
Diversion Bearings	iō	iō.		80.0%	20.0% 80.0%	.U.% \$0.U.%	C% 80.0%	% 80.0%	% 80.0%	80.0% 80.0%	80.0%	80.08	80.0%	30 .0%	80.0% (%)	80.0%	80.0% %0.0%	80.0%	80.0%	80.0%	80.0%	80.0% 80		200	
į	o (mm)	1.6	, ç	717		ı							•	,	٠	•	•			•				8 7 8	196 四四
				151				, ,					•		•					1	1	,	980	2.80	for Early Potatoes-2
Monthly average (1			0.436		0.082					'			ı	. •	•	, ,	•	, ,				;		0.212	III ZOIIC-D
																	-						-		

Table 3-2.10 Irrigation Requirement for Late Potatoes

Imigation Efficiency, etc.:
Field Efficiency for upland crops = 60.0%

Conveyance Efficiency = 80.0%

Imigation Efficiency for upland crops = 48.0%

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Modu	- 6	Jan.	į		War	4	Apr.		Toute 1	ty Tare	Lordy 1 7 other	Tong:	Jul.	μ	Aug.	Dep.	1 044	13 -	46	Early	, 46 T	Early () ata		Remarks
renog	2		_	Talk	EALLY	┪~			T Carrie				4	ă		rally.	Talk				300	arr) i	7	INCIDEL BO
Cropping Pattern	,				Late Potatoes	tatoes			Harvest Terminate lithgation	Ŗ														
Eto mm/day	\mathbf{I}	1.73 1.93	240	3.05	3.80	4.40	4.75	5.23	5.50	5.60	5.15 4	4.65	445 430	30 4.20	4.05	3.85	3.70	3.45	3.10	2.55	2.05	1.80	1.60 3.64 mm/day	n/day
Kc Late Potatoes	-	1.	I.	1	1	1	1.08	0.82				1	1				1			Ì				Late Potatoes
$Et = Ke \times Eto \qquad mm/day$ $Late Potatoes \qquad (mm)$	m/day			18.24	3.19	79.55	5.13	4.29			ļ !										! !		287 mm	E
ή 4 4 7	(II)			18.24	į	1	i	. 55		,					<u> </u>				,	,	,		тщ 0 -	Ħ
1					1	ı	Т	3																
Area intransport Area to be intrated Net Et (mm)	igated (mm)			50%	100%	79.6	100%	32.2										-					246 fo	246 for Late Potatoes
Area to be irrigated Net P (mm)	igated (mm)	•	•		r.		•			ı						•	•	•	•	•		-	- 0 mm	6
	<u>L</u>						. ;	!				ĺ	1	,	í	1	ł							
Provable Rainfall R80 (m Potential Effect Reinfall (m		6.40 8.90	820	9.6	S 8	12.8	3.50	8. 5. 5. 8.	8. F	30.45 30.45 30.45 30.45	68.20 115	119.80 142 83.86 98	90 54 137.77	77 107.10	8.77	221.10	32,70	28.77	6.70	900	8 6	800	0.50 1.215 mm	₩ E
							54.6	21.28									0	0	0	0	30			: 8
.별	ate o			80%		-	100%	50%																
S		t		2	9.0	12.5	9.5	10.6	•							'	1	,	•	•		•	- 42 mm	8
Total Net (Et + P - Re)	(mm)		,	89	413	67.0	67.5	21.5	•	,		,	,				1	'	'		,		- 204 mm	E
		60.0% 60.0%	\$ 60.0%	8	ø	Š	35	60.0%		60.0% 60	90.09	90.0% 60.	60.0% 60.0%	F 60.0%	60.09%	60.0%	60.0%	80.09	60.0%	60.0%	60.0% 6	60.0% 60.	20:09	
Field Requirement (m	(mm)		•	. 11.3			_	35.9	•	•	•						•	1	•				340 111	В
(mm/day)	(Jega)			0.87	4 5		5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5	239	, ,	1 1								1 (77	
Conveyance efficiency 80.	-	80.0% 80.0%	5 80.0%	~	1~	80.0%	٣	80.0%	80.0%	80.0%	80.0% 80	80.0% 80.	80.0% 80.0%	R 80.0%	%0.0% d	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0% 80	80.0%	
_	(HH)	•	•					8.7	•	,						•	•	1	•	1	•		- 425 mm	E *
(yap/mm)	day)			1.09				2,38	,	ı	•		ı				1	1	,	• :			2 .	for Late Potatoes
Monthly average (1/s/	(US/Da)	r	. ,	0.063	t 00:5	0.837	1.080	0.716		• •			'			,		•	. ,	•		'	#	ZAURC-FA
			ŀ					. ;										į	;		1			
	(1101)	1.30 7.90		920	11.10	1130	5.7	33.60	8 8	52.20	97.72 25.72 26.72	108.80 166	166.60 204.10	54.45	7.00	20.00	71.00	5.75	9 8	3 8	8 8	P 90	3.20 1.304 mm	8 1
Effective Rainfall Re (II		o .	0.70					3 82	0									Ş 0	90	90	0		•	
Area to be impated Net Re (mm)	(BEC)	·- •		9 9 9 8 8	100%	9.6		S 4	•		1		:	1			•			•	•		- 44 mm	Ħ
				53	38.4	`	1	1	-	-	-			'		,	'	,		,	,	ļ	- 202 mm	8
Field Efficiency 60.	1_	80.0% 60.0%	% 60.0%	9	9	À	60.0%	90.09	60.0%	60.0% 64	60.0% 60	60.0% 60.	60.0% 60.0%	56 60.0%	20.09	50.0%	60.0%	60.0%	50.0%	60.0%	60.0%	60,0% 60	20'09	
Ħ				'									,	,					٠	•			- 336 四四	E
(mm/day)	(d/s/ha)		idi Ma	0.67	17 7 17 7 17 7 17 7 17 7	82.7 83.9	7.82	85 FS			1 1		1 1						• •	1 . 1	1 (, ,	1 1	
1	l.,	80.0% 80.0%	20.0%	Г	ľ	1	Γ.	80.0%	80.0%	80.0% 8	80.0% 80	80.0%	80.0% 80.0%	30.0%	20.0%	80.0%	80.0%	80.0%	\$0.08	20.08	80.0%	80.0% 80	80.0%	
Diversion Requirement (n								37.3			•	•					1	•	•	•	•	•	- 421 пп	E .
(mm/day)	/day)	•		. 0.83				2.48	•	•			•	,			•	•	•		1			for Late Potatoes
(Jis Monthly average	(Jerba)	r		- 0.097	0.618	0.836	1.132	0.710	!				1	, .	,		, ,	1		1			a	in Cone-is
	į																							

Table 3-2.11 Irrigation Requirement for Maize intation Efficiency, etc.:

Field Efficiency for upland crops = 60.0% Irrigation Efficiency for upland crops = 48.0% Irr

			_	Total 1997			•	1			=							_	ċ	Nov.	_	2			
Period	[12]	Farty I ate	Light	1	1	1 1	ļ	, i	May	1	ı.	t	- I	┅╂	TI.	-	하		Į,	,	-1				
	1	_!	-			4	-{	- t	_	ate 1	Earty	ige H	Early Late	ste Early	ly Late	Early	Tage 1	Earty	캶	Early	Late	Early	Late	Annual Rep	Remarks
Сторріпд Райста										<u>/</u>	/		Mafze	4.	-	Territory Institut	/ j	Hannet							
												$\frac{1}{2}$		-	-										
Eto ota	yeb/mm	1.73	1.93 2.40	3.05	Н	11	4.75	523	5.50	5.60	\$15	4.65	4.45	4.30	4.20 4.05	3.85	3.70	0 3.45	3.10	2.55	2.05	1.80	1.60	3.64 mm/day	
Kc Maize	L	1		1	0.00	5		-	2	83.0	ľ	- 1			١	_]		-	- 1	- 1	30.8	1	l	1,328 mm	
	mm/dav										5 6	H	П		1	-	0.80	_					-	Maize	}
gize	(mm)												70.7 40.05	•	Ì			5 C							
	(mm)	,				ĺ,					1		ı		1							i	_	400 mm	
Tloos = Et + P	(mm)									•	34.76	3139 4	40.05 55	55.04 66.	66.15 68.04	, 45 50.64	' \$ \$ ' \$			•			,		
Field Irrigation Requirement								!			1	1	ı	1	1	1	1						-		
.8	gated										25%	75% 1		100% 100	100% 100%	% 75%		a,							
) H	Î						٠				8.7		40.1					1						318 for Maize	
Area to be imgated Net P (mm)	ngated (mm)	,	1			1	•	•	•			1			,					,	,	,	-		
																								0 mm	
			90 8.20	0 6.60		0 17.90	_		45.10							30 121.10				000	000	5		1215 11111	
ainfall					ø				31.57	35.28	47.74							28.77	4.69	8 6	8 6	00.0	3 8	058 mm	
Effective Rainfall Re ((mm	0	0			0	0	0	0					55.04 66.		_	18 37.59			0	0	0		394 mm	
Area to be imgated	gated										25%							a,							
	(mm)			,		,	•	1		٠	- 1	1	40.1	55.0	66.2 68.0	0 45.5		4		•	•	٠	'	316 mm	
	(mm)	,	,	. 1			•	•	•	,	,	ı	1	,			- 17		1		1			1	
	_	60.0% 60.0%	% eo.0%	5 60.0%	%0.09°	20:09	60.0%	260.09	60.0%	60.0% 6	60.0% 6	60.0% 60	60.0% 60.	60.0% 60.0%	%0.09 %0	% 60.0%	8	2 60.0%	60.0%	60.0%	60.0%	9 20'09	20.09	1	ļ
ricio Kequirement	(HH)		1			1		1	•	,	ı	1		•		٠	- 2.8	er.	•	•	•	•		3 mm	
(TA	(Techa)					•	•		•								0.15	•	1	•	•	•	•		
Conveyance efficiency 80		80.0% 80.0%	20 OS 20	2000	200 US	700 U8	00.00	. OU US	- 200 00		, 2000	. 1			- 1		0.022	_]		- 1	- 1	- 1	-		
_										50.0%		80.U8	80.0%	80.0% 80.0%	3% 80.0%	% 80.0% %		80.0%	80.0%	80.0%	80.0%	80.0%	80.0%		
Œ	(Agy)			•				• •							,		3.5	,	•	,	•		1	4 mm	
	(lis/ha)	•	•			,	•	•		•		, ,		• •				t r	,	•		ı	1	for Marze	
Monthly average (1/s	(l/s/ha)					. 1		•		1		•			1		0.027			•			7	in 2016-A	
Zone - B	-																						+		
		130 7.90	_		_	_				52.20	97.70 10									000	000	2.20		1.364 mm	
Potential Effect. Kamiali (1		0.00	81.6		ď	6	9	28.5					116.62 142	142.87 122.22	22 123.55		_	5 34.60	0.00	0.0	0.00	0.00	0.0	1,007 田田	
a to be im	(mm)				_	-	⇒	-	0	φ O	34.763 31					60.638	44.4	4	٥	0	0	0		400 mm	
Net Re	(EIII)	,		•	•		•	. '				9,00	100%	001 %001	_			٠ م							
	<u> </u> _							•		•		Į			DO:2 DO:0	0.C	ł		•	•	'	1	+	318 mm	1
	ı	- 1	J	- 1		17		1			•	•	•					•	٠	•	•	•		e E	
Field Efficiency 60	_	60.0% 60.0%	% 60.0%	50.0%	60.0%	%0'09	%0.0%	60.0%	60.0%	60.0% 6	60.0% 60	60.0% 60	60.0% 60.	20.03 60.0%	260.0%	% 60.0%	% 60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	20.09		
į			•		•		•	•	•		1								•	•	٠	•	•	0 mm	
	(lk/ha)						•		•				,	,			•	'	•	•	•	1	- -		
Conveyance efficiency 80	ᆫ	80.0% 80.0%	80.0%	80.08	80.08	80.08	80.08	. W	, SO 02	90.00	. 00.00	10000	2000	2000	, 200	.1		. ['			!	-		
																%0.0%	% O.U.S.	80.0% • 80.0%	86.0%	80.0%	80.0%	80.0% 80.0%	80.0%	1	
(mm/day)	(day)						•	•	•		•		,				•		,				· •	for Maize	
(Us	(lis/ha)						•	•	1	•	•	,	,		,		•		٠	•	,	,	-	in Zone-B	
	Silan							'		•		,											-		

Table 3-2.12 Irrigation Requirement for Summer Vegetables-1 Irrigation Efficiency, etc.:
Field Efficiency for whand crops = 60.0%

- 1	Conveyance Efficiency =	cy = 80.0%		igation in	ficiency :	Irrigation Efficiency for upland crops =	= Sdeup	808				-						[1		Ė	-	
Month		Jan.	_		Mar		Apr.		٤		月	-	ᇜ		鄮	-	댨.	٦ -	7			된.		
Period	<u> </u>	Early Late	Early	Late	Early	Late	Early	Late	Early	크	Early L	Late Em	Early Late	Early	y Late	Early	라 라	Early	Late	Early	ate	Fariy		Amual
Cropping Pattern			. *					/	Ō	Summer Vegetables-1	/egetabl	es-1	_	_/										
				:													- 1		- 1			ļ		
Elo	mmiday	1.73 1.93	3 2.40	3.05	3.80	4.40	4.75	5.23	5.50	5.60	5.15	4.65	4.45	430		4.05 3.85	8 55.5	51.8	3.10	2 E	30.8	27.0	23.6	1,328 шш
Kc Summer Vegetables-1	ceetables	2		1		1	1	934	2	ı		1		1			1	1			Í			Summer Vegetables-1
	mm/day						1.62	1.78	2.97	521	5.41	73.24 6	4.63 3	"	3.82									522 mm
Then Demolation P						1		,			1								'				Ī	O mm
Tioos = Et + P							24.23	26.67	44.55	8333	81.11	73.24 6	69.42 62	62.61 57.	57.33								1	
Field Impation Requirement	_						20.0	2004	2000	2000					10									
Area to be ungated Net Et (mm)	ngated (mm)						6.13	20.03	15.4 4.6	83.3	81.1	73.2	69.4 4	47.0 1	143									439 for Summer Vegetables-1
=	gared			1			1			,				·		1		1	•	•	•	•		O 田田 0
Į.																							1	
Zone - A J R80 ((ill	6.40 8.90	8.20	999	9,40	17.90	13.50	30.40	45.10	50.40		119.80 14				_					0.00	0.00	050	Ħ
Rainfall	Î						9.45	21.28	31.57	35.28			99.54 137	_		80.71 84.77	37	9 28.71	4	ð	0.00	000	0.0	
							9.45		31.57	35.28	•			41		0	0				0	b	0	408 mm
to be in	gated				-		25%	75%	100% 2.0%	100%	100%	100%	100% 7	75% 27	25% 143		,				•	•	1	337 mm
Total Nat (Gr + D - Da)	<u>J</u> .	-												1										
	(mm)	,			•			4.0	13.0	48.0	33.4						- 1		1	'	'			102 шш
	60.0%	60.0% 60.0%	% 60.0%	, 60.0%	60.0%	%0.09	9	60.0%				60.0% 60	60.0% 60	60.0% 60.	60.0% 60.0	60.0% 60.0%	\$0.03 \$	% 60.0%	, 60.0%	90.0%	on.c.	80.50 00.00 00	5.5	
Ħ	(mm)				'		62	6.7	21.6	80.	55.6									•	1	•	•	日日かり
₿	(mm/day)			! '	• •	1 .	0.041	0.45		5.01 0.579	3.71	, 1	1 1		1. 4							, 1		
Conveyance efficiency 8	80.0%	80.0% 80.0%	% 80.0%	260.0%	\$0.0%	80.0%	"			1	Į.	80.0%	80.0%	80.0% 80.	80.0% 80.	80.0% 80.0%	多0.0%	% 80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	
	(mm)	ı	r	,	•	1	7.7	8.4	27.0	100.1	5.69	•	ı			1,				•		1	•	ZIS mm for Summer Vesetables-1
THE T	(mm/day)	١.	•	•			0.51	9 9	80,5	3 5	4.5						. ,			• •		' '	. ,	in Zone-A
Monthly average	(L's/ha) (L's/ha)	1					ACO'O		6070	0.466		0.268	'	•	'	,	,		Ì					
											l												0	
	(HH)		_	9.20		_	07.70	888		52.20	5.76	108.80	166.60 20	204.10 174	174.60 176	176.50 130.00		8	88	3 6	9 9	0.00	000	1,307 mm
Potential Effect. Rainfall		0.00	6.72 9.18		2. 0.	7,01	•		33.915	4 4 5 7 5		-	÷	_			30						0	
~	igated	,							100%						25%								-	1
Net Re	E E	.•					1.6		33.9	4.44	81.1	73.2	4.69	1	143	ا ،	-	,			1	•		380 HH
Total Net (Et + P - Re)	i						44		10.6	39.0	٠	,	,	,			,			•	٠	•		54 mm
Field Efficiency	60 0g	20 09 20 09	20.09	20.09	%0.09	60.0%	8	60.0%	60.0%	60.0%	80.09	60.0% 6	60.0% 60	60.0% 60	60.0% 60	60.0% 60.0	60.0% 60.0%	% 60.0%	%0.09 4	, 60.0%	60.0%	960.0%	80.0%	
Ħ								,	17.7	6.49	٠	•									1	•	•	昭 86
1	(mm/day)		•		• ;		0.49	•	1.18	9,4	•	•		1	1 1	•							• •	
- 1	ı	-1	1	- 1	- 1	- 1	- 1	1	20,00	07+70 00 00	60.00	00.00	00.00	90.00	200 00	90.0% SU	SO 08 20 08	20 00	2002	80.0%	80.0%	80.0%	80.0%	
Conveyance efficiency		80.0% 80.0%	75 80.0% 150 00.0%	80.0%	80.08	% 50:0%	80.0% 0.03	26 26 27 28	32.0%	80.03 8.13 9.13														113 mm
	(mm)(day)	!} !			, ,		1970		8	5.07	٠	•		,		,	,					•		for Summer Vegetables-1
ļ	(l/s/ha)	•	1		1 -		. 0.071		0.171	0.587	•	•			,		,		1			•	•	in Zone-15
Monthly average ((l/s/ha)	,						0.036		0.379		•				,								

Table 3-2.13 Irrigation Requirement for Summer Vegetables-2 Field Efficiency, str.:
Field Efficiency for upland crops = 60.0%

Period Cropping Pattern			4		Ī	What	-		-	ì		İ		_	,		200	-		-				_	
Cropping Pattern		Early	Late	Early	Late Ear	Early Late	ite Early	y Late	ä	Late	Earty	Late	Early	Late	Early	24	Early L	Tige E	Early La	Late Early	ly Late	Early	Tate 1	Annual	Remarks
									/	/		Summe	Summer Vegetables-2	bles-2						-		-1	J	 	
Eto	mm/day	1.73	1.93	2.40	F			4.75 5.23	3 550	0, 5.60	5.15	4.65	4.45	4.30	4.20	4.05	3.85	3.70	3.45		2.55 2.05			3.64 mm/day	Á
Kc	Veortah	707			2.6	27.0	70.4	71.3 78	-	- 1	- 1	- 1	8.99	68.8	63.0	8.8	57.8	H		49.6		.8 27.0	0 25.6	1,328	
Kex Flo	mm/day								5	_	•	1	3		\$	15.0	0.91							Sumn	Summer Vegetables-2
s-2	(HIII)								28.05			4 4	, S	4 t	4 4 5 5 6 5	6 6 6 8	3,50							ç	
Deep Percolation P	(mm)		,		.					1	1	ı	,			Ŝ	24.00							### ####	
Tloos = Et + P	(îIII)							İ	28.05	5 30.46	41.72	64.87	70.09	72.24	65.52	58.97	52.55			ı			1	man o	•
Field Imgation Requirement	ent										1					1									
Area to be imgated	Eated Till								25%	8 75% of 15%	100%	100%	100%	100%	100%	75%	25%								
Area to be irrigated	irrigated	-		-	,			-	` .		1		70.1	771	Sel.	42	EI,	-	.					402 for St	402 for Summer Vegetables-2
Net P																								0 mm	
Zone - A Provable Rainfall R80	(mm)	6.40	06.8	8.20	6.60	71 07-6	05-21 06-21				0000	8 01	40.00	25	2	1	1	1		ĺ			1		
		4.48						9.45 21.28		7 35.28	-		3.05 24.05			80.71	84.77	37.59 2	28.77	6.70 4.69	000	0.00		21.21.5 mm	
Effective Rainfall Re	Î	0	o	Ф	0	Q	٥	0	0 28.05		4	v	70.088												
Area to be impaired	pajeguii (ww.)								25%			_	100%	100%	100%	75%	25%								
Total Net (Et + P - Re)						-	1		- 7.0		41.7	2	70.1	72.2	65.5	47	13.1	-			,			- 402 пп	
	(mm)												٠	•	1		,	,			,	,		0	
Field Efficiency	00.09	60.0%	99 %0'09	60.0% 60.	60.0% 60.0	60.0% 60.0	60.0% 60.0%	% 60.0%	% 60.0%	%0.09	60.0%	60.0%	60.0%	60.0%	260.09	€0.0% €	9 %0.09	90.09	60.0% 60	60.0% 60.0%	80:09 %0	% 60.0%	%0.09 %		
	(mm)		1								•	•	•	•	,		,							. 0 mm	
1	(Us/ba)	, ,				٠,	1 1					•	•	1	,					,			,	7'-	
1	80.0%	80.0% 8	80.0% 80	80.0% 80	80.0% 80.0	80.0% 80.0%	90.0%	260.08	250.08	20.0%	80.0%	- 50 OS	20.08	8008	80.0%	. 20 CS	80 000	- SO 05	, SO 08.	20 00 20 00	2000	- 00 00	00.00	- 1	
Diversion Requirement	(H			,			,																	0	
Ĥ.	(mm/day)		,				,				•	•	٠	r	٠	,		,		,	,			forSi	for Summer Vegetables-2
Monthly average	(sd/s/)	•							,			٠	•	•	•				,					- in Zone-A	k-A
Zono B												•		•		•		•				,		-,-	
Provable Rainfall R80		30	200	10.80	11	11 30 11	11.30	9	6			9													
.=	8	0.0								2 24.37	5 . X	26.80	15.60	204.10	174.90	176.50		71.00	97.79	9.60	0.00	0.00 2.20	3.20		
Effective Rainfall Re	(HH)	0									.प	_					20.1%				•			T	
Area to be imgated	mgated								25%				100%	100%			25%	>	>	5		5		*	
Net Re	(mm)	•					٠,	,	7.		41.7	649	70.1	72.2	65.5	44.2	13.1			•	,	,	,	- 402 mm	
1 oral Net (Et + P - Ke)	(mm)			,		,	•																		
Field Efficiency	20.09	60.0% 6	60.0% 60	60.0% 60.	60.0% 60.0%	0% 60.0%	0% 60.0%	% 60.0%	5 60.0%	20.09 3	60.0%	60.0%	60.0%	20.09	60.0%	60.0%	60.0%	- 00.09	. 60.09	- 60.09	250.03 20.09	. 60 05°	- 60 0g	- O that	
Field Requirement	Î	•	1				,		,	•	٠	٠,	•											£	
<u>.</u>	(mm/day)	•	•			٠,				,	4	•	•	•	•		- 1							ļ -	
1		- 1		- 1		- 1		ı	- 1		- 1			1	•					J			1		
Conveyance efficiency		80.08	80.0%	80.0% 80.	80.0% 80.0%	90.0%	80.0%	% 90.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0% 84	80.0%	80.0% 80	80.0% 80.0%	20.08 %0	% 80.0%	% 80.0%	88	
TO VERSION REQUIREMENT	(mm)	,				1			1		•	'	٠	•					,					0	
3	O/c/ha)	•		•							•	•	٠				,		,					- for Su	for Summer Vegetables-2
Monthly average	(l/s/ha)		•	:	, ,					. '	١.	•	•	٠	1								,	- in Zone-B	e u

Table 3-2.14 Irrigation Requirement for Winter Vegetable 1 Irrigation Efficiency, etc.: Field Efficiency for upland crops = 60.0% Conveyance Efficiency = 80.0% Irrigation Efficiency for upland crops = 48.0%

Ninter Vegetable 1 Ninter	Early Late 3.80	440 4.75 4.40 4.75 0.90 0.90 3.96 63.36 63.36		J구	Early	Late	Early L	Late Early	y Late	Earty	#	Early L	Late Early	y Late	菌/	ate	Annual Remarks
Winter Vegetable 1 Winter Vegetable 1	/	1 111 1 1	73.5		4												
Winter Vegetable			8,8					٠									
Winter Vegetable																	
Minter Vegetable 1.73 1.93 2.40 3.05			8.1												7		
Minder Vegetable 1.73 1.53 2.40 3.05 3.			8.5													7	
Ninter Vegetable 1.73 1.95 2.40 3.05			8. K.			ı			- 1	١			-1	1	-	1	
Note Color			F	5.50	5.60 5.15	3	4.45	8 4	4.20 4.05	8	3.70	3.5	-	255 205	187	817	5.04 mm day
Winter Vegetable 0.38 0.68 0.92 0.95				١	ł	ı	-	1	-1	١	(CS)	-	o i	Ì	1	-	mm ozer
mides 0.66 1.31 2.21 2.90 2.90 2.00 33.12 37.67 5 2.00 33.12 37.67 5 2.00 33.12 37.67 5 2.00 33.12 37.67 5 2.00 33.12 37.67 5 2.00 33.13 37.7 5 2.00															0.28	J	winter vegetable 1
(mm) 9.86 21.00 33.12 37.67 5 (mm) 9.86 11.00 33.12 37.67 5 gated 100% 100% 100% 100% (mm) 6.40 8.90 8.20 6.60 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 5.4 14.8 27.4 33.0 (mm) 5.4 14.8 27.4 33.0 (mm) 5.4 14.8 27.4 33.0 (mm) 9.0 24.6 45.6 55.1 u(dsy) 0.60 1.54 3.04 4.24															S :		
(mm) 9.86 21.00 33.12 37.67 5 gated 100% 100% 100% 100% (mm) 6.40 8.90 8.20 6.60 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 5.4 14.8 27.4 33.0 (mm) 5.4 14.8 27.4 33.0 (mm) 5.4 14.8 27.4 33.0 (mm) 5.4 14.8 27.4 33.0 (mm) 6.00% 60.0% 60.0% 60.0% (mm) 9.0 24.6 45.6 55.1 udsy) 0.60 1.54 3.04 4.24			'. 												2	7.17	231 mm
gated 100% 100% 100% 100% 100% 100% (mm) 9.9 21.0 33.1 37.7 5 (mm) 6.40 8.90 8.20 6.60 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 5.4 14.8 5.73 33.0 (mm) 5.4 14.8 5.7 33.0 5.00% 60.0%		55.8			•	1	1				•				' ;		日田口
Santal 100% 120%		5%													3	7.17	
Imagested 100% 10		5.8															
(mm) 6.40 8.90 8.20 6.60 (mm) 4.48 6.23 5.74 4.62 (mm) 1.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 5.4 14.8 5.74 5.77 4.62 (mm) 5.4 14.8 5.74 33.0 6.00.76 6.00.		2.8											٠		£ ;	0.00	
(mm) 6.40 8.90 8.20 6.60 (mm) 4.48 6.23 5.74 4.62 (mm) 1.48 6.23 5.74 4.62 (mm) 4.5 6.00% 100% 100% 100% 100% 100% 100% 100%															7	ł	103 for winter vegetable i
(mm) 6.40 8.90 8.20 6.60 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 4.5 6.2 5.7 4.6 (mm) 5.4 14.8 27.4 33.0 (mm) 5.4 14.8 27.4 33.0 (mm) 9.0 24.6 45.6 55.1 mm/day) 0.60 1.54 3.04 4.24			•	ı			•			1	1	•	,			-	1
(mm) 6.40 8.90 8.20 6.60 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 4.5 6.2 5.7 4.62 (mm) 5.4 14.8 27.4 33.0 (mm) 5.4 14.8 27.4 33.0 (mm) 5.4 14.8 27.4 33.0 (mm) 60.0%																	O min
(mm) 6.40 8.90 8.20 6.60 (mm) 4.48 6.23 5.74 4.62 (mm) 4.48 6.23 5.74 4.62 (mm) 4.5 6.2 5.7 4.62 (mm) 5.4 14.8 2.7 3.0 (mm) 5.4 14.8 2.7 3.0 (mm) 5.4 14.8 2.7 3.0 (mm) 5.4 14.8 2.7 3.0 (mm) 5.4 14.8 2.7 3.0 (mm) 5.4 14.8 2.7 3.0 (mm) 6.0 0.2 4.6 45.6 5.1 mm/day) 0.60 1.54 3.04 4.24																	
(mm) 4.48 6.23 5.74 4.62 intigated (mm) 4.48 6.23 5.74 4.62 intigated (mm) 4.5 6.2 5.74 4.62 (mm) 5.4 14.8 2.74 33.0 60.0% 60.			30.49 94		50.40 68.20	_				_	53.70	41.10		0.00 0.00	0.00	0.50	1,215 шш
Re (mm) 4.48 6.23 5.74 4.62 ato be impared (100% 100% 100% 100% 100% 100% 100% 100		6	21.28		Ġ	83.			107.10 80.71	Ä	31.59	28.77					850 mm
te (mm) 4.5 6.2 5.7 4.6 (mm) 5.4 14.8 27.4 33.0 (mm) 9.0 24.6 45.6 55.1 (mm) 9.0 24.6 45.6 55.1 (mm/day) 0.60 1.54 3.04 4.24		12.53 0	0	0	0	0	0	٥.	•	0	0	0	0	_ ©	0		am Ot
(mm) 4.5 6.2 5.7 4.6 (mm) 5.4 14.8 27.4 33.0 (mm) 9.0 24.6 45.6 55.1 (mm/day) 0.60 1.54 3.04 4.24	1 1	25%													22%	15%	
(mm) 5.4 14.8 27.4 33.0 60.0% 60.0% 60.0% 60.0% 60.0% 60.0% 60.0% 60.0% (mm) 9.0 24.6 45.6 55.1 (mm/day) 0.60 1.54 3.04 4.24		3.1	'		,				,	-		-		,		-	29 mm
(mm) 5.4 14.8 27.4 33.0 60.0% 60.0% 60.0% 60.0% 60.0% 6 (mm) 9.0 24.6 45.6 55.1 (mm/day) 0.60 1.54 3.04 4.24	- 1																
(mm) 9.0 24.6 45.6 55.1 (mm/day) 0.60 1.54 3.04 4.24		- 1				- 1	1	ı	- 1	- 1	'	- 1	- 6	L	- 1	4	134 mm
(mm) 9.0 24.6 45.6 55.1 (mm/day) 0.60 1.54 3.04 4.24		60.0% 60.0%	80.0%	60.0% 60.0%	0% 60.0%	60.0%	60.0%	60.0% 60.	60.0% 60.0%	60.0%	60.0%	60.0%	60.0% 60.	60.0% 60.0%	8		
0.60 1.54 3.04 4.24		21.2	1	•			,			'	•	•			5.2	S .	223 mm
		132	•				•			•	•		•	,	770		
(l/s/ha) 0.069 0.178 0.352 0.490			٠		- 1	- 1	- 1			.1	'	. I	ŀ	Ы	- 0.024	0.065	
80.0% 88.0% 8	65	80.0% 80.0%	80.0%	80.0% 80.	80.0% 80.0%	2,000,00	80.0%	80.0% 80	80.0% 80.0%	80.0%	80.0%	80.0%	80.0%	80.0% 80.0%			
t (mm) 11.2 30.8 57.0 68.8		26.5	•				•	•			•	•			33	11.2	5
(mm/day) 0.75 1.92 3.80 5.30		1.65	•	•			,				•	٠			0.26		
0.087 0.223 0.440 0.613	0.539	0.192		,							•	•			0.030		in Zone-A
Monthly average (lisina) 0.155 0.527	70	0.365	•			'		٠			-					0.056	
Zone - B																	
ainfall R80 (mm) 1.30 7.90 10.80 9.20						_				-		10 .70				3.20	
9.18 7.82		9	88		83	76.1			123.5	91.0	8	¥,		0.00 0.00	0.0		∺
0 6.715 9.18 7.82	٠,	9.605	0	Q	0	0 0	0	٥	0	0	0	0	0	0	0		43 mm
100% 100%	75% 2	25%													25%	75%	
- 6.7 9.2 7.8		2.4		1		•	•	1		'	'	,		-			33 mm
23.9 29.8	i		,				- 1	- 1	ŀ	- 1		ŀ	.	- 1	. I	4.0	130 距距
80.0% 60.0% 60.0% 60.0%	1	60.0% 60.0%	60.0%	09 %0'09	80:09 80:09	% 60.0%	90.09	60.0% 60	60.0% 60.0%	% 60.0%	80.09	%0.09	60.0%	60.0% 60.0%	8		
nt (mm) 16.4 23.8 39.9 49.7		22.4		1		•	,		,	•	•	,	•	,	. 3.2		1 217 mm
(mm/day) 110 149 2.66 3.83		1.40	•		,		1	•	,	'	•	•			- 0.21	0.56	
0.127 0.172 0.308 0.443 (·	0.162	,			•	1	,			•	•			- 0.024	0.065	
80.0% 80.0%	80.0% 80.	80.0% 80.0%	80.0%	80.0% 80	80.0% 80.0%	% 80.0%	80.0%	80.0% 80	80.0% 80.0%	% 80.0%	80.0%	80.0%	80.0% 80	80.0% 80.0%	85 .c.	00	
(шш)	65.4	28.0		•		•	•	•			•	•			¥;		2
(mm/day) 137 186 333		1.75	•	,	,		•	·			,		٠		- 0.26		for Winter Vegetable 1
0150 0385 0384	0.505	0.203				•	•			,	•				0:030	_	in Zone-B
035.0		0354			1	•					•		,			0.056	

Table 3-2.15 Irrigation Requirement for Winter Vegetable 2

Irrigation Efficiency, etc.: Field Efficiency for upland crops = 60.0%

Month	Cource cancerer =			Į,	Heh Mar A	Mar	-	Ann		Man	_	:	L	Lini	 -	A 20.0	F	0	[100		7.00		L		
Period		Early I	I afte	Early T	T age	Early	1	1	╁	ŧΊ.	÷		~-	1	1	in the	j		1	- 15 - 15 - 15	1		2	Т		_
	1		+-	- 1				-	20	Cally	ile Early	iy Lake	c Early	y 1.auc	rany	Tale	ramy	Tale	Early	Take	Earry	Tate	ramy	Late An	Annual Kemarks	9
	<u>V</u> _	1	-	+	+	-	1																			
Cropping Pattern		/	<u>₹</u> /	Winter Vegetable 2	egetable	~ <u>~</u>		/																		
				-	-	-	-	+	1																	
Eto	mm/day	1.73	.	2.40	3.05	3.80	4.40	4,75	5.23	5.50	5.60 5.	5.15 4	4.65 4.	4.45 4.30	30 4.20	0 4.05	5 3.85	5 3.70	3.45	3.10	2.55	2.05	1.80	1.60	3.64 mm/day	
16.3	(mm)	26.0	30.9	╽	39.7	57.0	70.4	71.3	78.5				_	- 1		Ì	١	- 1	- 1	. 1	ı		27.0		1,328 mm	
No winter vegetable	v egetabl	273	-	200	897	0.92	0.95		86.0						:				-	1				_	Winter Vegetable 2	le 2
First Veretable 2	(mm)	2 5		•			4. 78 8. 88 7.	428	17.77																1	
Deep Percolation P	E	<u>.</u>	1	П	ı	1	ı	ı	10.0															+	211 11111	
<u>н</u>	(11)	7.27	8.65	13.68	26.96	\$7.44	88.99	6413	70.61			,									•		1	, -		
Field Irrigation Requirement	Ħ		1				1																			
Area to be imgated	mgated	25%	75% 11		100%	100% 1	100%	75%	25%															_		
NetE	(HIII)	1.8		13.7	- 1	52.4	6.69	48.1	17.7																234 for Winter Vegetable 2	etable 2
Area to be imgated	mgated	•	F .			r.						,														
																				,				_	0 III II	1
Zone - A Provable Rainfall R80	(0.0)	6.40	06.8	8.20	09:9		17.90	13.50			80.40	68.20 119	80 147 20	00 106 10	00 23 00	0 11530	01.121.10		41 10			5	5	_	1.015 mm	-
ij	(mm)	4.48			4.62					31.57 33		47.74 83.86						7 37.59		4.69	0.00		0.00	80.0	850 mm	
Effective Rainfall Re	(HH)	4,48								0	0	0	0		0	0	0	9 0	0			0	0	0	71 mm	
Area to be imgated	rngated.	25%						75%	25%																	
Total Nat (Et 4. D. Da)			+).(4,0	0.0	2	7.7	ม		,	,	,									1	•	1	48 mm	
	(mm)	0.7	1.8	7.9	22.3	45.9	%	41.0	123			1	,	,		,		,				•	•		186 mm	
	L	ı		1	ı	ı	!	ł	1	90.09	2009 200	0% 60.0%	0% 60.0%	20.09 %0	%0.09	%0.09	% 60.0%	% 60.0%	20.0%	60.0%	%0'09 9	60.0%	%0.09	20.09		
Field Requirement	(mm)	17			37.2	76.4	90.6	68.3	20.6	,		,	,								,	,	٠	-	311 mm	
E)									137			,			r						,	,	. 1	,		
-	ľ	ľ	- 1	- 1	- 1	- 1	- [Į	- 1	- 1		- 1	- 1	- 1	- 1		ı	- 1					ì	-,		
										80.0%	.0% 80.0%	0% 80.0%	0% 80.0%	0% 80.0%	% 80.0%	% 80.0%	% 80.0%	%0.08 %	%0.08 3	%0.08 3	260.08 4	80.0%	80.0%	80.0%		
Liversion Kequirement	(mm)	1 5	2 5	70.	ς φ		13.2	4 6	2			,						1			1		ì	· -	388 mm	:
			٠	`								ŧ											•	•	for winter vegetable 2	eEable
Monthly average									0.429												. ,	. 1			A-2007 III	
Zone - B	_																							-		
Provable Rainfall R80	(mm)	130				11.10	11.30	7.70			52.20 97.	97.70 108	108.80 166.		10 174.60	30 176.50	30.00	0 71.00					2.20		1.364 mm	
ā	(HH)									33.92 4			76.16 116.62	.62 142.87					5 34.60	0.00	000	0.00	0.0	8	1.007 mm	
Effective Rainfall Re	Î				7.82					Ģ	0	ø	0	0		0	0	. 0					0		78 田田	
Area to be impated	Eated	25%							25%																	
Total Nat (Ct. 1: D. Da)		۱	0,0	2.7	2.8	4.6	9.6	6.9	7.1	-				-									-	-	53 mm	
י מאון יישו (דיי + די - דייני)	(HH)	1.8	1.4	5.5	19.1	43.0	573	43.2	10.5	,				,											191 mm	
		1		ð	1	1		Į.		60.0% 60	.0% 60.0%	20.09 %0	20.03 80.0%	2009 20	% 60.0%	% 60.0%	% 60.0%	% 60.0%	20.0%	6 60.0%	60.0%	20.09	20.09	60.0%	mm 101	
Field Requirement	(mm)	3.0			31.9	71.7		72.0	17.5	•		1		,									٠		301 mm	
<u> </u>		020					. '		1.17			1						•	•	1			•			
33	(ES/DR)		ď	- 1	- 1	- 1	- 1	- 1	- 1	- 1	,	П	.	d		. I	- 1	Ī		. 1		- 1	ŀ	-		
			90.00 90.00	86.0% 86.0% 86.0%	20.0%	80.0% 80.0%	30.0%	80.0%	80.0% 3.1%	80.0% 80.0%	.0.28	0.08	0% 80.0%	80.05	% 80.0%	% 80.0%	80.0%	80.0%	80.0%	80.0%	20.0% 20.0%	80.0%	80.0%	80.0%	!	
	(mm/dav)	0.25			3.07				217 24.			1 1			,							•		1	377 mm	f. class
			٠				_		0.169		,	,									· •		, ,		in Zone-B	ביפוניני
Monthly average	(1/s/ha)		0.026		0.214				0.432									·				*				

Irrigation Requirement for Winter Vegetable 3 Impation Efficiency for upland crops = 48.0% imgation Efficiency, etc.:
Field Efficiency for upland crops = 60.0%
Conveyance Efficiency = 80.0% Table 3-2.16

1.56					-		-		-		44	_	500	ŀ	5	2	Non	1	_		_
## Parkers Figure	8	Ž	_	≂ι	-+	ณ เ.	-			-1-	2	~⊦	OCP.	j		Code		Total	1	Ammal	Remarks
March Marc	Late Early	⊣	-1	1	⊣		Early	iği e		∤-	•			- }-			7	-+-	-+-		
Particle Particle										V	1	-	1		- 4						
												-		white vegetable 3	C alone						
Comparison Com	1.73 1.93 2.40	ľ	4.40				1		4.45		1	١	3.85 3.70	70 3.45		0 2.55	5 2.05	1.80	1.60	3.64 mm/day	
Victor Education Winter Victor Education	26.0 30.9 36.0	Ì	70.4		1	ļ		1	8.99		Ш		l	il				- 1	25.6	1.328 mm	
Checaring Figure Checaring Checaring Figure Checaring Checari										~			0.34 0.5		0.95	ļ	- 1	ı	-	Winter	Winter Vegetable 3
Third Thir																,					
Third Thir										1	ı		19.64 29.5	97 44.51	51 47.12	36.34		24.03	+	THE COT	
Charm Color Colo	Б (шш)					ı		1	•	'			1000 1900			. 25.24	77.37	, 74 M3	1.		
Third Thir	= Et+P (mm)									1	İ	ŀ	-	ı	П	1	П	1	+		
Figure Carry Figure Figu	Requirement																				
(mm) 4.48 6.25 5.74 4.62 6.59 12.59 9.45 12.128 31.57 55.28 4.77 48.58 99.54 157.27 11530 11530 142.20 19.60 11530	vrea to be imgated												100% 100%	% 100%	881 88 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 363	3 20.5	6.0		222 for Wint	222 for Winter Vegetable 3
(mm) 4.48 6.23 5.74 4.62 6.940 17.90 13.50 30.40 45.10 50.40 682.0 119.80 142.0 196.10 153.00 1153.0 1 mingred (mm) 4.48 6.23 5.74 4.62 6.80 9.40 17.90 13.50 30.40 45.10 50.40 682.0 119.80 142.0 196.10 153.00 1153.0 1 mingred (mm) 4.8 6.23 5.74 4.62 6.80 12.33 9.45 21.28 31.57 55.28 47.74 83.86 95.54 157.27 107.10 80.71 107.10 8	Net Lit (mm)			-							-	1	1	Ì	1	1	İ				
(mm) 4.48 6.23 5.74 4.62 6.58 12.53 9.44 45.10 50.40 68.20 119.80 142.20 196.10 153.00 1153.0 1153.0 110.10 months of the control of the cont	1	1	1	•	1	1	•	Į.			•				•			•		0 mm	
(mm) 4.48 6.23 5.74 4.62 6.58 12.53 94.5 12.83 15.77 35.28 47.74 83.8 95.44 157.07 10.80 71.76 80.77 (mm) 4.48 6.23 5.74 4.62 6.58 12.53 94.5 12.83 15.77 35.28 47.74 83.8 95.44 157.27 10.71 80.77 (mm) 4.48 6.23 5.74 4.62 6.58 12.53 94.5 12.83 15.77 35.28 47.74 83.8 95.44 157.27 10.71 80.77 (mm) 4.48 6.23 5.74 4.62 6.58 6.00% 60.																					
(mm) 1.36 6.00% 6.	1 R80 (mm) 6.40 8.90 8.20		17.90					119.80						.70 41.10	10 6.70	00.00	00.00	0.00	0.50	1,215 пт	
Figure Color Col	(mm) 4,48 6.23 5.74																		0.00	850 mm	
(mm) (micky) (0 0 (mm)		0	0	0	0	0		0		Ħ								Ö	119 mm	
(mm) (mm/day) (lis/ha) (mm) (mm/day) (mm) (mm/day) (mm) (mm) (mm) (mm) (mm) (mm) (mm) (m	trea to be impated												20% 100%	2001 200%	2001 Se	% 100%	75%	23 88			
(mm) (min/dy	జ	'	•		•		-	•	-		-	ĺ	19.6	- 1		-			+	101 1111	
(uscha) (uscha											:	1		¥1		363	3.05	6.0		121 mm	
(mm) (mm/dy) ((田田)	1	20.03	1	-	- 1	, ,	1		1	1	1	80.0% 60.0%	Γ	50.0%	120	1	3	20.09		
(1scha) (1scha	00.070 00.070 00.070 00.070		200				, ,												•	202 mm	
(1st.ha) (1s	, m			•				٠	•			,			1.75 4.42		2.28		•		
80.0% 80.0%	•			٠					- 1		- 1	Į	- 1		- 1	ľ		- 1			
(Hs/ha) (Hs/ha	80.0% 80.0% 80.0% 80.0%						9						80.0% 80.0%		%	3 5	~		80.U%	757 mm	
(uscha) (uscha		'	•						1					ńc	328 88.4	40.0	7 285	38	, .	for Win	for Winter Vegetable 3
(Uscha) [Rand (mm)	(mm/day)		•	r	•				, ,			, ,		0.2		ب			•	in Zone-A	. V
R80 (mm) 1.30 7.90 10.80 9.20 11.10 11.30 7.70 33.60 39.90 52.20 97.70 108.80 166.60 204.10 174.60 176.50 Rainfall (mm) 0.00 6.72 9.18 7.82 9.44 9.61 6.55 28.56 33.92 44.7 83.05 76.16 116.62 142.87 122.22 123.55 Rainfall (mm) 0.00 6.72 9.18 7.82 9.44 9.61 6.55 28.56 33.92 44.7 83.05 76.16 116.62 142.87 122.22 123.55 Rainfall (mm) 0.00 6.72 9.18 7.82 9.44 9.61 6.55 28.56 33.92 44.7 83.05 76.16 116.62 142.87 122.22 123.55 Rainfall (mm) 0.00 6.72 9.18 7.82 9.44 9.61 6.55 60.07 60.07 60.07 60.07 Rainfall (mm) 0.00 6.72 9.18 7.82 9.44 9.61 6.55 60.07 60.07 60.07 Rainfall (mm) 0.00 0.70 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.70 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Rainfall (mm) 0.00 0			• 1			į			ı			•			0.446	ļ		- 1	0.048		
(mm) 0.00 6.72 9.18 7.82 9.44 9.61 6.55 28.56 33.92 44.37 83.05 76.16 116.62 142.87 122.22 13.55 13.55 13.56 13.56 14.37 83.05 76.16 116.62 142.87 122.22 13.55 13.55 13.55 13.55 14.37 83.05 76.16 116.62 142.87 122.22 13.55										-											
(mm) 000 6.72 9.18 782 9.44 9.61 6.55 28.56 33.92 44.37 83.05 76.16 116.62 142.87 122.22 123.55 (mm) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1764 18144 irrigated (mm) 6.0.07 6.0	R80 (mm) 1.30 7.90 10.80								166.60			-			70 3.60	0.00	00.00	2.20	3.20	1,364 mm	
(mm) 6.0.0% 60.0%	(mm) 0.00 6.72 9.18								116.62	-									0.00	1,007 mm	
te (mm) (mm)	0 0 (mm)			0	0				0					29.97 34.595	Ş	Ş	0 25	0 200	5	120 mm	
(mm) 6.0.0% 60.0%	Area to be irrigated								•	٠			10.6	-		-				102 屈田	
(mm) 60.076 60.0	n n	` -		•	•							1	ł								
60.0% 60.0%			ŀ	1			,			,	ι						- 1	- 1	•	120 mm	
(mm/day) (1.9.fma) (1.9.fm	80.0% 60.0% 60.0% 60.0%	1	Į.	1	ı	1	1,8	ı	60.0%				60.0% 60.0%	স্ত	ত	Ø		Φ	60.0%	9	
(mm/dxy) (3.1a) (3.1b) (3.1b) (3.1c)	Ħ	,	•	•	•	,	•		•	•				i .				O'OI		TITE 207	
(1/s/ha) 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% 80.0% (mm) (mm) (mm/day)			•	•	•	•	•					,		- ; -					_		
80,0% 80,0%	(1/s/ha)	. [- 1	- t	٠,	- 1	1		- 1	- 1	, po	, ,	0.12/ 0.308		- 1	-1	200.08		
ŧ	80.0% 80.0% 80.0% 80.0%						ę.		85.58 85.58				80.U% 80.U	8					2000	05C	
(kg),mm)		1		•	,				•	•		ı		7 -	20 20 20 20 2				,,	for Wir	for Winter Vecetable 3
	(mm/day)			1					•		•		. ,	7	0150 0710	1850	230	7600	•	in Zone-B	, ed
(EGIST)		•		• .				,	1	•		1		•					0.048		
NORMY AREAGE VESTOR																					

Table 3-2.17 Irrigation Requirement for Winter Vegetable 4

Imigation Efficiency, etc.:

Field Efficiency for upland crops = 60.0%

Conveyance Efficiency = 80.0%

Moonth Apr. Apr. Jan. 1 Feb. Mar Apr. Jan. 1 Feb. 1 Jan. 1 Feb. 1 Jan. 1 Feb. 1 Jan. 1 Feb. 1 Jan. 1 Jan. 1 Feb. 1 Jan. 1 Feb. 1 Jan. 1 Jan. 1 Feb. 1 Jan. 1 Feb. 1 Jan. 1 Feb. 1 Jan. 1 Feb. 1 Jan. 1 Feb. 1 Jan. 1 Jan. 1 Feb. 2 Jan.

THE COLUMN		31	rep			_	Apr		è				Jel.	≺	Aug.	8	P	ځ		N.	_	Ž	-		ſ
renoa	Fariy	y ate	Early	Late	Early	Late	Early	Late	Early L	Late Ea	Early Late		Early Late		Late	Earty	Egg Egg	Early	E E	Early	ate	Early L	Late	Annual Remarks	
	-																1		-						T~~
Cropping Pattern	_/															/			-	}		_	_		
		Л															/	-	wmer vegelable 4	- Esembi			•		
Elo Bio	mm/day 1	1.73	2.40	305	380	1977	175	5 73	-1		- 1	ı	4	ſ			ı			-		1 1			
				30.7	1016	7	7 6	3 2	3 8	3.0	7 0 5	000	4.45	02.4	CO.4.		-	3.45	3.10	2.55	- 1			3.64 mm/day	Г
Kc Winter Vegetab	1								1	1	1		1	- 1	-[57.8	-	51.8	49.6	38.3	ı			(,328 mm	Г
Et = Ke x Eto m	ł	2		1												0.28	- [033	왕	98.			0.89	Winter Vegetable 4	ľ
	7	10														1.08	8 2	71.17	1.67	2.19	1.95	1.71	1.42		Γ
	(mm)	•		١	-] 			,		,		'				3	40.70	74.70	ı	- 1		210 mm	7
Tlocs = Et + P	(mm) 23.10	10				j				. ;		ı				16.17	15.54	17.60	26.78	32.90	29.21	25.65	. 27 00	0 mm	
Field Impation Requirement									•													1	2		Т
Area to be irrigated		25%														25%	75%	100%	100%	300%		100%	75%		
. 5		0														4.0	- }	17.6	26.8	32.9	29.2	25.7	17.1	171 for Winter Vegetable 4	
Net P	(mm)		ı	1	•	•	•			·		,				,	•	•	•	•	,		·		Ī
																								0 mm	\neg
	(шш) 6.	6.40 8.90		6.60	9,40	17.90	13.50	30.40	45.10 5			119.80 142.20	195 10				50	5	9	8	8	6			
infall		9		4.62	6.58	12.53				35.28	47.74 83			7 107.10	80.71	1 1 1 1 1 1 1 1 1 1 1	37.50	28.77	0,4	8 8	3 5	3 8	7 8	1,212 mm c12,1	
Effective Rainfall Re		4.48 0	0	0	0	0	0	0	0		0	0						17.595	4.69	-	2	90		25 mm	
ь.		25%																100%	100%	100%	100%	100%	7502		_
Total Not Ge (10 De)	Î	1.1	•	•	•	•	'	•	'		'	١	,	,		4.0		17.6	4.7	,	'	:	1	39 mm	
	(mm)	47	•	•		1													l		ı				Ī
	8	%0.09 %	20.09	60.0%	60.0%	80.08	60.0%	60.0%	60.09	60.0% 60	2009 2009	2000	200 05	20 00	- 00 05	, 2003	. 0000	1	- 1		- 1	- 1	17.1	132 mm	J
Ħ	(mm)	7.8															00.02	00.0%					0.0%		
₽	Ĭ	0.52	٠	٠	١		•				. ,					٠	•	•					28.5	219 mm	
ı	(i/s/ha) 0.060	- 1	•	1	- 1				•		,	,				, ,	, ,	, ,	0.266	0.423	0.376	0.330	0.706		
	8	80.0%	80.0%	80.0%	80.0%	80.0%	80.0% 8	80.0%	80.0% 80	80.0% 80	80.0% 80.0%	20'08 %0	₩ 80.0%	20.0%	80.0%	80.0%	80.0%	80.0%	1	1	1	11	0.0%		Ţ
Consider Acquirement	7.9 (mm)		•	•		•			•				،		'	•	•	•					35.6	274 mm	
			١.	•				1			ι				1	•	•	•					2.23	for Winter Vegetable 4	
Monthly average (1		0.037	•	1 1			1			,					•	•	•	•	0.333				0.258	in Zone-A	
												-							0.166		0.499		335		
ainfall R80	(mm)		10.80	9.20	11.10	11.30	7.70	33.60			97.70 108.80	80 166 60	50 204 10	0 17460	£		8	40.70	97 2	8	. 6				
infall		ý	9.18	7.82	ग 6	9.61			33.92	44.37 83						91.00	60.35	\$ \$	3 8	3 8	3 6	3 6	9 6		
Effective Rainfall Re	•	0	0	O	0	0	0	0			0						15.54	17.595	0	0	30		<u>.</u>	49 mm	
Not De (mm)	%CZ paned (mm)			4	į											25%	75%	100%	100%	100%	100%	100%	75%		
		•	'	•	1	•		$\cdot $,					•	4.0	11.7	17.6		•	•	,	•	33 mm	
				٠	•	•	•		,		,		•	,	'	•	,	•					1		
	8	% 60.0%	20.09	£0.0 8	80.09	60,0%	60.0% 6	60.0%	60.0% 60	60.0% 60.	20:09 20:09	%0.09 %0	% 60.09%	20.0%	60.0%	60.0%	20.09	80.09					200	mm /Ct	
Field Kequirement		9.6	•	•	J	•				,	•		,		•								28.5	229 mm	
mm)		1	•		1			•	•					•	•	•	٠	٠) X		
- 1	_1	- 1	- 1	- 1	- 1	- 1		- 1	1					'	•		١	•					206		
Diversion Demination	80.0%	%0.0% %0.0%	86.08 86.08	80.0%	80.0%	80.0%	80.0%	80.0%	80.0% 80	08 %07	80.0% 80.0%	3% 80.0%	% 80°0%	80.0%	80.0%	80.0%	80.0%	80.0%	1	1	1		0.0%		Τ~
			•	•		•									•	•	•	٠					35.6	286 加田	
] =		2 %			1 1		•		,	•	1	,		•	•	•	•	•		4.57		3.56	2.23	for Winter Vegetable 4	_
Monthly average (1		0.046		. .							ı				•	1	•	•	1040		0.470		0.258	in Zone-B	
																	,		0.202		U,437	3	133		٦

Table 3-2.18 Irrigation Requirement for Winter Vegetable 5

78°.

Imigation Efficiency, etc.:
Field Efficiency for upland crops = 60.0%
Conveyance Efficiency = 80.0%
Imigation Efficiency for upland crops = 48.0%
This is a second of the

												-			-	-	Č	-		-		_	į	-	
Month		톄	\neg	Ş.	-	₹ 1		Apr.		May	4				Aug.			+	н		ŏ.				
Period	-	Early Late	te Early	rfy Late	te Early	dy Late	ā	dy Late	Early	I at	Early	뫮	Early	Late	Earty	[Early L	함	Early La	Late Earty	ij.	te carty	y	Ammai	Kemarks
	!	_	1	-	Harvest	ŭ												V	_			-	_	Т	
Cropping Pattern	<u> </u>	Winter Vegetable 5	etable 5	7		4													/	With	iter Veg	Winter Vegetable 5			
			_	5	I eminate imgation	gation	71																		
Eto	mm/day	1.73	1.93	2.40	3.05			4.75 5.	5.23 5.50	0 5.60	5.15	4.65	4.45	430	4.20	4.05	3.85	3.70		3.10 2	2.55 2		1.80	1.60 3.64 пт./дау	ı/day
	(mm)	26.0	30.9	36.0	Ì	57.0 70	70.4					8.69	8.99	8.89	63.0	84.8	57.8				_ {	-		1,328	-
Kc Winter Vegetabl	/egetabl	0.94		1	687																		0.62 0.		Winter Vegetable 5
	mm/day		•		2.71														6.83	0.84 (1.86	,	138 22 (2)	
١	(III)	23.39	29.34	32.04 35	35.29														-	1	1	1	١		
Deep Percolation P		24.30	2934 32	32.04 35	35.29			•			:	1	1	•		٠			13.97	13.39 12	12.24 12	12.92 16	16.74 22	- 0 EDE 22.02	-
Lield franction Decripement		П	П	1															l	l	l	١			
Area to be irrigated	rigated	100% 10	100% 7	75% 2	25%			V :											25%	75% 10				2,001	•
Net Et	(H	24.4	29.3	24.0	8.8	٠				;											12.2	12.9	16.7 2	ļ	164 for Winter Vegetable 5
Area to be impared Net P (mm)	migated (mm)			•	·	•	•			,	•	•	•	•	1	•			ı					- O HH	
	!																								
Zone - A Provable Rainfall R80	(mm)	6.40				9.40 17.				50.40	68.20	***	142.20	196.10			121.10	53.70 4	41.10	6.70	0.00	0.00	0.00	0.50 1,215 mm	e .
Potential Effect, Rainfall	(mm)								21.28 31.57	35		83	8 14											00	ď
Effective Rainfall Re	(mm)				4.62	ø	o	0	0	0	0	0	0	0	0	0	0	0						40 mm	
Area to be imigated	migated				25%															75% 10	100%	100% 10	100% 10	100%	
Net Re	(H)	4.5	6.2	43	12	•	,	,	,		•	•	•		•	,	•		3.5	3.5		,		. 52 mm	
Total Net (Et + P - Re)	ĺ	, 001		10.7	-							٠	,	•	ı	,	,		,	6.5	12.2	12.9	16.7 2	22.0 141 mm	
Field Efficiency	60.0%		1.		Ι.	60.0% 60.0	50.03 50.03	9% 60.0%	0.09 %0	% 60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0% 6	60.0% 6	60.0% 60	1	3	120			
Field Requirement	(mm)	33.2	38.5	32.9	12.8	•					•	•	•	•	•	•		•	•			21.5	27.9 3	36.7 235 mm	e
	(mm/day)	22			86.0						'	٠	٠	1	•	1		,	•	0.68	136			2.29	
	(I/S/Ipa)	0.256 0			- 1	ı		- [- 1	-	- 1	- 1	ŀ		- 1	- 1	- 1	- !	- 1	- 1	ľ	ľ	Ì	0.265	
Conveyance efficiency	80.0%			æ		80.0% 80.0%	0% 80.0%	0% 80.0%	0% 80.0%	80.0%	80.0%	80.0%	80.0%	80.0% %	80.0%	80.0%	80.0%	80.0%	80.0%		85	20	••		
Diversion Requirement	(iii				16.0	 1	•			,		•	•			· ·	,			13.6		26.9		45.9 29.5 mm	mm for Winter Vecetable S
=	(mm day)		Ť		57			1				•	1	•	•			•	ا ا	•			4 0960		in Zone-à
Monthly average	(Listha)	0.550	0334	, (c)	0,230		٠.	,				' '	1						ا			0.202		0300	
Zone - B																									
Provable Rainfall R80	(HH)	1.30		10.80							07.70	_	166.60						40.70	3.60	0.00	0.00	2.20 3	3.20 1,364 mm	-
Potential Effect. Rainfall	(mm)	0.00							28.56 33.92	4		76.		142.8										<u> </u>	<u></u>
Effective Rainfall Re	(HH)				7.82	0	٥	0	0	0	0	0	0	P	0	0	0	0	13.973	•			0	0 35 EEE	
Area to be irrigated	irrigated	100%	100%	75%	25%								1	•	•	•			9 v	9,0)	er e	יים -		19 ====	-
Total Net (Et + P - Re)			ò	λ.	21																		1		
	(田田)	24.4	22.6	17.1	6.9	1	,		,		'					•	•			10.0		1	16.7 2	22.0 145 mm	Ħ
Field Efficiency	60.0%		1.	60.0% 64	1	50.0% 60.	60.0% 60.	60.0% 60.	60.0% 60.0%	%0.09 %(%0'09 g	80.0%	60,0%	60.0%	90.09	9.009	60.0%	60.0% 6	60.0% 6		20	ı	9		
Field Requirement	Î	45.7			11,4	•					,	•	•	•	•	•	•		•					36.7 242 пп	Ħ
	(mm/day)				0.88	•					'	•	i	1	1	ı	•	1	,		136	 된 :		29	
	(l/s/ha)	- 1	- 1	~ I	l	- 1	- 1	i	- 1	ľ	- 1	- 1	- 1	- 1	- 1	- 1	- 1	- 1	Į	ľ	- ľ	-1	ľ	0.263	
Conveyance efficiency	80.0%					80.0% 80.0%	80.0% 80.0%	80.0%	80,0% 80.0%	80.0%	80.0%	80.0%	80.0%	8	80.0% 0.0%	26.0% 26.0% 26.0% 26.0%	80.0%	80.0% 8	80.0%	96	20	25	25	30.0%	
Diversion Requirement	(i)				14.3 5.5	•	•						ı	•	•	•	•	•	,	50.5	0 5	707	77.	302	mm for Winter Venetable 5
	(day)	קיני געיייייייייייייייייייייייייייייייייי	277	6 7 C	1.10		•	•	. 1		• '	'	•	•	•					_		_			in Zone.B
Monthly average	(Listina)		1		0.201		. ,	t je				'		'		•		•	-	0.076		0.202		0300	
Women's artinger	(mark south		2																						

Table 3-3.1 Unit Field Irrigation Water Requirement by Crops in Zone - A

Section Sect	Crops Jan. Feb.	Jan		Feb.	-	Mar		Apr.		Mav	F	197	-	Ĕ	r	Ane	-	Sen	1	Č	Mov		0		Ammod A	Damarka
March 20, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	-	Early	ate	Sardy	₽₽	⊢	╆┈	Early	E SE	Ľ	╬	iL_	+	uly L	١.	<u>.</u>	╏		15	: I	TE.	• 1	Early	ate	/Max	
Marie San San San San San San San San San San	Paddy (Daddi: (T.)	-	0 6	0 0	0 0	0 :		0 •	0	0	1		 	35.4	2	3.8	0		3.1 89		10.7	1	•	0	730	innual total
Linguistic 120 325 401 455 455 21 455	Wheat	20.6	43.7	59.4	689	083	3 3	700	0 0	0 0	00	0 0		13.5	m c	9.5	0 0		5.4	.148.7			0 0	0 0	891	
Property 11 11 11 11 11 11 11	Legume	25.0	38.5	6	15.4	0	0	0	· c	• •		-			-		· c						9 2	5.50	9 5	
Martin M	Legume (L)	14.2	28.2	47.4	46.3	22.2	0	0	0	0	0	0		0	0		0		. 0	0			4.5	12.8	176	
Engly Presence 1	Mustard	88.5	41.1	9, 9	19.9	0	0	0	0	0	0	0		0	o	0	0		0	0			9.0	17.1	166	•
Empirement 1 11 652 1918 (1918) 41 652 1918 (1918)	Farly Potatoes - 1	30,7	15.0	ž, c	}	202	-	-	0 0	-	0 0	0 (0	0 (0	0		0 0	0 0			5.0	14.1	207	* :
High Part Services 0	Early Potatoes - 2	414	45.2	200	-	o c	> <	9 6	0 0	> <	,	5 C		> 0	-	> <	-		5 C				27.8	2,52	3 6	
State Stat	Late Potatoes	0	0	0	11.3	88	111.7	112.5	35.9	-) C	, c		-	0	,	o c		, c				† C	20.0	2 5	
Statistical Part Properties 1	Maize	0	0	0	0	٥	0	0	0	. 0	0				• 0	• =	, .		200	, ¢			o c	5 6	ξ "	•
Witter Vigatables 5 0 2 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6			0	0	0	0	0	6.2	6.7		80.1	55.6		. 0	0	, 0	0		90				0	0 0	1 5	•
Minch Vigatibles 1 0.0 246 454, 545 541, 545 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			0	0	0	0	0	0	0		۵	0		0	0	. 0	0		. 0	. 0			0	0	0	•
State Stat			24.6	45.6	55.1	55.9	212	0	0		٥	0		Q	0	¢	0		0	0			3.2	0.6	223	•
1		_	3.0	13.2	37.2	76.4	90'6	683	20.6		0	o		0	0	0	0		•	0			0	0	311	•
15 15 15 15 15 15 15 15			0	0	0	0	0	0	0		٥	0	0	0	0	0	0		0 26				10.0	0	202	t
Semi-Monthy Field Integration Water Requirement in minday Semi			38 78 78	00	200	00	00	0 0	0 0		Φ, 6	0 0	0 5	0	00	00	0	00	00				42.8	28.5	219	
Statistic Head Intrigation Water Requirement in manual systems Statistic Head Intrigation Water Requirement in manual systems Statistic Head Intrigation Water Requirement in manual systems Statistic Head Intrigation Water Requirement in manual systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Water Water Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the system Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the systems Statistic Head Intrigation Water Requirement in the system Statistic Head Intrigation Water Requirement in the system Statistic Head Intrigation Water Requirement Statistic Head Intrigation Water Requirement Statistic Head Intrigation Water R		J	3	24.5	T WE'D				•					5									21.9	30.7	533	•
Public 1.00 0		⁴ Imigation	Water F	Require	nent in	mm/day																			Unit: mr	\day
Purple 1,15 2,15 3,15 4,15 5,15	Paddy	0	6	0	ŀ	0	0	0	0		0	101	593	ı				ı	1		l			ē	9.03	1.0
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	Paddy (L)	0	0	0	0	0	0	0	0	0	0	0												0	13,33	-
145 154	Wheat	138	2.73	38	5.25	6.55	3.97	0.33	0	0	0	0	0	0	0	0	0	0	0					0.86	6.55	=
National 157 179 179 179 179 189	Legume	96.5	2.41 7.	2.67	1.19	O 9	0 0	0	0	0 0	0 (0 (0	0 (0	0	0	φ.	0				0.90	133	2.67	
1.47 2.47 2.49	Legume (L.)	<u> </u>	9 !	01.0	8	(⇒ (-	5	5	0	0	0	0	0	0	0	•	0			0	030	0.80	3.56	*
Early Politics - 1	Potatoec	F. 5	77.	و م م	3 5		> (-	= (0 (0 0	-	0 0	0 (φ.	φ,	0 (0 (0 1				0.60	1.07	336	= 1
The propose of the	Farix Detatore 1	÷.	1 8	8 0	0 c	j c	> <	-	- 0	> 0	.	5 6	> <	0 0	0 0	>	5 0	-				i	633	88.3	88.	• 1
Native Purposes Columbia Co	Early Potatoes - 2	2.76	2.83	1.32	o c	> c		-	> =	>	9 0	5 e	> c	-	-	-	= <	> c	-			ಎ	2.52	3.01	3.01	
National Part Part	Late Potatoes	0	0	0	0.87	65,	86.9	7.50	239	9 0			0 0	c) c	o c	.				600	7	3 5	•
Summer Vegetables 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Maize	٥	0	0	0	0	0	0	0	· C	0	0	. 0	0	0		0	0	15				· c	0	0.19	E
Winter Vegetables Color			0	0	0	0	0	0.41	0.45		5.01	3.71	0	0	0	. 0	. 0							0	5.01	
Viniter Vegetables 0.60 1.54 3.04 4.14 3.73 1.22 0.0 0 0 0 0 0 0 0 0			0	0	0	0	0	0	0	Đ	0	0	0	0	0	0	0	0	_C				0	0	0	Ł
Semi-Monthly Field Imparion Water Requirement in lity sections 1,000 1,0			¥ 5	ж. 2	7 6 4 6	3.73	1.32	0 ;	۱ -	0 (0 4	0 (0 (0 (0 (0	0	0	0	0	0	O ·	0.21	0.56	4.24	*
Semi-Monthly Field Irrigacion Water Requirement in litisce/harmony in the field formation of the field formation			۲. د	\$ C	98.7	0.10	8 0	4 8 c	<u>ئ</u> د	96	0 0	0 (0 (0 0	0 0	0 0	0 (۰ ۵	•				0 (0 (5.66	
Semi-Monthly Field Irrigation Water Requirement in littsec/ha Semi-Monthly Field Irrigation Water Requirement in littsec/ha Fieldy Briddy			0	0	•	o c	0	0	9 0	9 0		,	> C	.	.) C	-	-	-				0.b/	2 6	24.4	
Paddy (L) O O O O O O O O O	\$		2.41	2.19	0.98	0	0	0	0	0	0	. 0	. 0	0	. 0	. 0	· •	. 0	. 0				1.86	2.29	2.41	•
Paddy (L) O		1 Immerion	Water D	Somirer	nent in i	trices (he																				,
10	_	0	1		-	0		c	6	¢	6	41.5	-	-	1	1				1	-		ľ	ľ	Cont: Ut	
0.159 0.316 0.459 0.608 0.758 0.460 0.061 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Paddy (L)	0	0	0	0	0	0	0	. 0			0											9 0		3.5	
0.153 0.279 0.309 0.137 0 0 0 0 0 0 0 0 0	Wheat			0.459	0.608			0.061	6		0	0											0.037			•
0.109 0.204 0.256 0.412 0.111 0 0 0 0 0 0 0 0 0	Legume			0.309	0.137	o	0	0	0		٥	٥	0	0	0	0	0	0	0				0.104			3
0.216 0.227 0.289 0.178 0 0 0 0 0 0 0 0 0	Legume (L)			0.366	0.412	0.171	0	0	0		0	0	٥	0	0	0	O	0	0				0.035			٠
0.163 0.282 0.449 0.434 0.158 0 0 0 0 0 0 0 0 0	Mustard			0.389	0.178	0	0	0	0		0	0	0	0	٥	0	0		0				0.069			×
0.545 0.115	Potatoes Federal			0,449	484	0.158	۰ ،	۰ ۵	۰.		0	۰,	0	0	0	0	0	0	0				0.038			•
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er Vegetables I 0 0 0 0 0 0 0 0.048 0.052 0.167 0.579 0.429 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Maize			0					, c		•	, c	o c	s c	٥ د	> 0	> <		2 5				5 6	0 0	0.000	•
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1 0.069 0.178 0.352 0.490 0.431 0.153 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0		0	0					•		0	0	, o	0	. 0	. 0	. 0					0	Ó	0	•
0,009 0,022 0,102 0,332 0,590 0,655 0,527 0,159 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.069		0.352	0.490				0	0	0	o	0	0	0	0	0	0		0			0.024	0.065	0.490	•
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\dashv	10.7	} 0	0	0 5	0	0	0	0	0	0 0	-	>	909	8.73	20.4		0.71	5.79	0	0 (> 0	> C	0	0	0 (> C	0	0 (2 5	3.66	1.36		0.082	0.670	5 C	0	0	0	0	0	۰ ۹	> <	0	0	0	0.467	
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	Annual tota	*	· ·	- T		*	*	· ·		5 6	* 2 F		•		·	veb/mw	3 Maxim	* 10	<u>* </u>	. *	1 9		·	99		٠.		<u></u>		. 92	. [1	int : lit/sec/ha	045 Maxin	1.543	3 14	. 9		\$0	<u>8</u>	<u>.</u> .	<u></u>				0.691	8 8	2

Table 3-4.1 Unit Diversion Water Requirement by Crops in Semi-Monthly Diversion Water Requirement Conversate Efficience 80%	Jan. Feb Early Late Early	0 0 0 0 0 0 25.8 54.6 74.3	Legume (1, 177 353 593 Mustard 350 514 530	S-1 49.1 19.9 0	51.8 56.5 0 0	r Vegetables 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	11.2 30.8 57.0 1.5 3.8 16.5	3 0 0 0 4 9.7 0 0 5 41.5 48.1 41.1	Semi-Monthly Diversion Water Requirement in mm/day	Paddy (1.) 0 0 0 0 Paddy (1.)	2.08 3.01 3.34	1.18 2.20 3.95 2.33 3.21 4.20	3.05 1.24 0	3.45 3.53 1.65	Maize Summer Vegetables 1 0 0 0	0 0 0 0.75 1.92 3.80	2 0.10 0.24 1.10 3 0 0 0	4 0.65 0 0 5 2.77 3.01 2.74	Semi-Monthly Diversion Water Requirement in lit/sec/ha	y 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Wheat 0.199 0.395 0.573 0. Legume 0.241 0.348 0.387 0.	0.255 0.457	0.203 0.353 0.562	0.409 0.191	000
r Requirement by	Mar Late Early Late	0 0 0 0 0 0 85.4 122.9 79.4			86.0 139	- 	69.9 26 95.5 113	• • •	mm/day	0 0 0		28.0°	4.69 1.71 0 0 0 0	0 5.74 8.7	0 0 0	0 4 0 8	3.58 6.37 7.08 0 0 0	00	it/sec/ha	00	88 0.575 0 0	0.214	0.198	00	0 0 0 0
/ Crops in Zon	Apr. Early Late Ea	000		000	0 8 4	%	25.7	000		0 0	0.66 0	00	00	0 0 9.38 2.99	0.56	00	2			00	0.077	00			1.085 0.346 0 0
Zone - A	ay Late E	000		00,0	00	100.1	000	000			00				6			000						0 0 0 0	
	Late	130.1						000		0 0 0	00			, 0 0				000		1.004	00			00	
	ul. Late	28.5	000	000					,	1.29 1.78	0 0	00			.00			000		1.306 0.206 0.	0			00	
	lug.	103.8						,000		3.65 6.49				000				000		0.422 0.751 0	0			00	
	Scp.	79.1 128.9 79.1 132.9						000		527 8.59				000	8		00	000		0.610 0.994	0	00	00	00	0 0
	\vdash	75.1	000	000			000	32.8 88.4 0 46.0		7.42 4.69				000				2.19 5.52 0 2.88	Com	0.858 0.543 (0			00	
	Nov.	21.5	0 0 0	000	000	0 0	000	75.7 42.8 68.5 60.9	1	0.89	100			860 0		00		5.05 2.85 4.57 4.06		0.103 0		0 0.049	00	0 0.114	00
	Dec	100	6.0 17.2 16.9 26.7 5.6 16.0			00		12.5 0 53.4 35.6		0	1.0	0.38 1.00		_			0.26 0.70	0.83 3.56 2.23	78,7	0	0.047 0.124	0.130 0.193 0.043 0.116	0.087 0.154		
	Unit: mm Amual Remarks	913 Annua	199	258	191	4 8	279	252		Unit: mm/day 11.29 Maximum	8.19	\$ \$ \$	4.85	353	0.24	 0	7.08	4.57	<u> </u>	Unit: htsec/ha	0.948	0.515	0.486	0.436	1.085

Table 3.4.2 Unit Diversion Water Requirement by Crops in Zone - B

Semi-Monthly Diversion Water Requirement
Conveyance Efficiency = 80%

я	Dec Annual Remarks	0 0	6.0 17.2 470	16.9 26.7	5.6 16.0	6.2 17.6	47.3 60.3	*	. 0	6	0	3.9 11.2 271	0	0 1	34.9 45.9 302		Unit: mm/day	0 0 11.29 Maximum	- - -	1.13 1.67 2.98	8	133	0.41	0.86 2.80	0	. 0 0	******	*****	0	0.83	133 2.87	Tinit · litteartha	0 0 1.306 Maximum	0	0.047 0.124	0.043	0.087 0.154	0,048 0.127	0.436	0.324	00	0 0	c	2	0.030 0.081 0.53
-	Nov.	١	8.6 21.5 0 0		0 0			00			0	0 0	_	. .	25.5 26.9			0 68.0	4. C	0 0.43	0 0	0 0	0 0	06.0	0	0 0	00	000		5.05 2.85			103 0	838 0.166	0 0	0	0 0	0 0	0 0.114	00	. 0	0	•	0	
		81.4 13.4		0	00		0 (00			0	0			20.9	ľ		5.09		0	0	5	- 0	0 0		0	00	-		6.14			0.589 0.	1.405 0.	00	, 0	0	0	0 (> <	0	0	¢	> <	, c
	- 1	1	139.3		00							0 0		200	0			5 7.45		0 0	0	0	0			0	0 0	00	0 0	1.38	9 0		_	9 1.075	00	, 0	0 0	0	0.	0 0	0	0 0	0		00
	요	9.9 107.2			00									00	, 0			4.66 7.15			0	0	. ·			0	00		0	00				0.539 0.859	00	, 0	0	0	٥,	- -		0	~ 0	ć	00
	Tate Earl	40.8 69.9	8.0 7 0.0	0	00	0	O (o c	0	0	0	0	0	0 0	> 0			2.55 4		0	0	Φ,	-	.	0	0	0	0	0	0 0	00		l	0.295 0.	00	, o	0	0	0 (> 5	0	0	0		00
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<u>, </u>	Early [00	0 (00	Q	0) C	0	. 0	0	0	0 (0 0	> 0			1.18 0	- -		0	0 (-		. 0	0	0 0	0	0	00	0		0.136	0	00) O	0	0	0 4	- c	0	ø	0	•	00
	Late		00															0 0												0	0		0 0	0 0	00	0	0 0		0 0			85	0 0	•	00
-	te Early	0	00	0 1	00	0	00	⇒ **	ነ 🗢	22,	0	6	21.9					00		. 0	0	0 1	0 0		2,48	_	Ψ. Τ.		1.46	000	0		ó	0	- -	, o		0	٠.	0.00		0 0.171	•	•	0 00
	Apr. Early Late	0 (11.4	0	~ ~	0	06	146.7 37		875	0	0		¢ c				۰.	0.76	0	0	۰ ۵	⇒ <	0	9.78		0.61	0		0 0	0		0	0	0.088	. 0	0	0	0 0			0.071	0	•	0 0
	Take Take	0 (84.0		00	0	. .	145.7	0		0	28.0	1193	-				00	5.25	٥	0	0	- c		9.11	0	0 0	1.75	7.46	G C	», ©		c		9090	00	0	φ (0 6	25	, D		0		0.203
	Early	i	116.9		11	ĸ		88	3	0		3						00	7		13		191		12	.0		4	5.5	00		seciha			0.902	2		0.18		0.61					5050
ment	y Late		0 0 67.1 78.7			8		0 10.9	0		١.	9 62.2		٠. ٠	7 143		in m	0		38 135	•		24 84 c		O		0	गं		00		rent in lit	0		18 0.701	:		9							88 19 19 19 18 18 18 18 18 18 18 18 18 18 18 18 18
sr Kequiremen 80%	ate Early	1	53.6 67		8 55 50 55 55 55	٠.	19.4	1				29.8 49		3 6	47.1 35.7		Requirem	0 0		2.95 2.98	. : '	1		3.43	1	5	0 0	m		.		Requiren	0		0.387 0.518			0346 0.506	0.140		. 0	0			0.215 0.385
# g	11	0 ,			27.0 44.3		58.4					20.5		12.0	50.8		ion Water	0 0		2.70		÷				0	o c			0 &	339	ion Water	Đ		0.271 0.		1		0.451		0	0			0.159
Conveyance Efficiency =	_ 	Paddy	raddy (L.) Wheat	Legume	Legume (L) Mustand		Early Potatoes - 1	Late Potatoes	Maize	Summer Vegetables 1		Winter Vegetables 1	41 6	স ব	i va		Semi-Monthly Diversion Water Requirement	Paddy Paddy (1)	Wheat	Legume	Legume (L)	Mustard	Foraloes	Early Potatoes - 2	Late Potatoes		Summer Vegetables 1	Winter Vegetables 1	81	ল ব	- VS	Semi-Monthly Diversion Water Requirement in litisecfua	Paddy	3	Wheat		:		Early Potatoes - 1		Maize	Summer Vegetables 1	N N	-	Winter Vegetables 1