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APPENDIX 1

PARAMBIKULAM ALIYAR PROJECT AND THE ENTITLEMENTS

Parambikulam Aliyar Project (PAP) is an interstate multipurpose venture commissioned in 1960s, facilitating irrigation, drinking water and hydropower generation. An Inter State Agreement was signed by the States of Kerala and Tamil Nadu in May 1970. In an average water year 33 tmcft (934.461 Mm$^3$) of water is impounded and utilized; 639 MW power (installed capacity) is generated from the PAP. There are 68 gauging points where joint gauging is done. The details of the dams, powerhouses and canals are given below.

Dams under the PAP

<table>
<thead>
<tr>
<th>Dam</th>
<th>Catchment area, ha</th>
<th>FRL, m</th>
<th>Capacity, Mm$^3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Nir Weir</td>
<td>7510.97</td>
<td>1158.24</td>
<td>1.10</td>
</tr>
<tr>
<td>Lower Nirar</td>
<td>2123.79</td>
<td>1021.08</td>
<td>7.76</td>
</tr>
<tr>
<td>TN Sholayar</td>
<td>12172.94</td>
<td>1002.79</td>
<td>152.65</td>
</tr>
<tr>
<td>K Sholayar</td>
<td>6474.97</td>
<td>811.68</td>
<td>153.44</td>
</tr>
<tr>
<td>Parambikulam</td>
<td>22843.69</td>
<td>555.35</td>
<td>504.48</td>
</tr>
<tr>
<td>Thunacadavu</td>
<td>4325.28</td>
<td>539.49</td>
<td>15.77</td>
</tr>
<tr>
<td>Peruvaripallam</td>
<td>1579.89</td>
<td>539.49</td>
<td>17.55</td>
</tr>
<tr>
<td>Upper Aliyar</td>
<td>12224.74</td>
<td>758.95</td>
<td>26.53</td>
</tr>
<tr>
<td>Aliyar</td>
<td>4195.78</td>
<td>320.04</td>
<td>109.39</td>
</tr>
<tr>
<td>Thirumoorthy</td>
<td>12172.94</td>
<td>407.51</td>
<td>54.78</td>
</tr>
</tbody>
</table>

Powerhouses under the PAP

<table>
<thead>
<tr>
<th>Power house (PH)</th>
<th>Installed Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarkarpathy</td>
<td>1 X 30 = 30</td>
</tr>
<tr>
<td>Sholayar I</td>
<td>2 X 35 = 70</td>
</tr>
<tr>
<td>Sholayar II</td>
<td>1 X 25 = 25</td>
</tr>
<tr>
<td>K Sholayar</td>
<td>3 X 18 = 54</td>
</tr>
<tr>
<td>Aliyar</td>
<td>1 X 60 = 60</td>
</tr>
<tr>
<td>Kadamparai</td>
<td>4 X 100 = 400</td>
</tr>
</tbody>
</table>
Canals under the PAP

<table>
<thead>
<tr>
<th>Canal</th>
<th>Length, km</th>
<th>Discharge, m³/s</th>
<th>Takes off from</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFC</td>
<td>13.07</td>
<td>8.098</td>
<td>Sarkarpathy PH</td>
</tr>
<tr>
<td>Sethumadai Canal</td>
<td>8.29</td>
<td>1.783</td>
<td>Sarkarpathy</td>
</tr>
<tr>
<td>Pollachi Canal</td>
<td>48.00</td>
<td>8.466</td>
<td>Aliyar</td>
</tr>
<tr>
<td>VP Canal</td>
<td>17.58</td>
<td>2.690</td>
<td>Aliyar</td>
</tr>
<tr>
<td>PMC</td>
<td>126.1</td>
<td>29.19</td>
<td>Thirumoorthy</td>
</tr>
<tr>
<td>Udumalpet Canal</td>
<td>30.00</td>
<td>2.208</td>
<td>Thirumoorthy</td>
</tr>
<tr>
<td>CC</td>
<td>53.11</td>
<td>32.564</td>
<td>Sarkarpathy PH</td>
</tr>
</tbody>
</table>

PAP Agreement

PAP agreement was signed and executed on 29.05.1970 with retrospective effect from 9.11.1958. As per the agreement, arrangements in the agreement are open for review at the expiry of 30 years, in the light of experience gained. The entitlements of Kerala and Tamil Nadu are given below.

Kerala’s annual entitlement of water as envisaged in the agreement

1. 12.3 tmcft (348.3 Mm³) at Kerala Sholayar
2. 7.25 tmcft (205.3 Mm³) at Manacadavu weir (exclusive of unutilisable waters)
3. Entire flow from Nirar weir during 1 October to 31 January [1.4 tmcft (39.64 Mm³) approximately]
4. 2.5 tmcft (70.79 Mm³) from Parambikulam group of dams when the total yield from the group exceeds 16.5 tmcft (467.2 Mm³).

Tamil Nadu’s annual entitlement of water as envisaged in the agreement

1. 16.5 tmcft (467.2 Mm³) from Parambikulam group of dams.
2. Water from Upper Nirar weir from 1 February to 30 September [7.3 tmcft (206.7 Mm³) approximately]
3. Water from Tamil Nadu Sholayar after ensuring 12.3 tmcft (348.3 Mm³) of water at Kerala Sholayar.
4. Water from Aliyar and Palar after supplying 7.25 tmcft (205.3 Mm³) (excluding flood water) at Manacadavu weir.

A Joint Water Regulatory Board is functioning for monitoring and regulating the functioning of the PAP. The organizational structure of JWRB is given below.

**Organisational Structure of JWRB**

**Systems under the PAP with their command areas**

<table>
<thead>
<tr>
<th>Canal</th>
<th>Length, km</th>
<th>Discharge, m³/s</th>
<th>Area Irrigated, ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aliyar Dam System</td>
<td>127.138</td>
<td>23.87</td>
<td>24321.71</td>
</tr>
<tr>
<td>Thirumurthy Dam System</td>
<td>249.448</td>
<td>39.643</td>
<td>171992.1</td>
</tr>
<tr>
<td>Moolathara System</td>
<td>74.02</td>
<td>45.306</td>
<td>21500.23</td>
</tr>
<tr>
<td>Idamalayar Irrigation System</td>
<td>99.779</td>
<td>41.059</td>
<td>14142.2</td>
</tr>
<tr>
<td>Total</td>
<td>8518.257</td>
<td>149.881</td>
<td>231956.2</td>
</tr>
</tbody>
</table>

*Based on discussions with officials of the PAP*
APPENDIX 2

QUESTIONNAIRE FOR FARMER RESPONSE

Main Canal: RBC/ LBC  Branch Canal ……………… Distributary …………………

Village ………………….. Local Panchayat ………………… Taluk …………………

Location of major land holding
- in the branch canal command : Head Middle Tail
- in the Distributary command : Head Middle Tail

1. General information

1.1. Name of the respondent: 1.2 Sex: 1.3 Age:

1.4  Address:

1.5  Education : Illiterate / < SSLC / < Graduation / > Graduation

1.6  Main occupation: Farming / Labourer / Govt. / Private job / Business / Other

1.7  Staying in this area for: < 5 years/ 5-10 years/ 10-20 years/ 20-30 years/ > 30 years

1.8  Whether migrated: Yes / No If yes, from where? …………………

1.8.1  why?

1.9  Experience in farming (Total): < 5 years / 5-10 years / 10-15 years / > 15 years

In CPP Command area : < 5 years / 5-10 years / 10-15 years / > 15 years

Prepared based on the format prescribed by CWC and used by CWRDM
1.10 Details of family members

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Relationship*</th>
<th>Education **</th>
<th>Residing ***</th>
<th>Occupation</th>
<th>helps in farming</th>
</tr>
</thead>
</table>
| 1    | Yes/No
| 2    | Yes/No
| 3    | Yes/No
| 4    | Yes/No
| 5    | Yes/No


** IL - Illiterate, BS - Below SSLC, BG - Above SSLC, but below graduation,
    GB - Graduation & above

*** 1- living with the respondent, 2 - living Outside

1.11 Income level

1.11.1 Total land area owned/operated (Inside & outside command area):

1.11.2 Main source of income : Farming / Govt./ Private job / Business / Labourer / Other

1.11.3 Type of house : Thatched  Tiled  Terraced

1.11.4 Bed rooms : One  Two  Three and above

1.11.5 Electrification : Electrified / Not electrified

1.11.6 Source of drinking water :
    Own well / Own well with pump / Own bore well / Public supply / Other

1.11.7 Equipment/vehicle :
    TV / Phone / Computer / Mixie / Refrigerator / Bicycle / 2 wheeler / 3 or 4 wheeler
2. Details of land holding

2.1 Land within command area

<table>
<thead>
<tr>
<th>Wetland</th>
<th>Garden land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area(cents)</td>
<td>Number of plots</td>
</tr>
</tbody>
</table>

2.1.1 Owned

2.1.2 Leased out

2.1.3 Leased in

2.1.4 Other ………

2.1.5 Total

2.2 Land purchased after the commissioning of the Project (in cents):

| Wetland: | Garden land: | Total: |

2.3 Land sold out after the commissioning of the Project (in cents) :

| Wetland: | Garden land: | Total: |

2.4 Have you reclaimed wetland for cultivating coconut / plantation / housing?

Yes / No

2.4.1 If yes, how much area (in cents):

2.4.2 When?

Within 5 years / 5 to 10 years back / 10 to 20 years back / More than 20 years back

2.4.3 Details of crops:

2.4.4 Reason(s) for conversion: For construction of house / Rice cultivation is not profitable / Non-availability of water / Non-availability of labour force/ Other (Specify)

2.4.5 Whether water is given for the converted area? Yes / No
2.4.6 (i) Any additional benefit due to conversion in terms of income?  
Yes / No
If yes, details……

(ii) Any loss due to conversion in terms of income and problems?  
Yes / No
If yes, details…..

2.4.7 Whether there is any change in value of area due to conversion?
Increased / Decreased.

3. Details of irrigation

3.1 Land (within the command) irrigated (cents)

<table>
<thead>
<tr>
<th>Land size</th>
<th>Wetland</th>
<th>Garden land</th>
<th>Total</th>
</tr>
</thead>
</table>

3.1.1 Irrigated from the Project

3.1.2 Irrigated from other sources(s)
(Specify source(s)……………)

3.1.3 Whether there is any increase in  
(a) Cropped Area  
Yes / No
If Yes How much?  
(b) Production  
Yes / No
If yes give details:

3.2 Whether water is received

(a)Timely  
(b) Equitably  
Yes / No
Yes / No

(c) Adequately  
(d) Reliability  
Yes / No
Yes / No

3.2.1 Water availability period  
From:  
To:

3.2.2 Extent of irrigation needs met from the Project:
Not at all / Less than 25% / 25 – 50% / 50 – 75% / > 75%

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3.2.3 If your irrigation needs are not met, what do you think are the reasons for it, in the order of priority:

- Sufficient water is not there in the reservoir
- Distribution system is defective due to lack of proper maintenance.
- Canal runs below the level of fields
- Water is not released by the authority as and when required
- Other …………

3.3 Are you aware about an operation plan on the release of water from the Project?       Yes / No

3.3.1 Whether the water is released through a turn system?       Yes / No

3.3.2 If yes, how does it affects the efficiency?

3.4 How do you know about the release of water from the Project?

- From newspaper / from Project officials / from other farmers / from farmer group leaders
- / Only when it comes / other source …………

3.5 Are you aware about the quantity of water required for crops?       Yes / No

3.6 How do you decide to irrigate a particular crop/field ?

- Based on advice from officials / Based on experience / Following other farmers /
- Irrigate when Water is available / other …………

3.7 If water is not reaching your field within the specified period, what will you do?

- Complain to the Project officials personally
- Complain to the Project officials through farmer association
- Irrigate through other sources
- Just ignore and wait for its arrival other …………

3.8 At the time of scarcity of water, how do you adjust your cultivation practices?

- No cultivation / no irrigation / change of crop / other …………

3.9 Have you heard of Command Area Development Authority (CADA)? Yes / No
3.9.1 If yes, what you know about it?

3.9.2 Is it operational in your command? Yes / No
If yes, how it helps?

3.10 Are you satisfied with the maintenance of the system?

3.10.1 Main canal Yes No If no, why?
3.10.2 Branch canal Yes No If no, why?
3.10.3 Distributary Yes No If no, why?
3.10.4 Field channel Yes No If no, why?
3.10.5 Control structure Yes No If no, why?

3.11 How much water cess are you paying (per year)?

3.12 Specify the cropping pattern in your area?

3.13 Is there any change in cropping pattern due to irrigation? Yes / No

4. Details of Income

4.1 Income from farming:

4.2 Income from livestock, etc. Cow / Goat / Bullock / Buffalo / Other………

4.3 Income from other sources

4.4 Whether taken any loan from banks, money lender etc. Yes / No

4.4.1 If yes, Details: Nature of loan: Type of bank:

4.5 Total saving per year:

5. Details of Farm/ Nonfarm Employment

5.1 Farm employment:

5.1.1 Number of family members who worked their labour in your land:
5.1.2 Labour (man-days) invested in your land (yearly):

5.1.3 Cost of labour:

5.1.4 Whether you find difficulty in getting labour?

<table>
<thead>
<tr>
<th></th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male:</td>
<td></td>
</tr>
<tr>
<td>Female:</td>
<td></td>
</tr>
</tbody>
</table>

5.1.4.1 If yes, reasons for this shortage?

- Young people are not interested in agricultural labour
- Better payment from non-agricultural labour
- Others (specify)

6. Environmental Impact

6.1 Do you experience any water logging in your field? Yes / No

6.1.1 If yes, reasons: Excess irrigation/ seepage / inadequate drainage / other………..

6.1.1.1 If the reason is inadequate drainage, was it there before the project? Yes / No

6.1.1.2 Has the seepage water benefited the area? Yes / No

6.1.13 If yes, how much area?

6.1.14 If no, what are the problems?

6.2 Do you have any salinity problem due to irrigation? Yes / No

6.3 Has the canal water improved water availability in your open well or tank? Yes / No

6.4 Increase in bio mass area Yes / No

6.4.1 If yes, details……

6.5 Are there any cases of water borne diseases in your area? Yes / No

6.5.1 If yes, are they due to canal water? Yes / No

6.6 Do you find any soil degradation (need for excess application of fertilizer) in your command after the project? Yes / No

6.6.1 If yes, details……
6.7 Do you have any soil erosion problem in your field? Yes / No
6.7.1 If yes, reasons…..

7. **Indirect Benefits of the Project**

7.1 Do you think that the Project helped your village / locality in,

7.1.1 Electrification Yes / No If yes, how?
7.1.2 Making roads Yes / No If yes, how?
7.1.3 Transportation Yes / No If yes, how?
7.1.4 Marketing Yes / No If yes, how?
7.1.5 Starting banks Yes / No If yes, how?
7.1.6 Postal services Yes / No If yes, how?
7.1.7 Telecommunications Yes / No If yes, how?
7.1.8 Drinking water Yes / No If yes, how?
7.1.9 Medical facilities Yes / No If yes, how?
7.1.10 Educational facilities Yes / No If yes, how?

7.2 Do you think that because of the canal irrigation facilities, the land value has gone up? Yes / No

If yes, details:

7.3 Whether any farm roads were constructed in your area? Yes / No

8. **Participation of Farmers**

8.1 Did any officer of the project approach you for organizing farmer association for looking after irrigation related matters/ Yes / No
8.2 Whether any kind of farmed association(s) function(s) in your locality? Yes / No
8.2.1 If yes, name and nature of it / them

8.2.2 -are you a member in it / them  Yes / No

8.2.2.1 If yes, in which capacity?  -Officer bearer
-Ordinary member

8.2.2.2 Specify nature and practice of irrigation planning by association

8.3 Do you think that farmers if united and formed association, they can manage branches or distributaries of the system? Yes / No

8.3.1 If no, why?

8.4 Have you heard of participatory irrigation management? Yes / No

8.4.1 If yes, what does it mean?

8.5 Do you think farmers’ organization is required for better irrigation and agricultural practices? Yes / No

If no, why?

8.6 How can you participate in the management of the irrigation system?

By contributing cash or kind / By contributing labour / Taking leadership / Attending meetings / Not interested to do anything / Other………………

8.7 What do you think are the problems normally occur in united effort of the farmers?

- united efforts will take more time
- More cost involved
- Difficult to work united
- Other (specify)
9. Farmer – Officer Relations

9.1 From where do you get advice on irrigation?
From other farmers/ from Krishi bhavan / Irrigation Department / Other/ from nobody

9.2 How often you meet an officer of the Irrigation Project?
- Quite often / weekly / monthly / quarterly / not at all

9.2.1 Where do you meet him / her?
- In the office / at meetings or seminars / in the field / other (specify)

9.3 How often do you meet an officer of the Krishi bhavan?
- Quite often / weekly / monthly / quarterly to annually / not at all meet

9.3.1 Where do you meet him/her?
- In the office / at meetings or seminars / in the field / Other (specify)

9.4 Are you satisfied with services rendered by

1) Krishi bhavan Yes/ No
If not why?
- Officials not sympathetic to the problems of farmers
- No incentives provided
- Officials reluctant to meet farmers
- No services rendered
- Other (specify)

2) Irrigation Department Yes/ No
If not, why?
- Water not supplied as per requirements
- Officials not sympathetic to the problems of farmers
- No incentives provided
- Officials reluctant to meet farmers
- No services rendered
- Other (specify)
10. Training

10.1 Did you attend any training / discussion meeting on irrigation? Yes/ No

10.1.1 If yes, when was the last one, and what was the topic?

10.2 Do you require training on irrigation and related aspects? Yes/ No

10.2.1 If yes, on what all topics?

11. Suggestions for Improvement

11.1 What do you think are essential for the better performance of your irrigation system?

11.2 How can you achieve participatory irrigation management?

11.3 Is there any new agricultural intervention brought in due to project? Yes/ No

If yes, details

a) Mechanization
b) Organic/Inorganic fertilizer
c) New seed potential
d) New processing
e) Marketing

11.4 Any other

Date:

Time: ____________________________  Name and Signature of Interviewer
APPENDIX 3

QUESTIONNAIRE FOR OFFICER RESPONSE

Date: ___________________________ Time: ___________________________

1. Name of Dept./Agency : ___________________________

2. Name of official : ___________________________

3. Age : ___________________________

4. Designation : ___________________________

5. Address : ___________________________

6. Experience (yrs) in the Chittur Project area : ___________________________

7. Present area of operation/jurisdiction : ___________________________

8. Do you think that farmers in the Chittur command area get water as per the requirement? Yes / No

9. If no, what may be the reason(s)?

10. Are you aware about an operation plan for release of water, existing in CPP? Yes / No

10.1. If yes, do you think that the water is released as per the plan? Yes / No

Prepared based on the format prescribed by CWC and used by CWRDM
11. From where do you get the information about-
11.1. Breaches -
11.2. Crop schedule -
11.3. Water requirement -

12. What are the arrangements for monitoring the efficiency of water distribution system?

13. Do you think that necessary consultations are made with farmers before deciding the dates for opening and closing of the dam?
   Yes / No

13.1. If yes, when and how such consultations are made?

13.2. If no, why it is not done?

13.3. If meetings are conducted, whether minutes are recorded?
   Yes / No

14. What are the services rendered by your department to the farmers?

15. How often do you interact with or meet the farmers?

   Once a week  Twice a week  Once a month
   Once year  whenever necessary  Not applicable
15.1. Where does the meeting / interaction does takes place?

   In the office       In the field       In any convenient place

16. Have you attended training related to irrigated agriculture?

   Yes / No

16.1. If yes,

   a. When (latest):

   b. Topic:

   c. Agency conducted:

17. Do you think that there is technical / administrative coordination among the Agriculture and Irrigation Departments?

   Yes / No

17.1. If yes, what type of coordination?

17.2. If not, why it is so?

17.3. What is your suggestion?
18. What are the main problems faced in discharging your duties?
   i) Shortage of personnel
   ii) Co-operation from farmers
   iii) Shortage of fund
   iv) Lack of proper monitoring system (like flow measurements..)
   v) Others

19. In your opinion, what are the main problems faced by the farmers of the CPP command?
   i) Lack of fund               ii) Labour shortage
   iii) Availability of water     iv) Lack of awareness
   v) Others

20. What do you suggest for improving the performance of CPP?

Signature:
APPENDIX 4

WARABANDI SYSTEM OF IRRIGATION

The Warabandi system of canal operation was originated in northwest India and has developed into an integrated irrigation management system in the command areas of the states of Punjab, Haryana and Rajasthan in India. This traditional system is now spread over many other states in the country. The system today incorporates different elements involved in evolving an optimal reservoir operation policy, including temporal availability of water in the reservoir/river, area of the command and the cropping pattern. Socio-economic and legal aspects are also considered in the system.

Significant Features of Warabandi

(i) the system ensures equitable distribution of available water, proportional to the size of land-holdings
(ii) it ensures greatest overall production per unit of water (not unit of area)
(iii) instead of meeting full demand of a limited number of farmers, water is made available to all farmers, less than the required quantity, which necessitates farmers to utilise the available water in a more efficient way
(iv) The cultivator is the master of his water budget and he evolves his own cropping pattern in consultation with other farmers and agronomists; and
(v) Hardship during lean years is shared by all and not by a few.

Methodology Involved

a. The land of farmers is to be grouped into larger irrigation units, known as Chaks (units).
b. These units should be provided with a constant flow of water, via a farm group outlet whose size is proportional to the surface area irrigated, which the farmers are not supposed to alter. Technically, this can be done by using fixed semi-modular outlets, where the flow is dependent solely on the water level in the supply channel. The flow rate cannot, therefore, be altered at downstream level, i.e., by the farmers.
c. Where ever water reserves are sufficient, both the distributaries and the water courses (the channel from the distributary to the farmers’ field) are supposed to flow at full level and the maximum flow rate assigned to each outlet is provided automatically, without outside intervention.

---------------------------------------------------------------------------------------------------------------

Based on CBIP Publication, 1981
d. During water shortages, when the water levels in the canals are correspondingly lower, the flow to all outlets is made proportionally lower, again without any outside intervention.

e. Generally, a distributary will have round the week operation for 168 hours. In practice, a distributary is operational for 8 continuous days to ensure proper distribution. In some cases sub-grouping of distributaries is done for better allocation of the available water in the best possible manner and to save crops during times of scarcity.

f. Within the *chaks*, water is rotated among farms, with time of delivery proportional to holding size.

Important terminologies

*Water Allowance* is the rate of flow allocated for each unit of culturable command (in the case of Bhakra, this is 17 l/s per ha).

*Capacity Factor* is the ratio of operating period of distribution to total period of the crop; this may vary from crop period to crop period (in the case of Bhakra, this is 0.8 or 144 days for *Kharif* and 0.72 or 129 days for *Rabi*).

*Intensity of Irrigation* is the ratio of irrigated area to total culturable command (this is 62% for Bhakra, for example).

*Duty of Unit Water* (ha) may be estimated as:

\[
\frac{100 \text{ ha}}{100 \text{ ha}} \times \text{intensity} \%
\]

Water Allowance for 100 ha

‘*Nakha*’ is the delivery point to the holding.

‘*Bharai*’ is the time required for filling a unit length of empty watercourse.

‘*Jharai*’ is the time credited to the common pool from draining time to the tail-end (generally, this is 30-50% less ‘*Bharai*’).

‘*Chusai*’ is the absorption loss suffered by a farmer.

Other features

Flow time for unit area is estimated as:

\[
168 - \text{Total ‘Bharai’} + \text{Total ‘Jharai’} \over \text{Total area}
\]

Flow time for a farmer is estimated as:

\[
\text{Flow Time for Unit Area} \times \text{His Area} + \text{His ‘Bharai’} - \text{His ‘Jharai’}
\]

Irrigation period is generally specified from ‘head’ to ‘tail’ to save the farmer at the tail-end from closing all the ‘nakkas’ upstream. No compensation is available for missed turn in the system. Usually after two seasons, night irrigation turn of a farmer is changed into day irrigation turn by just giving a shift of 12 hours in the schedule. There is often a tendency among ‘tail-
enders’ to get declared as the last to utilize the water in the week-end. This is because of the irrational method followed in fixing ‘Jharai’. The length of water course should be judiciously restricted; lining of water course is often found more useful than lining parent canal. Regime of a water course is generally attained by trial and error. The tail-end of distributary is to be monitored every day at 0800 hrs. Water courses and land-holdings are to be inspected once every month. Tampering of outlet has to be checked regularly. For ensuring that the correct quantity is available at the right level, the following steps are suggested:

- Siltation assessments
- Measurements for monitoring
- Monitoring withdrawals and absorption
- Establishing masonry ‘control points’
- Check at the tail outlet (usual exit height is 30 cm).

The revision in schedule is required only under the following conditions:

- Change in size/site of outlet
- Change in alignment
- Change in ownership
- Allocation of extra irrigation time
- After carrying out lining

A typical water course serves 40-60 farmers (of 2-4 ha each) and will have the following characteristics:

- Capacity: 30-90 l/s
- Length: 5000 - 7000 m
- Head: 3-10 cm above the field
- Depth: 0.2 - 0.4 m
- Velocity: 0.1 - 0.3 m/t

In the large-scale irrigation systems that apply the Warabandhi system, increasing farm production for the market remains a secondary consideration for the irrigation authorities; the primary concern being protective irrigation to ensure subsistence for the maximum possible number of farm families over the annual dry season and during the longer periods of drought. This aim is bound up with efforts to distribute whatever quantity of water available during these periods to a large number of users as equitably as possible. That means that the volume of water allocated per hectare in the dry season is so small that a water shortage is felt by the individual farmer who is forced to make optimal use of allocated water. In systemic terms, taking the main factors, with their various interests, dependencies and stakes, as a whole, control of water delivery and distribution using Warabandhi irrigation is mostly dependant on time schedule.
Instead of volumetric measurements, allotted time in relation to the capacity of water course will give the quantum of water used for tax purposes. This method will be beneficial to all groups of farmers including farmers with small land-holdings.

Advantages of ‘WARABANDI’ System

- Equitable distribution of water to the largest number of farmers in the command
- Greatest overall production per unit of water
- Cultivator is the master of his water budget and crop selection
- Hardship in lean years is shared by all farmers in the command
- Soil salinity and water logging can be restricted to the minimum
- Tail-end farmer does not suffer as much as in some other systems
- Full flow in distributaries reduces running time and conveyance losses
- Scarcity condition encourages full use of water
- The distributary can be controlled at the ‘head’ end and monitored at the ‘tail’
- It is easy for farmers to remember the weekly timings of irrigation
- Farmer down-canal acts as a ‘watchdog’ for the farmer up-canal
- Administrative costs are comparatively low
- Night irrigation is possible
- Farmers often take initiative to line the water courses.

The main canal and branch canals are classified as the Primary System; distributary as the Secondary System; and the water courses as the Tertiary System. A typical distribution system is given below: