

**Analysis & Redesigning of Watermills for  
Sustainable Development of Rural Areas of Uttarakhand**

**APPENDIX - A1**

**BASELINE SURVEY FORMAT  
FOR ENLISTING OF WATERMILL OWNERS**

NAME OF DISTRICT:

**PART I – AREA**

- 1. Tehsil**
2. Block
3. Gram Panchayat
4. Revenue village and census code as per 2001
5. Distance of Watermill site from revenue Village
6. Nearest market place
  - a. Name
  - b. Distance from village

**PART II – WATERMILL**

- |  |   |
|--|---|
| <ol style="list-style-type: none"><li><b>1. Detail of Watermill Owner</b></li><br/><li>a. Name</li><li>b. Father's / Husband's name</li><li>c. Address with contact no.</li><br/><li>2. Location of Watermill</li><br/><br/><li>a. Name of site/ Village / Hamlet</li><li>b. Name of stream / Gadera / River / Canal<br/>(on which watermill is situated)</li><li>c. Discharge (Cumec)</li><li>d. Available Head (m)</li></ol> | <b>Individual /<br/>Community /<br/>Dept.</b> |
|--|---|

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- |    |   |  |
|----|---|--|
| 3. | Distance of watermill from nearest village/Hamlet |  |
| a. | Distance of watermill from nearest road head      |  |
| b. | Status of electrification of Village/Hamlet       | Electrified / Un<br>electrified        |
| c. | No. of household exist within 500 mtrs            |  |
| d. | No. of watermills within 1 km                     |  |
| 4. | Present Status of watermill                       |  |
| a. | Status  | Upgraded /<br>Traditional              |
| b. | Working condition                                 | Working /<br>Defunct                   |
| c. | If defunct then reason                            |  |
| d. | Working duration                                  | Seasonal / Year<br>round               |
| e. | If working then existing use of watermill         | Mechanical /<br>Electrical /<br>Others |

**PART III – COMMENTS OF SUPERVISORS**

1. Potential for Expansion / Upgradation (GOOD/POOR)
2. Potential for enterprise development(GOOD/POOR)
3. Willingness of watermill owner for Upgradation. (YES/NO)

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**APPENDIX – A2**

**ECONOMIC ANALYSIS OF WATERMILLS**

Investment/ earning analysis of improved watermill can be understood as follows:

Estimated cost of setting up of a watermill for mechanical application

S.No.	Activity	Amount (Rs)
A	Civil Work ( Repair/ New)	
1.	Diversion	3000
2.	Channel	6000
3.	De siltation tank	4000
4.	Penstock (10mtrs)	5000
5.	Foundation	2000
6.	Gate/Valve	1000
7.	Machine house	20000
8.	Tailrace	2000
	Total	43000
B	Equipments	
1.	Turbine/shaft/bearing/valve control etc	27000
	Mill stones	5000
	Transportation	3000
	Installation	2000
	Total	37000
	Total estimated cost of new watermill (A+B)	80000

The above cost is estimated based on prices on some suppliers.

This cost will be less for modification of existing watermill.

Similarly estimates can made for the watermills where electricity generation is also possible,

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### **Grants and subsidy**

1. Up to 5 kw capacity watermills, MNES gives a grant of 75% of estimated cost or Rs 30000/- whichever is less.
2. Up to 5 kw capacity watermills, State government gives a grant of 15% of estimated cost or Rs 6000/- whichever is less.
3. Up to 5 kw capacity watermills, MNES gives a grant of 75% of estimated cost or Rs 7500/- whichever is less under Prime Minister Employment scheme.
4. Under the same scheme the beneficiary can also get loan @ 4% interest from banks.

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### Estimated earnings from a typical improved watermill

A typical improved watermill @ 8 hrs per day can grind 200 kgs of grain. If per kg of grinding a profit of Rs 2.00 (prevailing rate in villages) can be earned than daily profit will be Rs 300.00.

If grinds the spices like turmeric, red chilly ginger etc than per day approx. 80 kgs can be ground @ 5 per kg

(A) Annual Income:

200 kgs/day x 200 days x @ Rs 2.00 per kg = Rs 80,000/-

80 kgs/day x 100 days x @ Rs 5.00 per kg = Rs 40,000/-

Total income = Rs 1,20,000/-

(B) Annual Expenditure

Maintenance of civil work

(diversion, channel, tank, room etc. ) : Rs 10,000/-

Maintenance of equipments : Rs 6000/-

Maintenance of mill stones : Rs  
3000/-

Insurance premium : Rs 1,000/-

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Total annual recurring expenditure : Rs 20,000/-

(C) Net Annual Income : Rs 1,00,000/-

Therefore by installing improved watermill the miller can earn approximately Rs 1.0 lac per annum. If on a community basis the flour or ground spices are collected, packed and sold in market than higher profit can be earned.

Further few watermills which are approachable and on the way to main tourist places like “ Char Dham”, Nanital, Almora, Ranikhet, Kausani, Mussorie etc can be developed as tourist attraction and be the center for selling watermill products and other related products.

### **Other benefits:**

As per the survey details presently 6750 watermills are in working condition, which can deliver mechanical output equivalent to 1.5 kw per hour.

As they work for approx. 8 hrs per and 300 days a year.

Approx. equivalent electricity generated =  $6750 \times 1.5 \times 8 \times 300$

= 2,43,00,000 kwhe

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If they replace grid electricity than taking average grid emission factor of 0.8 for Uttarakhand, equivalent Co<sub>2</sub> abatement =  $2,43,00,000 \times 0.8 = 1,94,40,000$  kg

= 19,440

tons

= 19,440

CERs

These CERs if traded than can fetch approx.

=  $19440 \times @ 12\$ \text{ per CER} \times @ \text{Rs } 48 \text{ per } \$$

= Rs 1,11,97440 Say Rs 1.12.crore (per annum)

This money can further be invested/ utilized for development of these watermill/ millers.

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**APPENDIX – A3**

**SOFTWARE**



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