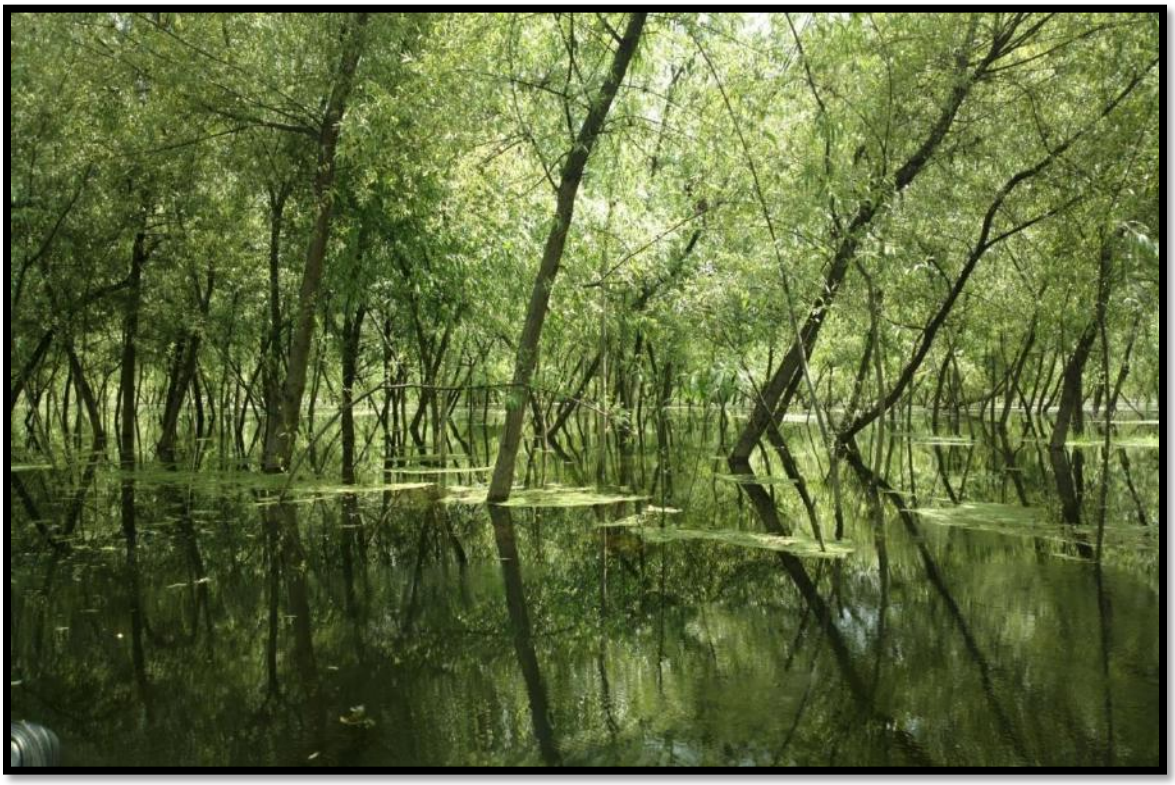
Action Plan

for Removal of Willows

from Wular Lake



Govt. of Jammu & Kashmir

WULAR CONSERVATION & MANAGEMENT AUTHORITY

(WUCMA)

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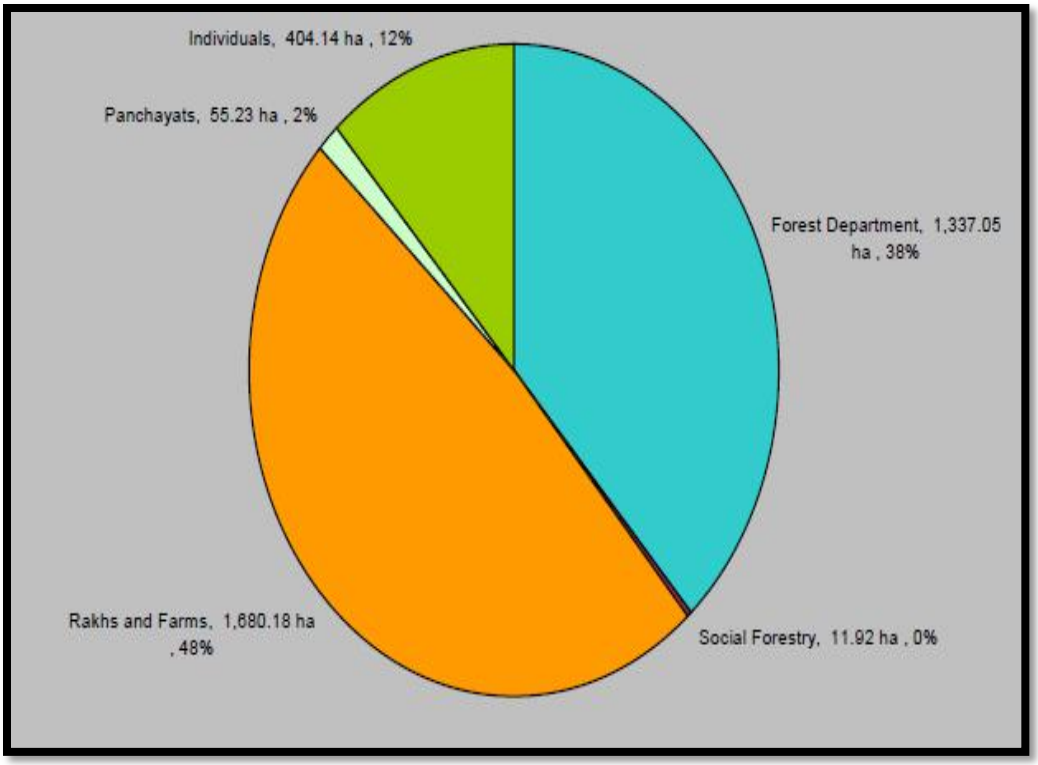
1. History of Willow Plantation in Wular Lake

Willows were grown as plantations in valley in the available marshy and barren areas of Kashmir, including Wular lake mainly to provide firewood. Through a series of experiments, willow was found to be most suitable for marshy areas and *Robinia* for drier sites. Willows currently represent a significant and potentially important component of Wular lake ecosystem. Systematic plantation within the marshes associated with Wular lake was initiated in 1916. By 1924, the Ningli plantations were established and transferred under the administrative control of the then Sindh Forest Division and subsequently expanded continuously under the Plantation Division of Forest Department, Government of Jammu and Kashmir. The State Department of Rakhs and Farms, constituted to manage and administer the marshes reclaimed for agricultural purposes further undertook the willow plantation in a major way after the 1950s. The Department promoted plantations in shallower zones of the marshes and water bodies primarily to provide fuelwood and in the later stages to support match and cricket bats manufacturing industries. In the later stages, social forestry division undertook willow plantations within the Wular Lake during 1982 – 2002 under the state government funded scheme on wasteland plantations, covering an area of 0.12 square kilometres. Village Panchayats, encouraged by the immense revenue potential of the willows also undertook plantations in 0.55 square kilometer area.

Following the Jammu and Kashmir State High Court Orders dated 10 October 2006 instructing the State Government to demarcate the territorial limits of the Wular and Manasbal Lakes, an assessment of the area under willow plantation in and around the lake was made by the Revenue Department in three tehsils of Sonawari, Bandipora and Sopore. The survey indicated an area of **34.88 sq km** under willow plantation in 30 peripheral villages. Of this, the state government departments of Forests, Rakhs and Farms and Social Forestry account for 86% (30.29 sq km) of the willow area. Preferences for willows are related to their easy vegetative propagation of rooted and unrooted cuttings, tolerance to flooding and periodically saturated soils, fast growth and formation of extensive fine fibrous root systems capable of binding sediments.



2. Availability of Willows

There are an estimated number of **21.50 lakh** willow trees within the Wular lake covering an area of 27.30 sq kms. This is as per survey done in 2007 assessed using remote sensing imageries. The estimation of quantity of willow trees is based on assumption of average plantation density of 1000 trees per ha. Estimated out-turn on account of sale of these willows is expected to be approx. Rs. 228 Crores (as per tentative cost analysis done by IIT-Roorke). Some 25771 willow trees have already been removed from the lake bed by Forest Department generating revenue of Rs.2.88 Crores. The plantation areas where from willows are required to be removed are as under:-

Location from where Plantation to be removed	Area Sq. Kms
Watlab to Wular Outlet	2.75
Ningli to Maqdoomyari	9.15
Maqdoomyari to Banyari(Laharwalpora side)	3.95
Laharwalpora to Kanusa	3.23
Kanusa to Zurimanz	0.17

The recorded ownership of willow trees within Wular Lake is shown as under:-

As per available records these willow trees are owned by			
S.No.	**Name of Agency**	**Percentage of willows owned**	**Approx. Number of willows**
01.	FOREST DEPARTMENT	38%	8,17,000
02.	RAKHS & FARMS	48%	10,32,000
03.	PANCHAYATS & SOCIAL FORESTRY DEPTT.	2%	43,000
04.	INDIVIDUALS (Local Inhabitants)	12%	2,58,000
	TOTAL	**100%**	**21,50,000**

(**Note:** Figures presented above are based on estimation)

3. Impact of Willow Plantation

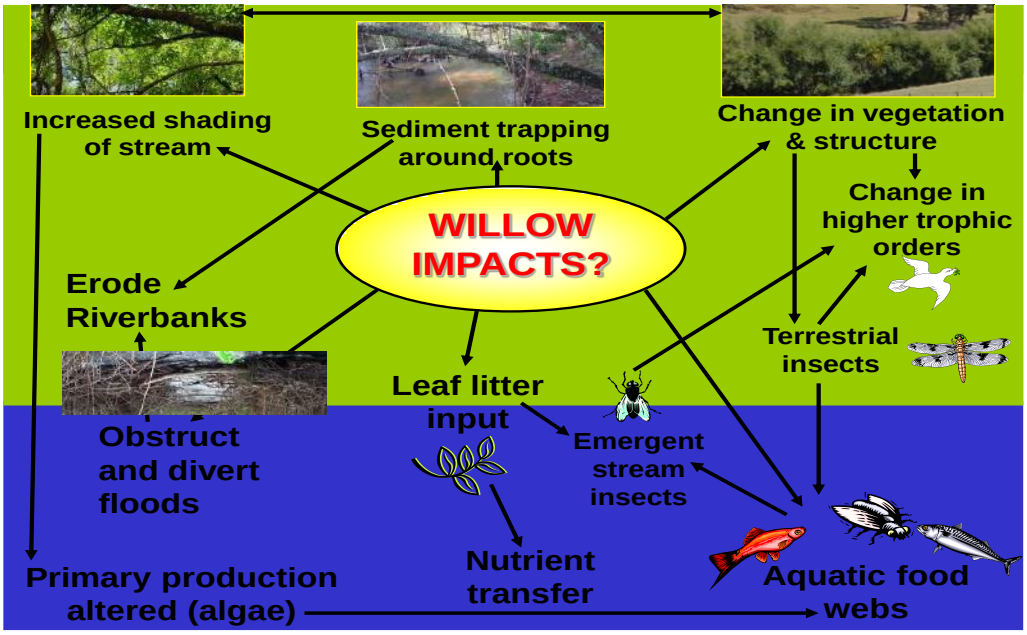
Willows are deciduous, with soft, fragile leaves that fall in late autumn and provide a large flux of rapidly decomposing organic matter to aquatic systems. Branches and bark from willows also have a fast decomposition rate. Also both the bark and leaves of willows leach cyanidins, delphinidins, leucoanthocyanidins and phenolglycosides into aquatic environments which have shown to deter herbivores. The thick, overhanging canopy of willows crowds native plants and casts heavy shade which decreases the amount of solar radiation reaching the surface water. This can affect water temperatures and primary production and can alter growing conditions for native understory vegetation.

The willow plantation has severely altered the hydrological processes of Wular lake. Willow plantations act as barriers to silt laden waters of the river Jhelum forcing it to discharge the sediment load into the lake and thereby inducing loss of water holding capacity. A spatial analysis of the sedimentation pattern within the wetland clearly indicates rapid siltation along the fringes of the plantation areas. The detritus from the plantations have also accelerated nutrient enrichment of the waterbody leading to water quality deterioration.

Willow characteristics and their associated possible environmental impacts (Adapted from the North East and Murray Willow Management Working Group 1998)

Characteristic	Possible Environmental Impacts of Willows
Deciduous	Dense shade in spring and summer, followed by light shade and heavy leaf fall in autumn and winter, suppresses indigenous understorey and river fauna. Most leaves fall in autumn when natural stream flows are high and water temperatures low. The massive leaf drop in autumn can lead to high nutrient pulses within the system and to reduced water quality.
Dense shallow mat-forming roots	Roots and foliage trap silt build up on the ground surface and divert flows into banks. Eventually watercourses may change course to flow around willows, creating 'braided' streams with mid-stream islands. Streams with willows tend to become wider and shallower. This leads to increased flooding, until the channels have expanded. Roots generally suppress growth of indigenous plants, leaving bare ground beneath.
Dense canopy	Dense shade created by tree canopies decreases light availability and water temperatures (especially during spring/summer). These modifications cause a decline in in-stream primary production: limited regeneration of native flora and a decrease in dissolved oxygen concentrations.
Lack of predators or terrestrial willow-eating animals	Willows contribute little to the terrestrial food chain. Fewer insects results in fewer insectivorous birds. Few insects drop into the watercourse to provide food for fish etc. Lack of predators allows willows to grow faster than indigenous plants, and suppress indigenous understorey growth.
Monoculture forming. Ability to dominate entire sections of the watercourses	Dominance of stream banks leads to marked reductions in natural diversity of flora and fauna and habitat/conservation values in the water and on the banks. Watercourses dominated by willows may not be as accessible as typically indigenous watercourses.
Ability to spread	Willows can spread prolifically vegetatively and by seeding between different willows. As such, they are highly invasive and have the potential to dominate watercourses. Such potential poses severe environmental risks to other areas, including intact 'natural' areas.
Tendency to grow into the centre of streams and cause erosion	Willows can grow in continually wet sediment and hence encroach towards the centre of watercourses. Such encroachment can create flow diversions which increases erosion potential, and can lead to complete stream blockages as the trees trap silt and debris. This increases flooding, and can cause streams to change course.

Tendency to accumulate debris	Willow debris deposited downstream can continue to grow causing further problems. Additionally, long overhanging willow branches or numerous trunks encourages the collection of debris, which increases stream blockages and redirects flows into banks where erosion may occur.
Few branches shed, and few hollows or snags formed	Willows are poor habitat for hollow-dependent mammals and birds, and snag dependent fish. Fallen branches that either rot quickly, reducing food resources for in stream invertebrates, or take root, spreading willows further.
Brief flowering season	Willow flowers only provide nectar for introduced honey bees, for a brief period. There are no records of use of flowers by nectar-feeding birds.
Water use	Willows can dry out streams and swamps by using more water than the herbaceous vegetation they replace, or have higher transpiration rates than indigenous species.



Ecological impacts of willow plantation

4. Removal of Willows

The State Government formally constituted the "**Wular Conservation and Management Authority**" **(WUCMA)** in 2012 vide SRO-311 & 314 of 2012 under the J & K Development Act of 1970 and the Authority came into existence in 2011-2012. Prior to the constitution of WUCMA, a Comprehensive Management Action Plan (CMAP) for the conservation and development of Wular lake and its associated ecosystems was prepared by M/s Wetlands International, South Asia, New Delhi in 2007 on behalf of the J & K Wildlife Protection Department. The removal of willows from lake has been an important recommendation of CMAP in rejuvenation proposal of Wular lake. However, the quantum of willows involved being humongous, a lot has been discussed and deliberated in the past on the issue of undertaking felling of such willows. Following are the important developments on this issue as detailed below:-

(i) **Constitution of Technical Committee:** Government of Jammu & Kashmir vide order No. 38 of FST of 2010 dated 02-02-2010 constituted **Technical Committee** to revisit the project report prepared by the consultant (Wetlands International South Asia) and directed the said committee to examine the report and submit its recommendations. The Technical Committee on Wular development submitted its report to the Govt. through its convener (CF Srinagar) vide letter No. CF/Sgr/Camp/1-2 dated 21/06/2010 and subsequently the state government vide letter no. FST/lease/07/2012 dt. 06/09/2012 accepted the recommendations of the said Technical Committee for implementation of different components. The report proposed following activities/components for lake rejuvenation:-

(ii) Removal of willow plantation.
(iii) Lake desiltation.
(iv) Linkage of Jhelum conservation project and Wular management action plan.
(v) Institutional arrangements.
(vi) Monitoring and Evaluation mechanism**.**

(ii) **Environment Impact Report by Kashmir University**: The "Centre of Research for Development (CORD) University of Kashmir" which was requisitioned by Wular Conservation & Management Authority (WUCMA) for conducting environment impact study of removal of willows from Wular lake has recommended removal of willows from lake with following comments:

(i) *Willow removal should be only restricted within the lake boundary (demarcated by bund), while leaving the buffer zone intact. Infact buffer zone can be used for willow plantation wherever, it is not present considering the importance of willows to filter the nutrients, trapping of sediments, erosion control and stabilization of bunds. However, continuous monitoring is needed to check their invasion within the lake boundary.*

(ii) *The removal of willow plantation from within the lake system is recommended because it is going to create more open water areas and provide habitat for diverse macrophytic communities to take over. However, regrowth of macrophytic vegetation in such areas wherefrom the willows are removed needs to be specially monitored as the invasive species*

are more likey to be the first colonizers in vies of nutrient flushes and disturbances created by willow removal.

(iii) Report by Wildlife Trust of India: The "*Economic Feasibility of Willow Removal from Wular Lake, Jammu and Kashmir"*, a report prepared by Wildlife Trust of India under an assignment from GIZ & MoEF&CC has carried out detailed cost-benefit analysis of the plan to assess economic feasibility of removal of willows from the lake. In the said report, the cost and benefit flows through four categories of stakeholders – government, public, individuals and business and industry have been examined. The results indicated overwhelming economic benefits of the plan in terms of costs saved on flood damage, increase in power generation, improvement in livelihoods by more fish and trapa becoming available and the onetime gain from the sale of willow.

(iv) Public Interest Litigation (PIL): Hon'ble High Court of Jammu & Kashmir in OWP (PIL) No. 345/2006 & CMP No.952/2007 in the case ***Kashmir Environmental Protection vs State of Jammu & Kashmir & ors*** has passed directions in respect of conservation and management of Wular lake on 19.10.2012 as under:-

(i) All the stakeholders should gear up for efficient execution of the action plan (CMAP/RMAP).
(ii) Demarcation works of Wular lake should be completed expeditiously.
(iii) No construction in the demarcated area should be permitted by any Authority without specific orders from Hon'ble High Court.
(iv) Necessary steps should be taken up by the state government to fill up the posts of WUCMA including engineering as well as forest staff as per the organizational chart in WUCMA for successful implantation of the plan.
(v) All other necessary steps should be taken up for implementation of the action plan.

(v) Wetlands (Conservation and Management) Rules, 2017: The Centre government has come out with rules to identify and manage the wetlands of country which play an important role in flood control, groundwater recharge, preserving plant varieties, supporting migratory birds and protecting coastlines. The new rules, notified by the Environment Ministry, decentralise wetlands management by giving states powers to not only identify and notify wetlands within their jurisdictions but also keep a watch on prohibited activities. It also indirectly widens the ambit of permitted activities by inserting the 'wise use' principle, giving powers to state-level wetland authorities to decide what can be allowed in larger interest. The notification says, "The wetlands shall be conserved and managed in accordance with the principle of 'wise use' as determined by the Wetlands Authority." The Centre's role under the Wetlands (Conservation and Management) Rules, 2017, is restricted to monitoring its implementation by states/UTs, recommending trans-boundary wetlands for notification and reviewing integrated management of selected wetlands under the Ramsar Convention — an international arrangement to preserve identified wetlands.

Section 3 of said rules restrict certain activities in wetlands. The activities restricted are as under:-

Restrictions of activities in wetlands.—(1) The wetlands shall be conserved and managed in accordance with the principle of 'wise use' as determined by the Wetlands Authority.

(2) The following activities shall be prohibited within the wetlands, namely,-

(i) conversion for non-wetland uses including encroachment of any kind;

(ii) setting up of any industry and expansion of existing industries;

(iii) manufacture or handling or storage or disposal of construction and demolition waste covered under the Construction and Demolition Waste Management Rules, 2016; hazardous substances covered under the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 or the Rules for Manufacture, Use, Import, Export and Storage of Hazardous Micro-organisms Genetically engineered organisms or cells, 1989 or the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008; electronic waste covered under the E-Waste (Management) Rules, 2016;

(iv) solid waste dumping;

(v) discharge of untreated wastes and effluents from industries, cities, towns, villages and other human settlements;

(vi) any construction of a permanent nature except for boat jetties within fifty metres from the mean high flood level observed in the past ten years calculated from the date of commencement of these rules; and,

(vii) poaching.

Provided that the Central Government may consider proposals from the State Government or Union Territory Administration for omitting any of the activities on the recommendation of the Authority.

(vi) **Conclusion:** The Wular lake being RAMSAR SITE/SCHEDULED LAKE under Wetlands (Conservation and Management) Rules, 2017 and the plantation activity within Wular lake being non-wetland use, therefore removal of willows is a permitted activity and must be carried out in phased manner keeping in view the market demand, ecological aspects and other lake management and conservation activities.

5. Compartment-wise willows in Ningli Range

S. No.	Name of the Block	Compartment	Total	Remarks
1	Hajin	6B, 7, 8, 9, 10, 11, 12, 13, 14	09	-
2	Shahgund	1, 2, 3, 4, 5, 6, 9, 10	08	-
3	Gundjehangir	1B, 2B, 2C, 3, 4, 5, 8	07	-
4	Ningli	3, 4, 5, 6A, 6B, 7, 8, 9 10, 11	10	-
5	Dharnambal	-	-	This block is not bifurcated into beats or compartments
6	Banyari	1, 2, 3, 4, 5, 6	06	-
7	Aadipora	2A,3, 4, 5, 6, , 7, 8, 9	08	-
8	Janwara	10, 11, 12, 13, S.P.Coupe	05	-
9	Zalwan	Bandipora Marg,Nathpora Marg,Watpora Marg,Lankreshipoora	04	-
10	Garoora	Leharwalpora,Tangwani, Kawkhori, Garoora	04	-

6. Year-wise Willows Removed from Wular

S.No.	Co.No.	Year of marking	No. of trees felled	Expected Volume (Qtls)	Remarks
1.	1/Banyari	2012-13	1108	2114	Works taken up departmentally during the year 2012-13. Trees felled and stocks removed in full and supplied to PC Depot as firewood supplies.

S.No.	Co.No.	Year of marking	No. of trees felled	Reserve Rate	Rates offered	Amount recovered
1.	2/Banyari	2013-14	13200	5732000.00	8566869.00	8566869.00
2.	3/Banyari		3205	3477000.00	5158000.00	5158000.00
3.	4/Banyari		3641	1193000.00	2622195.00	2622195.00
4.	5/Banyari		4935	3405000.00	11594185.00	11594185.00
5.	6/Banyari		2848	740000.00	815600.00	815600.00
			25771	**14547000.00**	**28756849.00**	**28756849.00**

7. Willow Markings Available and Expected Sale value

Division	Range	Comptt. No.	No. of Willow Trees	Expected Revenue generation
Bandipora	Ningli	Kawkhori Beat Garoora block	2718	2989800.00
		14/ Hajin Block Hajin	2817	3098700.00
		Tangwani Beat Garoora Block	5089	5597900.00
		13 Hajin Block Hajin	4081	4489100.00
		01/b Gundjahangir	7134	7847400.00
		10/Hajin Block Mukdamyari Beat –I	2121	2333100.00
		05/ Gundjahangir	3049	3353900.00
		03/ Gundjahangir	9922	10914200.00
		07/ Hajin	4850	5335000.00
		08 /Hajin	3637	4000700.00
		04/Gundjahangir	8896	9785600.00
		10/ Hajin Beat-I (Addl.)	84	92400.00
		09/Hajin Beat-I	348	382800.00
		11/ Hajin	2408	2648800.00
		12 / Hajin	1408	1548800.00
Grand Total			58562	64418200.00

Say 6.5 Crores

The markings have already been conducted in respect of compartments tabulated above in respect of portions which fall within the Wular lake. The plantation areas outside Wular boundaries have been left unmarked. The expected revenue has been calculated based on the assumption that each willow will fetch around Rs 1100/tree based on the results of previous auction conducted in Bandipora Forest Division.

8. Compartments to be Marked & Felled

S. No.	Name of the Block	Compartment	Total	Remarks
1.	Hajin	6b	01	Markings to be conducted
2.	Shahgund	1, 2, 3, 4, 5, 6, 9, 10	08	
3.	Gundjehangir	2b, 2c, 8	03	
4.	Ningli	3, 4, 5, 6a, 6b, 7, 8, 9 10, 11	10	
5.	Banyari	-	0	
6.	Aadipora	2A,3, 4, 5, 6, , 7, 8, 9	08	
7.	Janwara	10, 11, 12, 13, S.P.Coupe	05	
8.	Zalwan	Bandipora Marg,Nathpora Marg,Watpora Marg, Leharwalpora,	04	
9.	Garoora	Lankreshipoora	01	
10.	Ajas	Kulhuma	01	
11.	Social Forestry	Wetland Ashtingo,Wetland Zalwan, Wetland Kehnusa I &II, Co. 3, 7 & 8 Kanyari, Co. 14/Mukdamyari,Village Woodlot Watlab Ghat, Janwara (Co. 13 & SP Coupe)	10	
	Total		**51**	

FELLING PLAN OF WILLOWS

(2019-20 to 2023-24)

5 YEARS PLAN

1st Year
(2019-20)

Division	Range	Year		Comptt. No.	Remarks
Bandipora	Ningli	2019-20	1.	Kawkhori Beat Garoora block	Markings have been conducted.
			2.	14/ Hajin Block Hajin	
			3.	Tangwani Beat Garoora Block	
			4.	13 Hajin Block Hajin	
			5.	01/b Gundjahangir	
			6.	10/Hajin Block Mukdamyari Beat –I	
			7.	05/ Gundjahangir	
			8.	03/ Gundjahangir	
			9.	07/ Hajin	
			10.	08 /Hajin	
			11.	04/Gundjahangir	
			12.	10/ Hajin Beat-I (Addl.)	
			13.	09/Hajin Beat-I	
			14.	11/ Hajin	
			15.	12 / Hajin	

Willow markings available	Expected rate per willow (Rs)	Expected revenue (Rs)
58562	1100	64418200.00

2nd Year

(2020-21)

Division	Range	Year		Comptt. No.	Expected No. of trees	Remarks
Bandipora	Ningli	2020-21	1.	Hajin 6B	10000	Markings to be conducted.
			2.	Shahgund 1	27500	
			3.	Shahgund 2		
			4.	Shahgund 3		
			5.	Shahgund 4		
			6.	Shahgund 5		
			7.	Shahgund 6		
			8.	Shahgund 9		
			9.	Shahgund 10		
			10.	Guroora Lankrishipora	7000	
			11.	Kulhuma	6000	

Expected Willows available	Expected rate per willow (Rs)	Expected revenue (Rs)
50500	1100	55550000.00

3rd Year

(2021-22)

Division	Range	Year		Comptt. No.	Expected No. of trees	Remarks
Bandipora	Ningli	2021-22	1.	Bandipora Marg	21700	Markings to be conducted.
			2.	Nathpora Marg		
			3.	Watpora Marg		
			4.	Lehrwalpoora		
			5.	Social Forestry-Wetland Ashtingo	21846	
			6.	Social Forestry-Wetland Zalwan		
			7.	Social Forestry- Wetland Kehnusa I &II		
			8.	Social Forestry- Co. 3, 7 & 8 Kanyari		
			9.	Social Forestry- Co. 14/Mukdamyari		
			10.	Social Forestry- Village Woodlot Watlab Ghat		
			11.	Social Forestry- Janwara (Co. 13 & SP Coupe)		

Expected Willows available	Expected rate per willow (Rs)	Expected revenue (Rs)
43546	1100	47900600.00

4th Year

(2022-23)

Division	Range	Year		Comptt. No.	Expected No. of trees	Remarks
Bandipora	Ningli	2022-23	1.	Ningli 3	19600	Markings to be conducted.
			2.	Ningli 4		
			3.	Ningli 5		
			4.	Ningli 6A		
			5.	Ningli 6B		
			6.	Ningli 7		
			7.	Ningli 8		
			8.	Ningli 9		
			9.	Ningli 10		
			10.	Ningli 11		
			11.	Gund Jehanagir 2b	6450	
			12.	Gund Jehanagir 2c		
			13.	Gund Jehanagir 8		

Expected Willows available	Expected rate per willow (Rs)	Expected revenue (Rs)
26050	1100	28655000.00

5th Year

(2023-24)

Division	Range	Year		Comptt. No.	Expected No. of trees	Remarks
Bandipora	Ningli	2023-24	1.	Adipora 2A	2550	Markings to be conducted
			2.	Adipora 3		
			3.	Adipora 4		
			4.	Adipora 5		
			5.	Adipora 6		
			6.	Adipora 7		
			7.	Adipora 8		
			8.	Adipora 9		
			9.	Janwara 10	10500	
			10.	Janwara 11		
			11.	Janwara 12		
			12.	Janwara 13		

Expected Willows available	Expected rate per willow (Rs)	Expected revenue (Rs)
13050	1100	14355000.00

ABSTRACT

Year	Expected No. of Willows to be removed	Expected Revenue
2019-20	58562	64418200.00
2020-21	50500	55550000.00
2021-22	43546	47900600.00
2022-23	26050	28655000.00
2023-24	13050	14355000.00
Total	**191708**	**210878800.00**

Note: Availability of willows is based on estimation. It may increase or decrease. Only those plantation areas which fall within Wular boundary have been taken into consideration in this felling programme. Those plantation areas which are outside the Wular boundary have been left as such. Willow plantation areas in possession of Rakhs and Farms, Panchayat and Individuals have not been included in this action plan.

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