Naula Management in Nakina Village (Hanspeter Liniger)

Naula Management and Conservation (India)

Naula (depression well, indigenous water harvest technology)

DESCRIPTION

Naulas are shallow, four-sided stepped wells designed to collect water from subterranean seepages or springs and are used to meet domestic water needs by the local communities. Naula management and conservation encompasses a range of activities that preserve their structure and function.

Naulas are imperative sources of natural seepage of drinking water and are considered the most important hydraulic structures to the villages in hill regions of Uttarakhand. They appear as a dry stone masonry structure, normally with a four-sided (rectangle or square) shape with stairs on all the sides and are commonly covered by stone slates and an erected wall on three sides. Since ancient times, water rituals are practiced within the communities and the water from these naulas have idols of various deities like the sun, moon, Earth, Vishnu, Ganesh etc. The main motive of keeping idols of gods and goddesses tied to the naulas is to preserve these structures from pollution and other harmful anthropogenic activities.

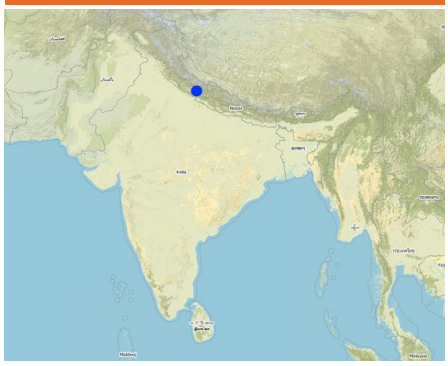
The efforts to preserve naulas include; building structural or vegetative barriers on the slope above to prevent physical damage, pollution from runoff and other erosive processes, establishing barriers of entry to deter wildlife and insects, initiating cleaning routines in the villages (scrubbing/disinfecting and clearing debris or weeds around the naulas).

The villages of Nakina, Digtoli, and Bhurmuni have carried out their own traditional measures to conserve these sacred structures and the water that flows into them. Sacred tree species like the peepal and banyan trees have been planted near naulas to signify its sanctity and to protect and shade it. To ensure the potability of a naula's water, biweekly cleaning regimes are undertaken. Structural measures such as check walls, check dams, and water channels have been made above the naulas. Additionally, wildlife entry is inhibited with cloth drapes that cover the naula's entrance, and some villages have established a protective enclosure around the naula.

Routine Naula conservation activities are taken up by those that collect the water, which include mainly the women and children. There is a water queue system in Nakina Village, in which people receive a specific time slot to take the water from the naula. This helps with keeping track of water use and promotes equitable use of water in the village. Other arduous tasks such as constructing the structural technologies include male participation. Monthly or bimonthly community meetings and daily checks on the Naulas help enforce the approach objectives. The villagers are are the sole stakeholders and take up full ownership and water user rights.

Generally, the older community members in these villages stress the need of Naula conservation and management to a greater degree. Members of the younger generation are less concerned and do not exhibit the same level of sensitivity, although they are aware of their importance to the community. The future effectiveness of the approach will depend on village participation and the level of dependency on the Naula for water during the dry season. With the drying of springs and increased use of pipe-schemes (though unreliable), external sources of water may replace this indigenous water harvesting technique.

LOCATION



Location: Digtoli, Pithoragarh Bloc, Uttarakhand, India

Geo-reference of selected sites

- 80.15276, 29.63008
- 80.17405, 29.62383
- 80.17609, 29.61961

Initiation date: n.a.

Year of termination: n.a.

Type of Approach

- [x] traditional/ indigenous
- [ ] recent local initiative/ innovative
- [ ] project/ programme based

Mr. Joshi explains the importance of the Vaishnavi Naula to the Nakina Village (Jaclyn Bandy)

Bhurmuni Naula is the main drinking water source for nearly 600 people. (Hanspeter Liniger)

APPROACH AIMS AND ENABLING ENVIRONMENT

Main aims / objectives of the approach

Maintenance and preservation of the indigenous water harvesting technology, the naula. By protecting this structure and the catchment area around it, the villages can protect their precious water resources and sustain a long-lasting tradition.

Conditions enabling the implementation of the Technology/ ies applied under the Approach

- **Social/ cultural/ religious norms and values**: Various religious ceremonies/rituals are still carried out around the naulas to this day. Lord Vishnu is associated with water in Hindu scriptures and mythology. Hence many naula have idols of Vishnu installed in them or sculpted on their stone walls. The need to revere and care for the naula is stressed by older generations.
- **Availability/ access to financial resources and services**: Little external financial resources are required
- **Collaboration/ coordination of actors**: The approach is traditionally community driven, site specific and requires little to no external input from other actors outside of the village.
- **Legal framework (land tenure, land and water use rights)**: There are no formal institutions or rules/written records of water rights and devices for regulating water use and their flow structures. In most traditional settings, water rights of individuals users are known, even if they are not formally recorded. In general all users are expected to participate in operation, maintenance and cleaning chores.
- **Policies**: According to traditional law, communities have had the ownership, control and rights to these water resources. They have had the freedom to build a variety of water harvesting structures based on their experiential knowledge and have designed them to fulfill their needs. Although the Kumaon Water Rules of 1917 transferred ownership of water resources to the state, the colonial government did not enact any specific legislation for water in the Uttarakhand region. As a result, village communities continued to look after their naulas and other water harvesting structures.
- **Land governance (decision-making, implementation and enforcement)**: Traditional water collecting systems in Uttarakhand comprise a variety of community control methods. Their assortments started from the differences in the local circumstances. Many of these plans were initially made by local leaders, dynasties and kings or by the prosperous people of the society. They display a diversity of technologies and minimal state intervention in water rights or management.
- **Workload, availability of manpower**: Naulas are typically close to the village (<500m), therefore combined community efforts make the workload and execution of this approach manageable, assuming their is collective participation.

Conditions hindering the implementation of the Technology/ ies applied under the Approach

- **Social/ cultural/ religious norms and values**: Due to shifting cultural dimensions, government or office jobs are considered to have a higher status than that of farmers in rural areas. These days rural youth have their minds set on getting a government or an office job. They are not willing to toil on their farms. This is severely straining the traditional systems of managing common property resources
- **Availability/ access to financial resources and services**: Less attention/investment is being directed to natural resources due to outmigration an off-farm employment opportunities
- **Institutional setting**: With better education and the increasing share of non-farm economy in the national economy, the potential for obtaining off-farm employment is growing rapidly. Non-farm employment (NFE) has affected traditional water management systems. NFE opportunities, particularly for rural males, have changed the traditional occupation structures in the villages. When a family's reliance shifts from agriculture to an off-farm source of income, its incentive to participate in the traditional voluntary chores required to maintain common property resources decreases. This reduces the supply of voluntary labor for tasks like the management and maintenance of naulas. Traditional sanctions against such households are less effective, thereby eroding local norms and authority. Families that are headed by women when the male head is away have difficulty in obtaining their rightful share of water. Interfamily disputes erupt on the return of the male heads, reducing the community's unity that is so essential for managing common property resources.
- **Legal framework (land tenure, land and water use rights)**: In the absence of formal records, however, this can be variable depending on the village.
- **Land governance (decision-making, implementation and enforcement)**: Sometimes, these systems failed to ensure social justice. Caste discrimination, appears to be a common feature. In many locations, there are separate naulas for people of upper and lower castes. The ones for the lower castes are usually smaller and unadorned structures by comparison. Care and maintenance is irregular and a large number are in a decrepit state.

PARTICIPATION AND ROLES OF STAKEHOLDERS INVOLVED

Stakeholders involved in the Approach and their roles

What stakeholders / implementing bodies were involved in the Approach?	Specify stakeholders	Describe roles of stakeholders
local land users/ local communities	Nakina, Digtoli, and Bhurmuni Village	Local village authorities hold regular meetings with the people to organize, discuss and monitor the use/status of their water resources and naula structures/

Involvement of local land users/ local communities in the different phases of the Approach

	none	passive	external support	interactive	self-mobilization	
initiation/ motivation					✓	Village heads, community members, Nakina Van Panchayat (community forest council)
planning					✓	Village heads organize a Gram Sabha (a meeting of all villagers in each village council area) and fulfill their obligations in local resource decision-making with active community participation.
implementation					✓	
monitoring/ evaluation					✓	
None	✓					

Flow chart

Decision-making on the selection of SLM Technology

Decisions were taken by
- ✓ land users alone (self-initiative)
- mainly land users, supported by SLM specialists
- all relevant actors, as part of a participatory approach
- mainly SLM specialists, following consultation with land users
- SLM specialists alone
- politicians/ leaders

Decisions were made based on
- evaluation of well-documented SLM knowledge (evidence-based decision-making)
- research findings
- ✓ personal experience and opinions (undocumented)

TECHNICAL SUPPORT, CAPACITY BUILDING, AND KNOWLEDGE MANAGEMENT

The following activities or services have been part of the approach
- Capacity building/ training
- ✓ Advisory service
- ✓ Institution strengthening (organizational development)
- ✓ Monitoring and evaluation
- Research

Advisory service

Advisory service was provided
- ✓ on land users' fields
- ✓ at permanent centres

There are several active organizations/ advisory services that are frequently engage with and are available to the communities. Some of these organisations include G.B. Pant, the Forest Department, and NGOs: Himalayan Sewa Samiti, CHEA, Swati Gramodyog Sansthan.

Institution strengthening

Institutions have been strengthened / established
- no
- yes, a little
- ✓ yes, moderately
- yes, greatly

at the following level
- ✓ local
- regional
- national

Describe institution, roles and responsibilities, members, etc.
Nakina village and Nakina Van Panchayat (community forest council) in particular have strengthened their relationships with external institutions and have been receptive to new projects for sustainable water management and natural resource use. This has increased involvement of the community and strengthened approach participation. Additionally, it has increased awareness and the need for spring restoration interventions and sustainable land use within the catchment areas of the springs/naulas.

Type of support
- ✓ financial
- ✓ capacity building/ training
- equipment

Further details

Monitoring and evaluation
Regular monitoring by the village community

FINANCING AND EXTERNAL MATERIAL SUPPORT

Annual budget in USD for the SLM component
- ✓ < 2,000

The following services or incentives have been provided to land users

- [ ] 2,000-10,000
- [ ] 10,000-100,000
- [ ] 100,000-1,000,000
- [ ] > 1,000,000

Precise annual budget: n.a.

- [ ] Financial/ material support provided to land users
- [ ] Subsidies for specific inputs
- [ ] Credit
- [x] Other incentives or instruments

Other incentives or instruments

The World Bank aided Uttarakhand Decentralized Watershed Development Project (GRAMYA) implemented by Watershed Development Directorate of Uttarakhand Government. It is operating since 2005 with the aim to mitigate water problems and addressing issues of other natural resources, with emphasis on women participation. NITI Aayog (National Institution for Transforming India), Government of India has recently launched a National Programme on Regeneration of Springs in the Himalayan Region 2017).

IMPACT ANALYSIS AND CONCLUDING STATEMENTS

Impacts of the Approach

	No	Yes, little	Yes, moderately	Yes, greatly
Did the Approach empower local land users, improve stakeholder participation? Increased awareness of naula importance; enhanced collaborative water conservation and use within the community				✓
Did the Approach enable evidence-based decision-making? Traditional approaches encompass ecosystem thinking, and therefore good practices such as planting trees above the naula and creating a favorable environment in the catchment area have been adopted by these communities for many generations. Though there has been improvements in infrastructure, officially provided water supply systems have either not reached the remote rural villages or where provided are unreliable, poorly maintained, and not the preferred source of drinking water.				✓
Did the Approach help land users to implement and maintain SLM Technologies? Increased sensitivity to the importance and impact of the surrounding ecosystem to the springs/naula function.				✓
Did the Approach improve coordination and cost-effective implementation of SLM? The approach supported community ecosystem-based thinking and has extended to interventions with the Nakina Van Panchayat (community forest council)			✓	
Did the Approach mobilize/ improve access to financial resources for SLM implementation? Active participation of the community and strong organizational qualities have helped extend their network and resource base			✓	
Did the Approach improve knowledge and capacities of land users to implement SLM? This approach increased engagement and refined attention to their main drinking water resources. Because spring discharge is decreasing, people have started to extend interventions in the microwatersheds or catchment areas of the springs for ground water recharge. This includes establishing plantations, avoiding overgrazing in the forests, and building recharge ponds and trenches.			✓	
Did the Approach improve knowledge and capacities of other stakeholders? Increased the combined interest of village-institution cooperation to understand the hydrogeological science behind spring recharge and develop recharge schemes to improve water security.			✓	
Did the Approach build/ strengthen institutions, collaboration between stakeholders? ICIMOD, G.B. Pant, the Forest Dept., and local NGOS are improving the merging of their efforts when working with particular communities that are open and curious to new projects and scientific technologies.			✓	
Did the Approach mitigate conflicts? There is a systematic organization of naula use and care in the villages, which is generally obeyed and thus conflict is avoided.			✓	
Did the Approach empower socially and economically disadvantaged groups? Upper caste members in the villages continue to determine social inclusion/exclusion with access to water sources. The culture excludes the Dalits in Chuni (lower castes) from accessing or using any Naula in the village except the one that is assigned as theirs. Despite this, the naulas of the lower caste are still considered important for management and conservation.		✓		
Did the Approach improve gender equality and empower women and girls? Improved the realization and need for woman empowerment in decision-making for the water resource use and management. Women in Nakina village feel comfortable to speak up and voice their concerns in group discussions. However, when the water in the naulas reduces, women are still blamed for accessing the spring in an "impure" condition (when menstruating) and are consequently banned from using the naula and sent to live in small huts outside the domains of the main house.		✓		
Did the Approach encourage young people/ the next generation of land users to engage in SLM? The approach has gained momentum for participation in preservation and restoration of naula structures. If water scarcity persists, the next generation can't expect to make a sustainable livelihood in their home villages.			✓	
Did the Approach lead to improved food security/ improved nutrition? Increased available water supply for small vegetable patch watering and water for livestock		✓		
Did the Approach lead to improved access to water and sanitation? Decreased risks of pollution from run off, water-born diseases and water availability				✓
Did the Approach improve the capacity of the land users to adapt to climate changes/ extremes and mitigate climate related disasters? Decreased effects and damage of extreme weather events on naula structure (e.g. reduced impact of erosion			✓	

and pollution from run-off, protection from fire)

Main motivation of land users to implement SLM

- [ ] increased production
- [ ] increased profit(ability), improved cost-benefit-ratio
- [x] reduced land degradation
- [ ] reduced risk of disasters
- [x] reduced workload
- [ ] payments/ subsidies
- [x] rules and regulations (fines)/ enforcement
- [x] prestige, social pressure/ social cohesion
- [x] affiliation to movement/ project/ group/ networks
- [x] environmental consciousness
- [x] customs and beliefs, morals
- [x] enhanced SLM knowledge and skills
- [x] aesthetic improvement
- [x] conflict mitigation

Sustainability of Approach activities

Can the land users sustain what hat been implemented through the Approach (without external support)?

- [ ] no
- [x] yes
- [ ] uncertain

The community is and has historically been dependent on these water harvesting structures. What has been implemented through the approach needs to be perpetuated for generation to come, along with management of the forests aand other natural resources within the catchments of the springs.

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view

- Improved awareness and action in the community to preserve Naulas; daily users incorporate habitual care and the naulas are well-preserved, clean and respected. Water quality is improved.
- Increased cohesion of village members and inclusion of women participation with water use and other natural resource management. This is especially recognized in Nakina village.
- Aesthetic of area is improved, and this is important for spiritual purposes within the communities. Rituals associated with water and naula more appreciated and celebrated. Enhancement of these cultural aspects improves harmony and connectedness within social groups and to nature.

Strengths: compiler's or other key resource person's view

- Improved understanding of the Naula's respective catchment area (origin of water source/storage) and the need for SLM practices upstream in springsheds
- Maintains and strengthens social order and awareness of water resource use/requirements

Weaknesses/ disadvantages/ risks: land user's view → how to overcome

- If naulas get severely damaged there is hardly anyone in the village today with knowledge of how these structures were constructed and the engineering techniques behind them. → Consultations with older members of the community and with nearby villages could be organized. This would effectively be combined with interventions from institutions like G.B. Pant, who can also combine research efforts on the geohydrology of springs an engineering methods to improve naula/spring discharge.
- 2 years ago, Nakina village members used bleaching powder to clean the naula. A small amount of bleaching powder (2 teaspoons) was suggested for each Naula (approx Volume: 1mx 1m x 0.8m), however there is no strict monitoring of the water quality. → Now Nakina has recently switched to chlorine tablets, which make measurements easier. They use them about once a month or when there is some incidence of pollution. Traditional methods of naula disinfection could be reintegrated in the cleaning regime (e.g. using the leaves of Amla: Emblica officinalis Gaertn and Neem, Azadirachta indica A Juss)
- There are times when the water overflows from the confines of the naula structure. → Overflow can be harvested in earthen/ polyethylene ponds or recharge trenches below.

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's view → how to overcome

- In the absence of documentation about the engineering and the science behind the traditional water management systems, it is very difficult to revive these structures once they have been neglected. → Studies that integrate land use changes, traditional knowledge on water management systems, hydrogeological aspects of springs, and potential structural/biological interventions for spring revival need to be implemented with the help of coordinated actors and stakeholders across all agency levels.
- There are sometimes pipes connected to the naulas leading to reservoirs (storage tanks). The pipes or taps of these reservoirs often have leaks. The community trouble-shoots this issue by plugging the open taps with a fitted wooden stick or ball of plastic trash. There is still significant leakage. → Pipes need to be monitored and repaired; open taps need to be properly plugged (perhaps with a rubber stopper). Twist-taps need to be repaired, and if this is not possible then the leaking droplets can be harvested with a bucket.
- There is still discrimination of water use within the caste system. Dalits remain excluded from authorities that make decisions about water at the village level. Similarly, women in many villages are still excluded from any decision-making. Both groups are perceived to be highly susceptible in "spoiling" the water collected from nauala structures. → Deep-rooted caste and gender inequities are not simply erased at the local level, despite the policy efforts to improve economic and political mobility within these groups. To equitably improve access to water for the Dalits and women, the root causes of the determinants of social inequity need to be identified, exposed and addressed locally. Nakina village is taking strides to incorporate women and Dalits into decision making processes, as they are the ones remaining in the village. Nakina recognizes this need to involve these formerly

excluded groups, as the phenomenon of unidirectional outmigration will simultaneously amplify the necessity of group-cohesion and dedication for sustainable land/resource management .

REFERENCES

Compiler
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Reviewer

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Resource persons
Joshi Jagdamba - land user
Pooran Chandra Patni - land user

Full description in the WOCAT database
https://qcat.wocat.net/en/wocat/approaches/view/approaches_5202/

Linked SLM data
Technologies: Recharge Ponds and Recharge Trenches https://qcat.wocat.net/en/wocat/technologies/view/technologies_5193/
Technologies: Broadleaf Plantations, Assisted Tree Regeneration and Fodder Nurseries for Sustainable Forest Management https://qcat.wocat.net/en/wocat/technologies/view/technologies_5243/
Technologies: Stone Check Walls and Check Dams for Soil and Water Conservation https://qcat.wocat.net/en/wocat/technologies/view/technologies_5210/

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- G.B. Pant Institute of Himalayan Einvironment & Development (G.B. Pant Institute of Himalayan Einvironment & Development) - India
- ICIMOD (ICIMOD) - Nepal

Project
- Book project: where the land is greener - Case Studies and Analysis of Soil and Water Conservation Initiatives Worldwide (where the land is greener)

Key references
- Traditional Knowledge of Water Management, Rawat A.S., Sah R. 2009, Indian Journal of Traditional Knowledge, Vol. 8(2) pp. 249-254: http://nopr.niscair.res.in/bitstream/123456789/3942/1/IJTK%208(2)%20249-254.pdf

Links to relevant information which is available online
- Report of Working Group I Inventory and Revival of Springs in the Himalayas for Water Security: https://niti.gov.in/writereaddata/files/document_publication/doc1.pdf