Multiple-use Water System (MUS) increases income opportunity through vegetable production

Background

Only 18% of agricultural land is irrigated year-round in Nepal. The uneven distribution of rainfall makes it harder for people in hill areas to grow crops during dry season. It is often the poor, marginalized and disadvantaged people who own unirrigated less productive land and are excluded from income opportunities in commercial farming. MUS is a combined water facility where the surplus water after meeting domestic needs is collected in a tank and is used to irrigate crops through water efficient micro-irrigation technologies such as drip and sprinkle. MUS uses a variety of waters sources however the gravity flow MUS utilizing spring sources are the least expensive and were promoted in Initiative for Agriculture Productivity and Commercialization (IAPAC) project implemented by ADRA Nepal in Rolpa, Dang and Banke districts.

Methodological Approach

Community consultation and prefeasibility study: Project developed a prefeasibility criteria including social and technical parameters such as number of beneficiaries, availability of perennial source of water and its elevation for gravity flow, distance to source, water source conflict, water discharge during dry season, water quality, current hardship in water collection, willingness of community for labor contribution for non-cash component of the scheme, willingness to set up operation and maintenance fund by imposing water tariff, willingness and feasibility to grow vegetable and the use of water efficient micro-irrigation technologies etc.

User group formation: User group is formed comprising all beneficiary HHs if the project passes the prefeasibility stage. An executive committee is formed from the user group ensuring the participation of women and disadvantaged people.

Survey and design: Project technicians led the survey and design of MUS scheme with active engagement of beneficiaries in identifying the reservoir site and having a plan for tap stands for domestic use and points for irrigation at appropriate places.

Box 1: List of MUS constructed in IAPAC

S. N.	Name of MUS	Address	Benefited HHs
1	Phallaphare mul MUS	Dubidanda-4, Jaspur, Rolpa	41
2	Bhalajung MUS	Nuwagaun-8, Bhalajung, Rolpa	16
3	Olipadhera Lift MUS	Nuwagaun-2 Dahaban, Rolpa	21
4	Silbangkhola MUS	korchabang-7, Bogalcha, Rolpa	22
5	Silbangkhola Misidanda MUS	Korchabang-7, Misidanda, Rolpa	15
6	Danga MUS	Kotgaun-7, Danga, Rolpa	21
7	Bahun Padhera MUS	Jhenam-9, Dhaban, Rolpa	15
8	Putaligaira MUS	Jhenam - 6, Khasgori, Rolpa	28
9	Danga MUS	Kotgaun-7, Danga, Rolpa	27
10	Ramagel MUS	Kotgaun - 8, Dangbang, Rolpa	31
11	Bhalukhola MUS	Gadhawa-5, Khabari, Dang	92
	Total		**329**

Community consultation to finalize cost estimate and design: After completing the survey, design and cost estimate, community consultation meetings were held to finalize the design and cost estimate. This meeting also discusses on the kind and cash contribution from users and the plan to generate leverage from different government and non-government agencies to cover the cost of MUS construction.

Public hearing and construction planning: After the required funding is met, the users committee prepares a work schedule. This meeting also serves as the public hearing to make resources generated from different agencies public and make the construction plan in a transparent way.

MUS construction: The project then provides technical training to skilled labor and also to general users who will provide voluntary labour. The user committee is required to open a bank account channel fund. Project technician provides the technical supervision whereas users committee provide management support including procurement and transportation of materials.

Training and repair and maintenance: A training on repair and maintenance is provided to users and users committee is expected to nominate a person as a caretaker for the system. Users committee also decides to set up an operation and maintenance fund imposing a monthly water tariff.

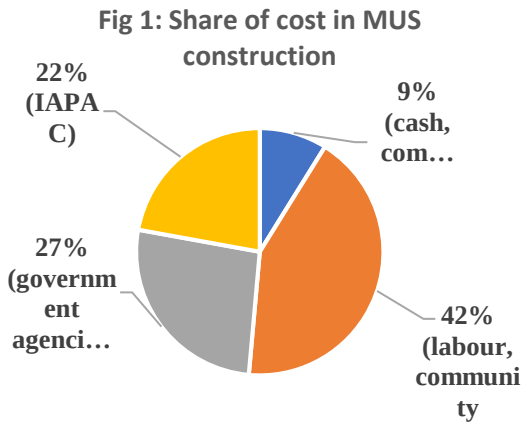
Public audit: After the completion of the project, users committee organizes a public audit event where the entire construction process is reviewed, reflected and expenditure is made public for its endorsement by users.

Technical training and demonstration of micro-irrigation and improved production technologies: The project simultaneously provides technical training to users and demonstrate production technologies such as new crop varieties, integrated pest management, poly-house vegetable production etc. Upon the completion of MUS construction, the project also demonstrates water efficient irrigation technologies such as drip and sprinkler.

Picture 1: Reservoir tank to collect water

Picture 2: Tap stand for domestic use

Picture 3: Drip irrigation in tomato crop



Change/Results

MUS construction brought additional 19.24 ha land under irrigation enabling farmers to grow vegetable in the dry season. It resulted in time saving to fetch water by an average of 2.5 hours per day enabling women to participate in productive work such as vegetable farming. The average annual income of HHs from the sale of vegetables in four MUS completed in the first lot was NPR 27,000. This shows that the investment in MUS is recoverable within a year from increased income from vegetable sale. Farmers report about 15-

20% increase in the productivity of the fresh vegetables due to availability of irrigation facility. Further, improved water availability improved sanitation and hygiene contributing to better health condition in MUS user households.

Constraints

Water sources/springs are not available in all the needy sites and some settlements are above the source of water making the system more expensive due to water lifting requirement. In many places, it was difficult to transport local and non-local construction materials due to unavailability of road access. Conflict in water sources can be a major hinderance to construct water schemes in places where the source is scarce. Since the project required users to share part of the cost, it is often difficult for vulnerable and poor section of society to meet this requirement.

Lessons learned

The project learned that gravity-flow MUS is more affordable for users and has low maintenance cost compared to water-lifting systems due to low level of technological needs. The enthusiasm of community demonstrated that they are willing to invest labour or even cash if there is a strong need for water. Income of farmers in MUS sites revealed that the cost of construction is recoverable within a year from the sale of vegetable if capacity building on vegetable production and demonstration of production technologies are implemented simultaneously with MUS construction.

Sustainability and replicability

MUS was constructed on the basis of community need where the scarcity of water was severe for domestic use and irrigation. Users' contribution to the tune of more than 50% cost through unskilled labour and cash ensured ownership. Project has provided repair and maintenance training along with repair and maintenance tools. A care taken/system operator has been appointed and an operation and maintenance fund is established by imposing water tariff. MUS schemes are registered in District Water Resource Committee. In addition, increased income from vegetable production and sale provides incentive to farmers to invest in the maintenance of water system for sustainable use. Since the gravity MUS technology is low cost and the cost is recovered from increased income from commercial vegetable production, its replicability is high as long as water source is available nearby. However, if the water source is not available above the elevation of village, alternative technologies such as solar lifting will be more expensive in upfront investment.

Conclusion

MUS schemes coupled with activities to promote commercial vegetable production can be an effective approach to increase income of smallholder farmers. Increased income from vegetable sale incentivize users to invest in repair and maintenance of MUS schemes and contribute to its sustainability compared to single use systems for domestic purpose. The engagement of community right from project planning, construction and up to the end use of water empowers them to take lead in own development initiatives and the institutional development through MUS user groups.

For further information:
ADRA Nepal Country Office, Sanepa, Lalitpur, Nepal
Phone: (++977)-1-5555913/14; Fax: (++977)-1-5554251
Email: info@adranepal.org; Website: www.adranepal.org
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