

Difficulties in replicating success stories: The case of Domestic Rainwater Harvesting

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Abstract/Summary

A desk study - based on previous field work - was undertaken to compare the experiences and results of promoting the technology of Domestic Rainwater Harvesting (DRWH) in Thailand and Nepal. DRWH comprises a set of technologies and products used to store and use rainwater for domestic purposes, including drinking. Whereas DRWH has been successfully implemented for single households in both countries, only in Thailand this practice reached massive scale and mainstream practice. Using the tool of the Technology Application Framework (TAF) for a rapid assessment of the situation in these two countries, the following key factors were identified to have hindered scaling up in Nepal: user’s perceptions and habits, affordability and profitability, and provider capacity. The comparison at hand clearly demonstrates the key importance of contextual factors. Even though similar technologies were used in the two countries, the outcomes were very different. More research on enabling and hindering factors for diffusion of innovations is needed.

Introduction

Domestic Rainwater Harvesting (DRWH) comprises a set of technologies and products used to store and use rainwater for domestic purposes, including drinking. In rural Thailand, DRWH is extensively used as source of drinking water, and it has been an important factor which allowed the country to reach almost universal coverage - even of the poorest 20% of the population in Thailand, 97% have access to an improved source of drinking water (ESCAP 2009). This success was made possible through massive promotion of this technology in the 1980s under the leadership of Thai government agencies (mainly the Department for Rural Development) followed by a private sector-led phase of diffusion, which allowed for a decentralized mass production of storage vessels and the development of effective supply chains. At the peak use of DRWH around the year 2000, more than 50% of the rural population of Thailand were using rainwater as their main source of drinking water (JMP 2015), which is equivalent to about 21 million people. The widespread use of DRWH in rural Thailand is considered a success story and the historic development of this initiative has been documented elsewhere (EWV 2009, Saladin 2016).

Many people and organizations around the world have tried to replicate this approach in other contexts. One such initiative took place (and continues to evolve) in Nepal. Around 16.4% of the total population lack access to clean and potable water supplies (NMIP, 2014), and rainwater harvesting is considered as an appropriate solution for the households situated on hilltops and along the ridges where gravity flow systems are not feasible and lifting water through pumps is economically not viable. This technology is equally considered feasible in parts of the foot hill zone, commonly known as the bolder belt. In spite of this potential and a seemingly obvious need, DRWH so far only had limited impact: In 2012 there were around 11,000 DRWH systems in use, most of them in the hilly regions of Nepal (NEWAH, 2012).

Context, aims and activities undertaken

In this article, we summarize the efforts of promoting DRWH in Thailand and in Nepal over the past three decades and reflect on the differences of the two contexts, based on the experience of key stakeholders involved in the process. A retrospective comparison of the two initiatives is carried out, using the tool of the Technology Application Framework (TAF), which has been documented elsewhere (Olschewski and Casey, 2103). We applied the TAF in a theoretical setting, where we used information from previous research (Saladin 2016, Bohara 2015) to compile the key information needed for each key stakeholder (interviews with several individuals were summarized in a generic profil for each stakeholder). In this article, we are pointing out the main factors which made the promotion of DRWH in Thailand successful and only partially successful in Nepal and make some general recommendations for promoting DRWH in different contexts.

Main results and lessons learnt

The experience of Thailand in getting the collection and use of rainwater for domestic purposes (including drinking) into mainstream provided an example of how DRWH can contribute to increased access to improved water sources, also for the rural sector and also for low-income households. This process evolved over a period of more than 30 years and can be summarized as follows (the following is a simplification of the process which involved dozens of key players in a complex and dynamic process – more comprehensive descriptions of this process have been provided by EWV 2009 and Saladin 2016):

1. 1980s: National government agencies take the lead: setting policies, defining goals, making plans.
2. Developing the design of adequate products (jars, gutters, plumbing, roofing) and training of thousands of artisans to fabricate the products and deliver services (maintenance and reparation of jars).
3. Stimulate demand and support mechanisms for demand satisfaction (including group credit schemes). During this first phase, materials were subsidized by government agencies.
4. In a second phase (1990s), subsidies stopped and the private sector took over the lead from government agencies. Fierce competition set in and brought the prices further down. Mass production capacities in several locations (clusters of producers), combined with a functioning transport sector, allowed for mainstreaming of DRWH.
5. In a next phase, DRWH reached its maximum outreach (around 50% of rural population around the year 2000) and now is slowly being pushed out by solutions which allow for an even higher service level (piped networks, bottled water, etc.). However, people continue to collect and use drinking water for domestic purposes. Government, through the Ministry of Health, focuses its role on water quality surveillance of the different DRWH systems (as well as other water sources).

This is a very rough description of the experience of DRWH promotion in Thailand, also referred to as the “Thai Experience”, which was a strong inspiration for many people and organizations around the world. Here, we describe the example of Nepal, where efforts were undertaken to replicate or simulate the Thai Experience. The experience can be summarized as follows:

1. Pilot demonstration projects (to harvest rainwater systematically at household level) by pioneer organizations (namely the Rural Water –Supply and Sanitation Programme financed by FINNIDA) started in 1996
2. Acceptance by local authorities, inclusion of DRWH into national policies in 2009
3. Promotion by government agencies, supporting the installation of more demonstration units

4. Replication by other donors on a small scale

In 2009, to ensure proper utilization and conservation of water resources, the Government of Nepal, Ministry of Physical Planning and Works (MoPPW) prepared a working policy on rainwater harvesting to promote suitable developments in rainwater harvesting for human consumption and domestic use, and facilitate guidance and capacity building (MoPPW, 2009). Nevertheless, DRWH is considered a low-priority intervention by government agencies at most levels, which clearly contrasts with the strong backing up of DRWH promotion observed in Thailand.

Overall, it can be stated that there is sustained use of DRWH in some pockets of the rural population of Nepal (typically houses on hilltops where the gravity driven supply systems can not reach), but no “ripple effect” and no scaling up was observed until now. This is likely due to a series of factors which are related to the local context. In order to analyse and illustrate these factors, we used the tool of the Technology Applicability Framework (TAF), which is described in more detail elsewhere (Olschewski and Casey, 2103).

The following illustration summarizes the situation in the two countries, looking back at the situation over the past 20-30 years.

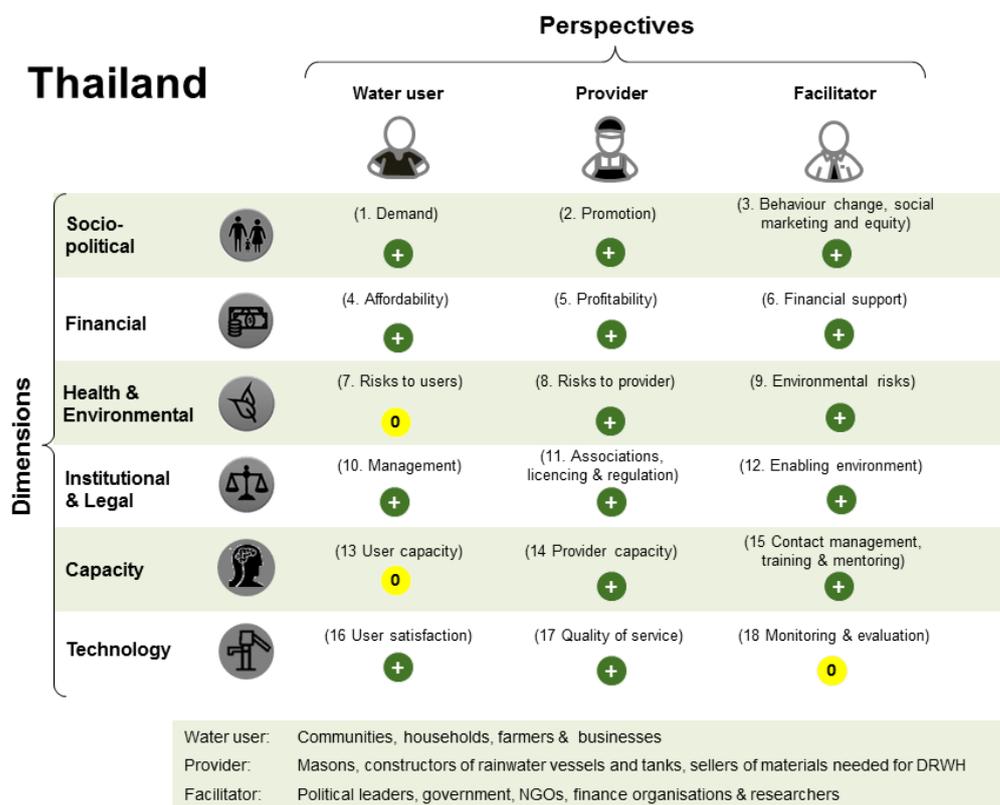


Fig 1: TAF Scorecard of DRWH in Thailand

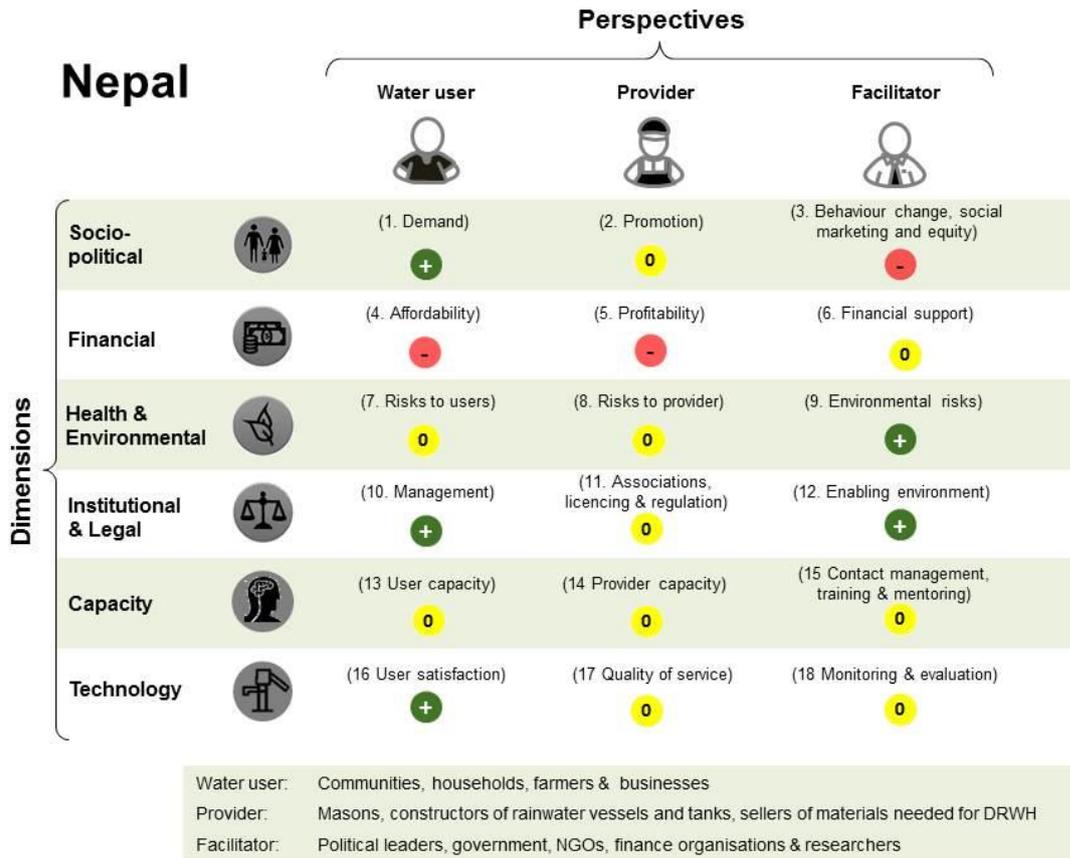


Fig. 2: TAF Scorecard of DRWH in Nepal

As can be seen from the figures, the overall picture for Thailand looks much more positive (more positive and neutral factors, no negative factors) than for Nepal. The overview allows to quickly identify the main factors which hindered a widespread use of DRWH in Nepal, which will be further described here:

a. Behaviour change

Rainwater harvesting and its consumption is a tradition which goes back centuries and even millennia in Thailand – for people living in rural Thailand in the 1980s, it was very common – and indeed desirable – to drink rainwater. Due to cultural factors (including religion), rainwater was considered the purest form of drinking water. Even before the consumption of rainwater was promoted by state agencies and NGOs in the 1980, the habit already existed.

This is quite different in rural Nepal: many people - especially the ones in the hills who are used to drink spring water – have doubts about the quality of rainwater. Several Government agencies actually support and promote DRWH, but culturally, there is a popular myth in Nepal that "flowing water is the purest water and stored water becomes impure (baasi paani)" (Bohara 2015). They have to be convinced that drinking rainwater is acceptable and not harmful. This different perception and habit makes the promotion of DRWH in Nepal much more difficult and resource consuming in comparison to Thailand. People generally accept to use rainwater for domestic purposes but when it comes to drinking they prefer walking a long distance to fetch spring water for drinking. Nevertheless, some hardship areas that are devoid of springs in a reasonable vicinity do use rainwater for drinking. Thus, convincing people to accept it as the prime source for drinking water is an uphill battle – it is possible, but it takes more time and resources than in other contexts.

b. Affordability

While the 1,500-2,000 litre cement mortar jars in Thailand were sold in the 1990s at 20 USD per unit, the price of ferro-cement tanks in Nepal in the last 15 years was much higher. Costs of a typical 6,500 litre jar are around 375 USD per unit. This has to do with the fact that materials (cement, sand, etc.) are more expensive in Nepal and transportation of these construction materials in the remote hills, often by headload, makes it even more expensive, but also with the fact that in Thailand mass production was established, which was not possible in Nepal because of a different market structure (a few customers living scattered in hard-to-reach areas) and because less space is available around most houses in hilly parts of Nepal, thus allowing for only one jar (whereas multiple jars per household are very common in Thailand). High material costs and high transportation costs, combined with artisanal production (compared to mass production) make DRWH systems very costly to build in Nepal – and there are other competing technologies which are more affordable or more attractive from a user’s perspective.

Another factor related to affordability is the fact that in Thailand in 1980, more than 80% of women were participating in the labour economy (Bauer 2001). This meant that every hour not spent on fetching drinking water could be invested into financially productive work, thus creating a strong incentive for investing in DRWH systems and for continuously increasing the storage volume. In short – DRWH paid off for the family financially in Thailand whereas the time savings gained by Nepalese women could not be directly converted into financial gains. Nevertheless, the time savings in the Nepal study were estimated at 6.35 hours per family per day, which are very important and allowed the women and girls who usually are in charge of fetching water to dedicate more time to other activities, which they perceived as a great relief.

c. Profitability

Profitability is closely related to affordability, but it focuses more on the producer/provider: where there only is a small market to be served, with only the poorest as potential customers, the producers and providers will always rely on external funding to be able to sell their product. This reduces profitability and does not foster competition, which in turn would allow for prices to come down over time.

Because of the high costs of DRWH systems in Nepal, most of these have been constructed by NGOs with substantial subsidies (either direct or indirect subsidies). Private sector has played a relatively minor role, partly because the profitability of the technology is limited but also because the strong position of the NGOs and the policies implemented by them, often bypassing local delivery channels and thus hindering an adequate development of local entrepreneurs and supply chains.

The low profitability of DRWH also is a factor which limits the capacity of the providers: Even if many people would have been trained in providing professional services related to DRWH, the chances are high that they would end up in doing something else because in the Nepali context, other professions and activities offer better earning opportunities. Therefore, in the scorecard, “Profitability” was marked negative for being a bottleneck, whereas “Provider Capacity” was marked neutral, indicating a potential hindering factor but in the current setting not being a bottleneck.

Conclusions and Recommendations

Various studies regarding RWH in Nepal revealed that the technology has a potential and can be implemented adequately in various settings. However, when it comes to bringing the technology and the implementing mechanisms to scale, there are a number of hindering factors which need to be addressed. In particular, more attention needs to be paid to cultural aspects (e.g. the perception of current water quality from springs and the perception of quality of rainwater), and a more thorough analysis of the potential market needs to be carried out prior to setting up demonstrations modules or pilot projects. The

point of view of the final users as well as of the producers/providers are crucial factors to take into account by government entities, NGOs and funding agencies when planning projects and initiatives.

The success story of DRWH promotion and use in Thailand proved difficult to replicate in other contexts – here we highlight the case of Nepal. The main hindering factors were not of technological nature but related to context – most importantly cultural aspects (acceptability of drinking rainwater and its perceived quality) and market factors (price and availability of the materials, competition, and labour force participation of women). When promoting novel technologies in a given settings, such factors need to be taken into account from the onset of an initiative, and more effort needs to be undertaken to link live-saving technologies with productivity (which, like the case of Thailand showed, can happen through time savings for not having to fetch water).

Our study is not a general evaluation of the success or failure of DRWH, but rather a comparative study on two different settings and their impact on the proliferation of a specific technology (DRWH) therein. Using a relatively simple tool for analysis and illustration, we were able to identify key factors which hindered DRWH to become a mainstream technology in Nepal up to date. With the same tools, other technologies and other context can be analysed in a fast and cost-effective way in order to optimize diffusion strategies and make best use of the resources available. The tool also makes sure that due importance is given to different points of view. We recommend its further use, both at the planning stage of a project/initiative but also during its implementation, given that its holistic focus allows to quickly focus on bottlenecks, which then can be addressed properly.

For the specific case of DRWH promotion in Nepal, we propose to pay more attention to the three factors which most hinder its proliferation: common perceptions of the quality and adequacy of rainwater as a source of drinking water, the affordability and profitability of the technology, and the capacity of the providers.

We invite researchers, implementers and promoters of DRWH and other technologies to further investigate cases like the ones presented here – both successful and not - to shed more light on the importance of different contextual factors.

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