

# Crossfire: 'Technology development versus capacity building'

CATARINA FONSECA AND PAM MINNIGH

*In our debate between two experts, Crossfire invites Catarina Fonseca and Pam Minnigh to debate the following: 'Improving access to safe and sustainable water supplies is primarily a matter of establishing functioning institutions and ensuring that revenues cover operation and maintenance costs. We should not be wasting time and resources on science and technology'.*

*Dear Pam,*

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The institutions to manage these technologies are non-existent or poorly functioning

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It is a fantasy that poor communities will manage and sustain their systems forever

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Several technology focused NGOs and quite a number of private companies are asking for more and more money to develop new and ever more 'appropriate' technologies for rural water supply, yet this investment largely misses the point that the institutions to manage these technologies are non-existent or poorly functioning, and that we don't know what existing technologies cost to run (either financially or in broader economic terms).

The reality is that after decades of work, most stakeholders in the sector still do not know

how much their interventions in water supply actually cost and will cost in the future. Even more worrying, most stakeholders have little idea of the disaggregated costs of their interventions beyond capital (infrastructural) costs. And the concept of long-term service provision, which includes proper support from decentralized institutions, is only embryonic in developing countries.

In rural water supply, the (wrong) assumption that poor communities will contribute to and manage and sustain their systems forever creates a 'fantasy world' of planning and budgeting which is perpetuated by donors, governments and NGOs. Revenue and cost recovery models are treated only in terms of capital requirements to implement them. Recurrent costs and long-term capacity requirements are not explored. Furthermore, the selection of different service levels (technology) is seldom sufficiently related to post construction

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Quantitative data are needed on the amount of finances that are available to meet capital and recurrent costs

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requirements (physical, socio-economic, financial).

There cannot be proper planning and budgeting by local governments, donors and other stakeholders without quantitative data to support – and even drive – these processes. In the context of decentralization, local governments, utilities, NGOs and other service providers need strategies for improved cost recovery and increased service coverage, particularly for the poorest. These strategies must be informed by a rigorous analysis of quantitative data related to the magnitude and adequacy of finances that are available to meet capital and recurrent costs – be it at the level of the community, local or national government.

The sector survives with heavy injections of foreign aid which has not been cost-effective for at least the last 20 years, given the limited progress of water and sanitation coverage rates in rural areas. Part of the problem seems to be the focus on building new infrastructures without any thought or provision for maintaining existing capacity. Maintenance is defined as the activities which allow public infrastructure to efficiently deliver the outputs for which they were built over their design life.

Since the 1980s, the trend for disengaging government from capital maintenance has increased in the context of decentralization and commu-

nity level management of water systems. While operation and maintenance are possible within communities with a couple of hundred people, there are many examples of how management and maintenance requirements increase as the size of the scheme increases.

Many developing countries do not succeed in allocating sufficient resources either for capital or maintenance expenditures. At the same time international funding agencies are not willing to assist in long-term maintenance either. Under present practice, without capital maintenance and other recurrent expenditures being taken properly into account by donor organizations and governments, capital investments in water supply are not sustainable. Either service levels need to be reduced or a more pragmatic approach with realistic steps towards achieving poverty reduction targets is required.

The short-term economic benefits of rural water supply have been overvalued and medium and long-term financial costs undervalued, leading to non-existent long-term revenue strategies and unsustainable services – independently of the amount of science and fancy technologies that were put in place.

*Yours,  
Catarina*

*Dear Catarina,*  
Improved water supply means improved service levels across

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The short-term economic benefits of rural water supply have been overvalued

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the board for rich and poor alike. More particularly, it promises to close the physical gap between water source and house. The diversification of water supply systems and appropriate technologies is a strength. Most rural systems over the last 30 years have been constructed based on basic standard designs which have not been changed much, were and still are often based on a 'low-cost, low maintenance' dogma. Rural is equivalent to poor and under-privileged, and as such projects and programmes which have raised high expectations in communities have subsequently dashed them.

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Failures are not only based on the lack of a financial basis but also on technology failure

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The choice of water systems should involve communities as well as local governments

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Indeed failures of supply systems are not only based on the lack of a financial basis but also on technology failure and the human factor. Advances in technology – even low-cost technology – are possible and necessary, and so investments in this sector are essential to achieve higher coverage through safe water supply. In particular in rural areas it is expected that development of new materials (e.g. solar cells from different materials or aluminium structures instead of cast iron) as well as the use of renewed/improved energy sources will make the greatest contribution towards effective and efficient water supply systems.

Water sources are linked to hydrogeology, but modern communities often choose the location of their homes not according

to nature, but in order to have access to services and goods. Technologies are therefore needed that can bring water resources to the community.

Putting into place water supply systems is indeed capital intensive, and keeping them working in an optimal fashion requires specialized knowledge and experience, as does use of a car, a gas stove or an air conditioner. Therefore, the choice of water systems should not be subject to ad hoc planning and donor trends, but should be based on a careful process of weighing alternatives by communities as well as by local governments.

There are in principle three types of water supply development. The first one is the 'normal urban' development and extension of urban systems, where people come and receive a service by paying water utilities. In developing countries, the high cost of energy and spare parts, the high percentage of water leakage and relatively low water prices set by governments based on a policy of minimizing political unrest, often leads to (nearly) bankrupt systems. However, better energy-saving mechanisms, effective leak-detection and prevention systems, and technologies at the household-level can all turn this around in the not-so-distant future.

The second category related to development is actually not 'development', but a real 'aid'

situation. In the case of communities and households who are too poor, because of difficult situations or long-term disasters, the people cannot be expected to pay in full for their water supply. In this 'aid' situation infrastructure should be paid for by the local government together with other donors, fast and effectively with proper technologies depending on the situation.

The last category, the 'development' group, should in fact be the focus group for projects and programmes. Communities should be encouraged to put themselves forward if they wish to change their situation and to pay for a water supply, remembering that not all communities, local governments and other stakeholders have water supply as their priority. A menu of options should be provided based on informed choice, and the choice should be related to technical feasibility and the accountability of the group. 'Pre-cooked' selection procedures for communities and 'standard' technical choices do not ensure that people will cope with the changes. Furthermore, donors are still reluctant to 'buy' the idea that rural communities, often branded as poor, also develop and might be ready for private wells and house connections.

The law which says 'structure follows function' also applies to rural or poor communities. Investing in technologies and

at the same time in people with specialized skills at the local level, assisting people with assessing their situation, explaining the ins and outs of different technologies, training local and professional staff and backstopping communities in future with service provision, as well as allowing a variety of community-based management models based on demand – this is all part of giving people a choice of technologies in a changing world.

*Yours,  
Pam*

*Dear Pam,*

It's not technologies that bring water resources to communities. Advances in technologies in the last 30 years have not meant higher coverage levels in many developing countries. Advances in institutional set up, capacity building, regulation, decentralized planning along with economic growth have proved more effective. In the end it does not matter if it is rural or urban, appropriate technology or high cost or they use sustainable energy – but how the institutional support has been set up in order to make the technologies work for a long time. There are no technological developments that can hide bad management and weak institutions.

I think there is a fundamental contradiction in 'allowing a variety of community-based management models based on demand' and service

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Standard technical choices do not ensure that people will cope with change

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Advances in institutional set up rather than technology have been more effective

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We should start with services that the economic context can afford

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When it comes to capital maintenance, communities need external technical and financial support

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sustainability. Communities can manage by themselves regular operation and maintenance in relatively standard technologies such as shallow wells and boreholes fitted with handpumps, but when it comes to capital maintenance – replacing large parts of their technology when it wears out – then they do need external technical and financial support (although I do know communities in Latin America that do it all by themselves). The more sophisticated the technology, the more costly it will be either in rural or urban settings. We can opt for this situation, but then donors, governments and consumers also need to be aware that they will have less frequent, but more expensive maintenance.

In rural areas, when given the choice between a handpump and solar system the community will opt for the solar system with convenient water flowing from the tap, even given all the costs breakdowns. What matters to them is that the system is there, providing water. But when it breaks down it does sound cynical and irresponsible to reply ‘you asked for it; now you pay for it’. In urban settings, most consumers do not have a choice anyway.

In low-income countries, for all the three categories you have mentioned, the more choices there are, the more difficult it is to set up support structures from district and regional water departments, spare part chains,

and functioning utilities. In development some pragmatism is needed: start with services that the economic context can afford. Improve the institutions and regulatory frameworks to make this work properly. Then once higher income levels are achieved, move to higher levels of service. It has been like that in most developed countries over the last 200 years.

Quoting a colleague, we need to choose ‘either to wait on people’s real demand, which is a function of economic growth – and we’ll be waiting far longer than our patience and desires for the MDGs will allow – or to recognize that to achieve our ‘outsider’s’ view of what is required (improved technologies providing higher levels of service) we cannot depend upon user charges and local taxes. Full cost recovery is expecting too much too soon – we will therefore have to be prepared to fund local institutions from international resources for much longer than to date we have been ready to consider’.

*Yours,  
Catarina*

*Dear Catarina,*  
Anything that brings water close is a type of technology, simple or more complex, and it needs to be put in place and maintained. Technology is not by definition complex and expensive, it is the whole range, but it should be suitable and effective. As an example, one of the

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Why has the tap not yet been adequately developed?

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weakest components in piped systems is the tap, a simple part, but one for which there is no really reliable and affordable design for community systems, except for the expensive Talbot type. Why has the tap not yet been adequately developed?

It is difficult, especially in developing countries, for all people involved – from the villagers to the governmental officials, the facilitators, engineers and contractors – to know their limits and make suitable choices regarding technologies as well as institutions. Regarding technology choice the main issue is gaining knowledge about the different options and how to install them, and also what they will require in terms of operation and maintenance. But the community also has to know about capacity and organization, and the factors – such as politics, the use of information, and hidden agendas – which play a major role in both setting up the institution and making the technological choices.

Therefore, the most important issue related to water supply systems is the information which needs to be provided for people to be able to make informed choices, and it is part of the role of the campaigner/informer/facilitator to invite discussion about the possible choices, including their technological, institutional and financial consequences. It is not a fixed menu which has to be pre-

presented, a sort of ‘take it or leave it’, but a flexible package which can be adjusted based on needs, demands and capacity. And it is this package which in the past has suffered from relentless standardization especially in rural areas, where being poor often means having a low education and limited understanding. Often the field staff, many of them schooled in social and community issues, are themselves very poorly informed about choices and are afraid of technology. Standardization limits the number of choices, even for low technology options, and has made a business out of providing cheap and simple solutions, based on fixed costs per capita, and maximum investment costs allowed by donors and national governments to reach as many people as possible. Hardly any technological development of this package has taken place to produce not only simple but also more complex technologies, based on more reliable and durable materials, which are more consumer friendly and cost effective as well more efficient (fitting) solutions.

Therefore, it is not the technology as such which is to blame for the failure of water supply systems in the field, but it is the way in which options are presented, and the lack of guidance after construction by informed professionals. In the case of sanitation one can see that more and more people

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Information is needed for people to be able to make informed choices

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responsible

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understand what is available and they make their choices based on their needs and wishes. But these choices are mainly private, which is hardly ever the case with (larger) water supply systems. Indeed, for these larger systems you need more professional support, and community water supply management might be a 'transitional phase', as it was in Europe. When systems grow, management grows, models evolve and the more professional your management team needs to become to handle these complex technologies.

Openness to new possibilities is key, and communities should be presented with the correct information and allowed to take part in the planning even with different price tags. However, with the right to choose comes a duty to be responsible, and local governments need to find out how local communities can become accountable for their choices, so that they are indeed making choices based on their own limitations, their financial resources, their capacity, needs and wishes.

*Greetings to you from Indonesia,  
Pam*