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Viewpoint – Another Well-Intentioned Bad Investment in Irrigation: The Millennium Challenge Corporation's 'Compact' with the Republic of Niger

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ABSTRACT: This commentary argues that the recently approved contract under which the Millennium Challenge Corporation (MCC) is investing US\$437 million dollars in Niger over the next five years, most of it on large-scale irrigation, is not a good investment. The paper explains why the programme is not likely to achieve the benefits anticipated. MCC had commissioned a detailed feasibility study, carried out by the authors of this paper, which strongly argued against investing in large-scale irrigation, in part because there is a poor track record for these investments in Niger, and in part because MCC has no comparative advantage in such investments. Instead, the feasibility study presented a strong case for investing in small-scale rainwater harvesting for agriculture and livestock at farm and watershed levels; and individualised small-scale irrigation for high-value nutritious crops and other water uses. The commentary concludes with suggestions on how the funds allocated for large-scale irrigation infrastructure (about US\$250 million) could be reallocated to benefit a far larger number of people; and a recommendation that investors in African agricultural water management projects carry out an assessment of the performance and impacts of investment experiences over the past decade to identify lessons that could inform the next decade of investments in agricultural water management.

KEYWORDS: Irrigation investment, large-scale irrigation, Millennium Challenge Corporation, agricultural water management, Niger

INTRODUCTION

It is a curious characteristic of the international development world that the wheel keeps getting reinvented. In agriculture alone, thousands of talented, technically competent and well-intentioned development professionals have developed and implemented projects to support partner countries to improve food and nutrition security. Likewise, hundreds of project impact assessments and research studies abound. They provide rich evidence on what has worked or not, and explain why. Yet in the design of the next big investment project, we often neglect to learn from the past – to use what we think we already know. Consequently, the cycle of disappointment, even failure, repeats itself.

The case of investments in large-scale irrigation infrastructure – constructing new schemes or rehabilitating existing schemes – has been the subject of much discussion, and is well-documented.¹ This paper argues that the recent decision by a major development donor, the Millennium Challenge Corporation (MCC; www.mcc.gov), to support a project that includes a quarter billion-dollar investment in large-scale irrigation in Niger is disappointing. Its focus on large infrastructure misses a big

¹ A good synthesis is found in World Bank (2007).

opportunity to put into action lessons learned from the past two decades on small-scale irrigation, that will directly benefit a large number of the country's rural poor – women as well as men.

Over our long careers in applied research and consulting on agricultural water management in Asia and Africa,² we have observed donors repeat the same errors, resulting in disappointing outcomes of well-intentioned investments. MCC was set up by the United States government to pursue innovative demand-driven and cost-effective development on a large scale. According to its website, MCC "forms partnerships with poor countries that show they are committed to good governance, economic freedom, and investing in their citizens". Its funds are provided as grants based on a detailed contract, called a 'Compact', that sets out the obligations of both MCC and the partner country. Grants are always substantial, intended to have a major impact on economic growth; but they are strictly limited by law to five years.

MCC prides itself on its transparency and its commitment to rigorous monitoring and impact assessment. Its website offers numerous success stories and independent impact assessments (though none for its irrigation investments, as far as we could tell). While MCC has achieved a lot since it was established, in one important investment domain it has failed to learn the lessons emerging from several decades of investments: the construction and rehabilitation of large-scale irrigation systems.

THE MCC 'COMPACT' WITH NIGER

The Compact recently signed with the Republic of Niger is the latest example (MCC and Republic of Niger 2016). Through this programme, MCC will provide up to US\$437 million in grant funds over the next five years – a period that by law cannot be extended even by one day.³ The Compact summarises two major projects: *Irrigation and Market Access*; and *Climate-Resilient Communities*. The latter project is budgeted at US\$182.5 million, but leverages additional funding from the World Bank. Divided into several components, this project is aimed at supporting pastoralists and cultivators in a combination of infrastructure, natural resources management, and community-strengthening activities.

The Irrigation and Market Access project is budgeted at US\$254.5 million, to benefit 37,656 people. These funds will be used to rehabilitate the Konni irrigation system and develop new irrigated perimeters in the Dosso-Gaya area, located in the southwestern part of the country, along the Niger River; and to improve market access and irrigation management services through a combination of training, policy reform, and road construction.

Why do we consider this a well-intentioned but bad investment? In 2013, MCC hired Doug Merrey to do a background research and analysis. His terms of reference were to inform the development of an irrigation project in Niger. With MCC's concurrence, Doug asked Hilmy Sally, a water and irrigation management professional with field experience in Nigerien irrigation, to work with him. We produced a detailed analysis with very specific recommendations. As part of the assignment, one of us (Doug) was also involved in a study of the cost of irrigation investments, done by another team of specialists.⁴ This was motivated by the realisation that MCC irrigation project costs in some cases seemed relatively high compared to those of international finance agencies such as the World Bank and African Development Bank. An unpublished draft report based on MCC data shows irrigation development costs as high as

² Doug Merrey has worked on water management in developing countries for his entire career, over 37 years; and spent 20 years at the International Water Management Institute (IWMI) as researcher, program leader, Deputy Director General, and founding Director for Africa. Hilmy Sally also has over 20 years of experience with IWMI in Asia and Africa, as well as many years of consulting on irrigation investments for other donors. He has spent 10 years working and living in West Africa, including Niger.

³ See: www.mcc.gov/where-we-work/program/niger-compact. The full compact document is accessible from this page as well.

⁴ Doug provided inputs to the terms of reference, and was interviewed by phone once by those implementing the study. We cannot find any evidence that this study was ever published.

US\$17,154 per hectare (ha) in Mali, US\$14,772 per ha in Senegal, and US\$34,338 per ha in Burkina Faso (see Table 1), while we understand currently US\$6,000-11,000 is the norm in sub-Saharan Africa for other donors.⁵ MCC does not seem to have published any detailed data on the costs of its irrigation investments; therefore, the table is only indicative. Studies by the World Bank (e.g. World Bank, 2007; You, 2008), and others (e.g. Inocencio et al., 2007) emphasise that the most critical determinant of achieving high returns on irrigation investments is cost: expensive schemes have poor returns.

Table 1. Indicative irrigation development costs of MCC Projects in West Africa.

Country	Area (ha)	Total Works Cost (million USD)	Works cost/hectare
Mali	5200	89.2	\$17,154
Burkina Faso	2033	69.8	\$34,338
Senegal – N’Gallenka	440	6.5	\$14,772
Ghana	2396	13.3	\$5,550

Sources and notes: Unpublished draft MCC statement of work, 2013. For Senegal, IMPAQ International (2014). The sources do not give much detail, and the Senegal report is a proposal for an impact assessment (we could find no completed evaluation). Therefore, these data are only indicative. The Senegal figure is for a 440-ha extension of the irrigable area of the N’Gallenka Scheme. In the 2013 report, the costs were lower: a total of US\$4.8 million, i.e. US\$10,708 per ha; clearly, the cost had escalated. We acknowledge the low costs in Ghana and have no explanation for this. A reviewer of the earlier draft of this paper suggested the Mali costs are high because it refers to a project in an unsecured area. We cannot verify this.

At the time, MCC officials were aware of a detailed study by the International Water Management Institute (IWMI) on the cost of investments in large – scale irrigation in Africa (Inocencio et al., 2007). It demonstrated that, while large-scale irrigation projects are almost inevitably very expensive with low returns on investments, large projects investing in multiple small-scale irrigation systems have reasonable costs and often achieve high returns on investments.⁶

Field research in the 1990s identified the challenges confronting large-scale irrigation schemes in Niger (Abernethy et al., 2000). The long-term sustainability of these mainly rice-producing schemes is threatened, among other factors by deficits in management and organisational skills among farmer-beneficiaries, deferred maintenance, and lack of resources to deal with major repairs and renewal. Government disengagement and management turnover to farmer cooperatives had not yielded the expected results. A study conducted nearly 15 years later (Sally et al., eds.; 2012) showed there had been little change in this situation, and highlighted the consequences of the gradual deterioration of large irrigation schemes, with many in need of urgent rehabilitation and repairs. So, the proposed MMC intervention targeting irrigation rehabilitation may appear justified in one sense. On the other hand, if the underlying reasons for poor performance are not addressed, then there is a real danger that this well-intentioned intervention will come to naught and demonstrate, once again, that poorly conceived investment in large-scale irrigation infrastructure is a bad idea.

A recent review (Inter-réseaux Développement rural, 2016) shows that irrigation policies in many West African countries are founded on the belief that large investments in irrigation, and irrigated rice production in particular, are required for agricultural development and food security. This hypothesis is largely unverified. Moreover, not all farmers are willing and able to focus primarily on irrigated rice production as many maintain a diverse portfolio of livelihood strategies, including rain-fed farming and

⁵ Based on email exchanges with World Bank colleagues Francois Onimus, Pierrick Fraval, David Casanova and Pieter Waalewijn. Costs vary tremendously; we recognise that such figures are at best indicative.

⁶ Disclosure: both authors of this commentary were among the co-authors of that study.

nonagricultural activities (Adolph, 2016). One study found that because of the low quality and therefore low price of local rice and high labour costs, rice farming is not privately profitable in Niger (Katic, 2013). On the other hand, there is evidence that small-scale farmer-driven irrigation systems have proven to be successful and productive, providing significant direct and indirect benefits.

We reviewed experiences in Niger with a wide range of sustainable land and water management options, explained in detail in our study (Merrey and Sally, 2014). These included investments by other major donors as well as by NGOs and various international research institutions. We identified eight investment options. Our analysis of Niger's past experiences with irrigation – and more broadly, agricultural water management investments – combined with an analysis of which investments could have the greatest positive benefits on gender-equitable poverty reduction for people in rural areas, arrived at very clear conclusions and recommendations (Merrey and Sally, 2014). We strongly recommended that MCC *not* invest in large-scale irrigation. Our report documented that other donors are already investing in this area with mixed results. The government agency responsible for large-scale irrigation remains weak, construction costs tend to be far higher than anticipated at the planning stage, and productivity much lower than expected.

Past experiences with these kinds of investments in Africa reveal that at least a decade of commitment is needed to achieve positive results – such as increased crop production and farmer income. This is impossible for MCC to achieve given its strict five-year rule. Without the capacity to remain engaged to ensure its investments achieve their goals and become sustainable, MCC lacks the comparative advantage for these investments that characterise development banks. Past research and assessments have also documented that, per-hectare and per-beneficiary, such projects are expensive compared to investments focused on small-scale irrigation, and therefore benefit a privileged few (e.g. Innocencio et al., 2007). They often never achieve the targeted outcome of improving the livelihoods of smallholder farmers and rural communities; Williams et al. (2014) highlight the mixed results achieved by large-scale irrigation schemes in sub-Saharan Africa, particularly in terms of contribution to national food security and cost-benefit performance. MCC's own track record with such investments in the region has not been promising.

As noted above, the Irrigation and Market Access project is budgeted at US\$254.5 million, and is expected to benefit 37,656 people. This budget includes irrigation infrastructure rehabilitation and construction, as well as construction of roads, training, and other items. It works out to US\$6,759 per person. The Compact does not provide a detailed breakdown of these costs; therefore, the following analysis is indicative, not definitive. Households in Niger average 5-6 persons. Using the lower figure (5), MCC is investing US\$33,793 per beneficiary household. The Compact does not provide data on the estimated area to be benefited, but in Niger's large-scale schemes, the average irrigated holding is around 0.35 ha (Abernethy et al., 2000), which is not sufficient to fully support a farm household.⁷ Using this hypothetical figure, MCC will be investing over US\$96,550 per irrigated hectare. Even using a larger holding size of 0.5 ha per household, the investment is over US\$67,585 per ha. Based on this admittedly back-of-the-envelope analysis, the MCC irrigation investment may well set a record for cost per hectare, especially considering that a portion of the investment is for rehabilitation of an existing scheme.⁸

The relatively poor performance of large-scale irrigation schemes in Niger is well-documented and, indeed, is not unique to Niger (see Lankford et al., 2016). Other donors and investors with longer-term perspectives have been engaging with the Government of Niger to promote reforms for several decades, with mixed results. In contrast, we reviewed experiences with a range of other kinds of agricultural water management investments, including: sustainable land and water management,

⁷ One reviewer of this paper noted that the 'viability threshold' in the Office du Niger scheme in Mali is 3 ha.

⁸ The Compact does not provide a breakdown of area of rehabilitated and new infrastructure.

"farmer-managed natural regeneration" combining agroforestry and water harvesting, and private small-scale irrigation (Merrey and Sally, 2014). There is very strong evidence that these kinds of investments have had major positive impacts on both livelihoods and natural resources in Niger; and there is a very large potential for such investments to enable rural people to improve their incomes and well-being (see e.g. World Bank, 2009; Reij et al., 2009; Sendzimeer et al., 2011; Di Prima et al., 2012; Winterbottom et al., 2013; Faurès and Santini, eds., 2008; Abric et al., 2011; de Fraiture and Giordano, 2014; Williams et al., 2014).

Given this context, our analysis ranked two agricultural water management investment options as bringing the highest benefit to the greatest number of people in the project area: rainwater management, improved water control for rain-fed agriculture and for livestock at farm and watershed levels; and individual small-scale irrigation technology (pumps, drip kits) for high-value crops for local markets (vegetables that bring direct income to farmers and provide the household with nutritional food), and other critical uses of water (e.g. livestock, domestic water). We found there may be an opportunity to exploit shallow groundwater for irrigation (Pavelic et al., 2013).⁹ We therefore recommended an investment in assessing and mapping this potential. The study argued that investing in these options would build directly on recent successful pilot projects supported by several donors and could tie together these disparate activities. It stressed investments in small-scale approaches will benefit many more people than a project that concentrates solely on large-scale irrigation, and offers the best opportunity to bring positive results to women and youth. Niger is one of the lowest-ranked countries in the United Nations' Human Development Index; therefore, investments that focus on improved nutrition can have a significant positive impact.

There is considerable evidence to support our recommendations. A recent wide-ranging review of much of this evidence by Woodhouse et al. (2017) emphasises the major contributions of small-scale producers in driving irrigation development in SSA. These contributions are largely 'hidden' and ignored by governments and international investors, whose focus remains on large-scale infrastructure. The paper argues that encouraging farmer-driven small-scale irrigation investments is more likely to lead to structural transformation of rural economies than continuing to invest in large-scale publicly and privately managed infrastructure. Government agencies, development organisations and researchers need to properly assess the magnitude and dynamics of farmer-driven irrigation expansion to provide a more realistic basis for investment decisions related to agricultural water management.

To be fair, the Climate-Resilient Communities project contains elements of what we had recommended. The surprise to us is the inclusion of major investments in both the rehabilitation of existing large-scale irrigation infrastructure and construction of new infrastructure.

We also wonder if the proposed MCC Irrigation and Market Access project pays sufficient attention to Niger's own irrigation development priorities, which explicitly mention the need to expand rainwater harvesting and soil and water conservation practices in addition to improving the performance of large-scale schemes (Ousseini and Amadou, 2014). These options not only contribute to enhancing agriculture-livestock integration and minimising degradation, but are especially appropriate given that the main cereal crops, apart from rice, are grown under rain-fed conditions and not under irrigation. Again, we reiterate we are not opposed to investing in large-scale schemes per se; but we believe MCC lacks a comparative advantage for these investments, and other agricultural water management investments have a greater potential for reducing poverty. Indeed, the various attempts to improve the performance of large-scale irrigation systems in Asia and Africa over the past few decades have a dismal

⁹ A view also expressed by Williams et al. (2014), who point out that groundwater is a relatively abundant but underutilised resource in sub-Saharan Africa, providing less than 5% of irrigation water, and suggest that investments be particularly directed towards improving the hydrogeological information base and providing access to affordable energy sources to drill and lift water.

track record. This is because the 'normal' approaches which channel funds from donors through government agencies reinforces rather than transforms the underlying institutional roots of poor performance. A radically different approach, for example along the lines of a 'global irrigation compact' that promotes new forms of leadership, partnership and ownership, is required to achieve higher performance (Lankford et al., 2016) – and this would require a long-term commitment impossible for MCC.

We received positive feedback on the report from MCC and from independent reviewers with whom we had shared the report (with permission), but heard nothing more from MCC. We did learn that there were staffing changes in the organisation. Perhaps more importantly, there was anecdotal evidence that the Government of Niger was pushing for major investments in large-scale irrigation. The explanation for this choice probably lies in the political economy and incentive structures of both governments and donors. It also lies in the narrow kind of economic analysis that MCC uses, in its formal 'constraints analysis' to prioritise investment options (MCC, 2014).¹⁰

CONCLUSION

This opinion-piece is not meant as a condemnation of large-scale irrigation investments. Rather, it is an appeal to donors and development partners to use the evidence base, or seek informed advice, so they can make the most informed decisions – ones that favour the best balance and combination of irrigation investments. Other donors able to commit to such investments for at least a decade have a big comparative advantage over MCC with its strict five-year limit. We believe that MCC and Niger have missed a golden opportunity to invest in small-scale agricultural water management that could have been transformational and benefited hundreds of thousands of people. Importantly, such small-scale local investments also offer greater opportunities to ensure women benefit from the investments. Expensive investments in large-scale irrigation benefit a smaller number of 'privileged' farmers, are more likely to benefit the elites (mostly men), and, as experienced in many irrigation projects (e.g. Inocencio et al., 2009), pose a high risk of escalating costs that will force the reduction of the scope of the programme or require additional time and resources to complete. We can only hope that the parties to this Compact will remain open to learning lessons as they proceed, and make adjustments that will bring some benefit to the people of Niger.

This experience is not unique to the situation in Niger or to this case. In the world of agricultural development, donors seem to have retained their taste for big infrastructure projects, despite both their mixed track record, and the strong evidence that investments in village-level development of water resources and small-scale irrigation have a great potential to increase food security and bring new income streams directly to rural communities.

We can only speculate as to whether this is because *Big Irrigation* is easier for development agency programme managers to understand and manage. Governments, too, favour this kind of investment (often, as in Niger's case, despite other options contained in official policy papers). Perhaps this is because mega-project budgets give them more political capital; and centralised control over the funds is more attractive than decentralising funding into smaller packages to local NGOs and implementers. A political-economy analysis of the incentives and decision-making processes would undoubtedly be revealing.

¹⁰ An early draft of this report was available to us when we did our work. The cover page of the final version is a disclaimer, saying the analysis was done jointly with Niger, and its posting on the MCC website does not constitute an endorsement by MCC. The methodology is based on a specific 'growth diagnostics' approach. It concludes access to water for agriculture and livestock is one of three critical 'binding constraints' on economic growth, and specifically endorses a pilot project that tested a market-based approach to promoting small pumps and other irrigation technologies – the same type of investment we recommended. This still begs the question as to why MCC chose to invest so much in large-scale irrigation.

Whatever the reasons, we believe that the past 20 years have brought the world many examples of validated approaches and interventions that help water resources development to have positive local impacts. If we were speaking to Niger's Minister in charge of Agriculture, here is how we would advise him to spend the US\$254 million allocated for irrigation on agricultural water development to improve the lives of the largest number of people:

1. Allocate funds (35%) to developing practical approaches to improving the performance and sustainability of large-scale irrigation schemes by focusing on one scheme as 'proof of concept'. This would include minimal physical rehabilitation combined with a major emphasis on strengthening institutional arrangements at all levels for scheme management and profitable agricultural production.
2. Allocate funds (35%) to assist local communities to improve management of watersheds, including harvesting rainwater and storing it for livestock, agriculture, and domestic uses, and improved management of rain-fed lands to maintain and enhance soil fertility and water-holding capacity. This would complement and strengthen the planned Climate-Resilient Communities Project that is part of the existing Compact.
3. Allocate funds (30%) aimed at developing a viable and effective supply chain for low-cost agricultural water management and other technologies (such as pumps, especially solar pumps) driven by the private sector. This would complement the planned 'market access' component of the Compact.

These steps should be integrated with the rest of the MCC funding aimed at roads and livestock improvement to achieve strong synergies.

We were involved in studies in the early 2000s that made the case for increasing investments in agricultural water management in Africa (e.g. World Bank, 2007) – an increase that has subsequently taken place. Governments and investors as well as researchers have been piloting and promoting a variety of new approaches, including public-private investments, and an emphasis on creating conditions that encourage private investment in new pump and water application technologies using groundwater (de Fraiture and Giordano, 2014). As documented by Wodehouse et al. (2017), farmers are also driving substantial irrigation developments throughout Africa. We believe that the time is ripe to take stock and assess the performance and impacts of these investments, and identify lessons that could inform the next decade of investments in agricultural water management.

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