



Infrastructure & Cities
for Economic Development

Guidance note:

Improving sustainability of infrastructure

Value for Money of Infrastructure in Fragile and Conflict Affected States

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1. Introduction

1.1 Purpose of this guidance note

This guidance note is intended to inform donor programme design and delivery decisions for infrastructure in Fragile and Conflict Affected States (FCAS). It provides good practice guidance on how to design and deliver sustainable infrastructure. It includes an examination of five possible delivery models for funding long term operations and maintenance (O&M) of infrastructure, and the relative merits of each for fostering sustainability.

While there are significant challenges to infrastructure provision in FCAS (many of which are discussed in this paper), infrastructure can provide a foundation for stabilisation and economic development if benefits are sustainable over the longer term. It can also contribute to broader sustainable programme outcomes such as conflict reduction, improved governance and community cohesion. Thus sustainability is an important Value for Money (VFM) consideration when considering infrastructure investment.¹ Getting it wrong can result in severe consequences, including greater fragility and increased conflict.²

This paper should be used as a reference by development actors managing existing programmes with an infrastructure component, and to inform new programme design. The discussion and options presented are based on good practice approaches; not all options will be relevant in all contexts.

The options examined represent at a high level, the range of possible models available to donors for delivering infrastructure, and considering long term funding and accountability for its O&M:

1. The beneficiary government is accountable for and funds longer term operations and maintenance of an infrastructure asset.
2. Models of community ownership (*community funds O&M – either from user tariffs or other funding available to the community – e.g. levies / voluntary community contributions*).
3. Public private partnerships (PPPs) and comparable financing arrangements (*the funder depends on the specific arrangement – may be public sector or private sector or a combination of both. These models involve various arrangements for risk sharing between public/private sector, and can include a range of revenue collection mechanisms*).³
4. ‘User pays’ delivery models (*users of the infrastructure fund O&M through various revenue collection mechanisms*).
5. Donor funding of longer term operations and maintenance.

Under each of these options, funding and responsibility for O&M of the infrastructure varies. We assess each option in its ability to foster sustainability in FCAS; listing pros, cons, and necessary conditions for effectiveness. We present case studies of where options have worked well and where they have resulted in difficulties, both from which lessons can be learned (Chapter 4).

These options are a *simplified* version of the multitude of infrastructure delivery approaches available in a real life context. Options in practice will involve many more complexities; and may overlap with each other.

¹ Infrastructure services are important enablers of economic growth. However, infrastructure is expensive to build, and the economic and social benefits from a road or a hospital will only surmount the costs if it can be used for a number of years post construction. An investment in infrastructure can achieve economy, efficiency, effectiveness and equity but will not provide good VFM if it is not sustainable.

² For detailed discussion of this point, see UNOPS and the Danish Institute for International Studies (2017). *Roads to Peace? The role of infrastructure in Fragile and Conflict-Affected States*, Available at: <https://d3gxp3iknbs7bs.cloudfront.net/attachments/36f42fa9-98ff-496e-b0f4-f5f6e6fdb2de.pdf>

³ See World Bank, Public Private Partnership in Infrastructure Resource Centre for further details on the range of PPPs available: <https://ppp.worldbank.org/public-private-partnership/agreements>

Each infrastructure project is also affected by political economy and conflict dynamics, and practical realities in implementation. This paper does not replace the need for advisers operating in the field who are best placed to make project decisions; it simply provides guidance based on what has worked in the past, and should be adapted for purpose in each individual situation.

Complicating factors in FCAS that put pressure on the various options and delivery models from a sustainability perspective include:

- Corruption – both in the public and private sphere, and the often blurring of the two sectors when it comes to large scale infrastructure development and concessioning.
- Ease of doing business as an indicator of how likely PPPs or market based solutions can be brought to bear.
- National / sub-national government structures and dynamics, including multiple political actors often with conflicting incentives, and little continuity across political cycles.
- Policy environment maturity / enforceability.
- Governance assessment and capacity, and overall quality of engagement level.
- Availability of host government counterpart funding and budgetary processes, including complex institutional arrangements for securing recurrent government funding.
- The characteristics of the local private sector, including technical capacity, and the availability of private capital and connectivity with foreign investors.
- Range of international donors often with competing or overlapping agendas, in a landscape that is often constantly changing to respond to new conflict-driven and humanitarian and reconstruction needs. This can make it challenging to efficiently coordinate investment.
- The level of fragility and severity of the conflict.

These factors and their implications for the options identified above are discussed in detail in Section **Error! Reference source not found.** We also present guidance on other mechanisms to foster sustainability of infrastructure investments in FCAS, such as sustainability considerations that should be built in from the outset (Section 1.3); and building in ‘portfolio conditionality’, monitoring infrastructure beyond the programme lifecycle, maintenance focused programmes, and improved donor coordination (Chapter 3).

1.2 What do we mean by sustainable infrastructure?

We define the sustainability challenge for our purposes to be two-fold:

1. **The supply side challenge of infrastructure delivery:** Infrastructure programming that supports the construction of infrastructure assets that remain productive for use as intended, over their design life.⁴ That is, infrastructure that is of high quality, is operated and maintained to a standard such that it continues to work, does not fall into disrepair, and delivers the services and benefits intended. This requires infrastructure to be planned and designed to take full account of its own impact and its operational needs and use, and establishing a successful long term maintenance regime.
2. **The demand side challenge of access to infrastructure:** Infrastructure construction and operation is not an end goal in itself. Infrastructure and the services it provides need to be accessed and used productively by the intended beneficiaries over time, for the benefits of the investment to be

⁴ The definition of sustainable infrastructure is often much wider than this. For example, according to Community Research Connections (CRC) sustainable infrastructure refers to: ‘the designing, building, and operating of these structural elements in ways that do not diminish the social, economic and ecological processes required to maintain human equity, diversity, and the functionality of natural systems.’ We do not disagree with a wider definition of sustainable infrastructure, but have defined it more narrowly here to match the scope of this paper.

sustainable. This may require overcoming other barriers to beneficiary access (beyond establishing successful O&M). Some of these challenges are discussed in this guidance paper, particularly in reference to FCAS-specific complexities observed.

1.3 Sustainability must be built in from the outset

In order for an infrastructure investment to be sustainable, sustainability considerations need to be built into programming from the outset. This should include building skills, knowledge, institutions, and promoting incentives that can make development processes self-sustaining.

Plans for sustainability need to be practical and achievable, with sufficient funding allocated to support their achievement. Flexibility is also important, given security and stability is ever-changing in FCAS. For example, local authorities are often changing, and a good relationship with a local mayor who is willing and able to agree to maintenance responsibilities does not guarantee that his/her successor will feel the same way. Another significant obstacle is that the lifespan of the programme set up to deliver infrastructure is usually much shorter than the life of the asset constructed. Incentives for sustainability (in the form of an effective O&M plan for instance) therefore often do not naturally exist. Each of the delivery options explored in this paper seeks to address this incentive problem.

Beyond the delivery mechanism of an infrastructure investment, there are other things that can be considered at the outset to help foster sustainability in infrastructure investments. The following questions should be considered before investment is made:

- ***Is there political support for the investment?*** This includes support from both the UK and host government, and from the community. If political support does not exist, it will be much more challenging to achieve sustainability, particularly in a conflict affected state. Involvement of the local authorities, and keeping national government sighted, can help to ease the barriers to implementation. During implementation it is important that both sets of authorities are sighted and there is a consensus or agreed framework among all parties outlining their individual roles. Getting host governments and/or local authorities to make a contribution to infrastructure projects (even if not a monetary contribution) can improve the chances for sustainability of projects.
- ***Do no harm and conflict sensitivity assessment: what are the security and stability risks?*** Have they been properly identified and assessed and can any threats to sustainability of the project be properly managed? Investments such as selection of road routes, choice of government area to receive funding et cetera, can affect the sustainability of an investment in FCAS. The need to weigh the importance of sustainability against achieving short-medium term objectives of the planned intervention is also important. For example, it might be more important in a conflict situation for a road to be built quickly to transport provisions today; than for it to last in good condition for 10 years. Site selection for infrastructure investment must also be carefully considered in this context. For example, DFID's Solar Nigeria Programme's pilot investment in solar power installations in hospitals in Borno State was careful to select one hospital in each of Borno's senatorial districts to avoid any perception that some districts were being favoured over others in reconstruction effort, reducing the risks of fuelling political rivalries and putting the sustainability of the project at risk.
- ***Has analysis and assessment of the project (e.g. economic and financial appraisal) been undertaken on a whole-of-life basis, taking into consideration the functional life of an asset; and does sensitivity / scenario analysis appropriately take account of future uncertainty (particularly in relation to different possible future conflict outcomes)?*** This is necessary in order to understand the true likely return on investment that the asset will deliver both economically and financially. Has an appropriate discount rate been used and has sensitivity analysis and/or real options analysis been undertaken to understand the impact of possible/likely future risks and opportunities?
- ***Has the design specification of the infrastructure been appropriately considered for the context in which it is being delivered?*** In conflict affected and difficult to reach areas, it is often more

appropriate from a sustainability perspective to select high-quality and highly reliable design specifications, against cheaper less robust options. Particularly where capacity and skills in O&M cannot be relied upon, selection of design specification can have a large impact on long term sustainability and thus VFM. Solar technology is a good example of this. Cheaper solutions break down more easily, and because they require more frequent and specialised maintenance, rarely last longer than 3-5 years in difficult delivery environments.⁵ For this reason the systems installed in conflict-affected Borno State by DFID's Solar Nigeria Programme were custom designed for the local conditions (e.g. to withstand extreme heat and limited availability of skilled technicians for regular maintenance). Importantly, the appropriate design specification will vary with the programme context and objectives.

- **Does the current policy framework and government / private sector / beneficiary capacity exist to support sustainability of the selected delivery approach?** Supporting the development and modification of existing regulatory frameworks to empower relevant public sector agencies to enforce regulations can greatly improve sustainability. Technical assistance to improve legal and regulatory frameworks and capacity building to improve their implementation are important in many situations and are complementary to the options for infrastructure delivery set out in this guidance paper. Conversely, there are sustainability options that rely less upon an improved policy environment. These are useful when improving formal governance is too costly, or creates a high risk of delay or project failure. Governance improvements are not *always* cost-effective.
- **What is the capacity of local contractors?** This will affect which of the options for delivery are likely to work. Use of local contractors (e.g. traders' organisations) to implement projects, including in PPP arrangements, can help to improve sustainability of infrastructure. Evidence from other donors and / or delivery partners operating in a specific location being considered for investment may help to answer this question.
- **Does the donor programme delivering the infrastructure have enough budget flexibility to adapt to unforeseen sustainability challenges?** In a conflict-affected delivery environment where there is a high level of uncertainty, it is not possible to identify at the design stage, all challenges that will arise during programme implementation. Having the flexibility to adaptively manage the programme (and its budget) and allocate funding to capital investment, O&M, technical assistance and/or other activities as is needed to achieve the best programme results, helps to safeguard large sums of donor capital spending, especially when unforeseen challenges arise. This can help to address challenges such as delays in agreeing and establishing government / community funded recurrent maintenance, or barriers on the demand side to beneficiaries accessing infrastructure. Some of these challenges are presented and discussed in the Solar Nigeria Programme Case Study in Chapter 4.
- **Is the programme budget component for technical assistance sufficient to support the activities required to safeguard donor capital spend?** Related to the above point, in a conflict-affected environment an approach of *'build it and forget about it'* can be problematic for a number of reasons. Successful, sustainable results will likely require a number of supporting activities to be undertaken by donors / implementing partners. This could include assistance in establishing an effective long term recurrent maintenance regime; building capacity of the government, community, and/or private sector in policy, regulation, financial and budget management, and/or technical capabilities; effectively coordinating investment with other donors; and addressing any barriers to beneficiary access to infrastructure. These challenges are described more specifically in relation to each possible infrastructure delivery option in Chapter 2. To protect the sustainability of capital investment, it is important for a programme delivering infrastructure in FCAS to assess what technical assistance is required to address these challenges, and include sufficient funds in programme budgets.

⁵ World Bank Group, International Bank for Reconstruction and Development (2010). Photovoltaics for Community Service Facilities: Guidance for Sustainability, available at: <http://siteresources.worldbank.org/EXTENERGY2/Resources/PVToolkit.pdf>

2. Infrastructure delivery options and the effect on sustainability

2.1 Options considered

We consider five high-level options⁶ for donors delivering infrastructure in FCAS, which have certain characteristics that can be used to foster greater sustainability depending on the specific context of a given investment, by providing incentives or assigning responsibilities to one or more parties for long term O&M of assets.

- 1. The host government takes on accountability and funding for longer term operations and maintenance of an infrastructure asset.** This is considered the ‘status quo’ option in most FCAS contexts, including Somalia and NE Nigeria (for which we present case studies in Chapter 4). Donors and implementing partners design, deliver and fund programmes that construct infrastructure, with O&M included for a defects period only; usually one year. Responsibility for O&M of the asset is then handed over to the recipient country government – perhaps a central ministry, or a municipal governance body. This can be through informal agreement, signing a memorandum of understanding (MOU), or stronger contractual procedures.⁷ For this option to be used successfully, the donor usually needs to include sufficient technical assistance budget in the programme for capacity building – upskilling the government and / or community on the operational and maintenance requirements of the asset; the governance processes to support this; and any relevant training needed.
- 2. Models of community ownership.** Community owned assets are those that are owned and controlled through some representative mechanism that allows a community to influence their operation or use and to enjoy the benefits arising. Community ownership of infrastructure involves cash contributions from beneficiaries. It is often associated with participatory development approaches in which the community are involved in key decisions related to the delivery of the infrastructure, and directly in planning and construction activities. Community ownership works best for assets that are of a high value to the community and do not require complex government cooperation.
- 3. Public private partnerships (PPPs) and comparable financing arrangements.** PPP arrangements involve partnership agreements between a government organisation and a private sector entity to do one or more of construct, operate, maintain, or finance an infrastructure asset. There is a role for donors, and their implementing partners to facilitate infrastructure PPP arrangements. A typical PPP example would be construction of a hospital building funded and financed by a private developer and then leased to the hospital authority. The private developer acts as landlord, providing upkeep, maintenance and other non-medical services while the hospital itself provides medical services. The private developer has incentive to maintain the building (fostering sustainability) as it receives a revenue stream from the hospital authority for doing so. PPPs trialled in FCAS environments may be simple financial arrangements between municipal or regional authorities and small to medium enterprises (SMEs). Consideration must be given to the difficulty of getting companies to operate in dangerous and conflict affected environments. The more untrustworthy the government is, the less likely there will be companies willing to enter into a PPP arrangement.
- 4. ‘User pays’ delivery models.** The most common example of this model to deliver infrastructure is a ‘fee for service’ road maintenance fund: fees are collected from fuel levies, vehicle taxes, road tolls,

⁶ As stated in section 1.1, these options are a ‘simplified’ version of the multitude of infrastructure delivery approaches available in a real life context. Options in practice will involve many more complexities; and may overlap with each other.

⁷ Strong contracting arrangements with government officials in FCAS are often not possible or enforceable. It is also important to ensure that contracting is undertaken with the correct party – i.e. a government ministry may have responsibility for constructing an asset, but maintenance may be carried out by a different party.

or other fees dependent upon road use, and this funding is dedicated to road maintenance outside of the normal government budget. This delivery model is generally described as a ‘second generation’ Road (Maintenance) Fund, and has been extensively applied in countries in Africa with mixed success.

5. **Donor funding of longer term O&M.** This option examines the possibility of donors including more funding for O&M of infrastructure in programme budgets, beyond the initial (usually one year) defects period. This could be through the same programme that is established to construct the infrastructure; or through separate programmes focussed on maintenance or operations only. This option is likely to only improve long term sustainability in support of broader stabilisation or political economy objectives, where achieving these outweighs the cost of a solution that is not internally sustainable (e.g. immediate post-conflict stabilisation). The approach should be part of a sequenced ‘exit’ strategy that transitions to use of one of the other four options above before the end of the asset’s life. The number of years or overall budget ceiling set aside for O&M should be commensurate with safeguarding donor capital investment, and the economic benefits provided by the asset. It is also important to consider the possible adverse incentives under this option for beneficiary governments to delay investment in their own capacity and capability to take responsibility for longer term O&M.

2.2 Options Assessment

Table 1 presents a summary of the pros, cons and necessary conditions for each option to be effective. It also sets out complicating factors that need to be considered for each option in an FCAS environment.

Table 1: Summary of options

Option	Pros	Cons	Necessary conditions for effectiveness	Complicating factors / FCAS specific issues
<u>1.) Host government operates and maintains</u>	<ul style="list-style-type: none"> • No long term costs to donor • Can result in increased long term employment benefits • If capacity building is also undertaken, this can result in sustained improvement in skills of government / local industry 	<ul style="list-style-type: none"> • Without sufficient capacity building, government / community often does not have required skills and expertise to operate / maintain asset, leading to disrepair • Government revenues often uncertain – despite good intentions, there is no guarantee that O&M funding will be available long term • May be limited ability to access and source replacement parts / materials or specialised labour from overseas 	<ul style="list-style-type: none"> • Most importantly, donor must perform adequate capacity building within government (and / or community) for a successful recurring O&M regime to be established • Government needs adequate public financial management (PFM) capability⁸ • Government needs to have adequate and certain revenue stream for funding • Adequate governance arrangements for undertaking O&M of public assets must exist⁹ • Majority of replacement parts / materials and necessary labour are available locally • Low levels of government corruption 	<ul style="list-style-type: none"> • If infrastructure is in a contested area, this is a high-risk approach regardless of funding availability. Success depends on government access / control • There must be a way to translate the outcomes of sustained infrastructure into a clear government / agency benefit; i.e. in terms of increased revenue or cost savings. E.g. if investment timeline is long enough, investment in solar energy systems could result in increased revenue from consumers and/or reduced expenditure on diesel generation • There are always winners and losers (and avenues for corruption) when a new budget line is created for O&M, or reduced • Political economy analysis is required to ensure the mandated agency for O&M is identified – or at least issues of overlapping mandate and interest are understood. In many cases it will be easier to use an existing body or mechanism to handle O&M, even if this requires adaptation of its mandate and expertise. Creating new bodies and processes is harder in difficult political economic environments • The relationship between donor and host government should be strong enough for the donor to advise / provide training on procurement, technical maintenance requirements, governance processes etc., so that O&M is planned, costed and undertaken by a qualified provider • A phased approach to the handover of assets and O&M responsibility should be undertaken over a suitable time period so that O&M budget allocation becomes established and recurrent before final handover. Agencies can learn from donors / delivery partners over time to establish a culture, and effective governance systems and processes that support productive O&M • If government capacity is weak, and capacity building is likely to be costly or not successful, the host government should outsource the O&M via a public procurement. The success of this depends on the market's ability to respond and its skill base. While available skills can be an issue for outsourcing, it can often be the willingness of the government to pay for services that is lacking, rather than the supply of appropriate skills in the private sector. Skills and quality constraints in the private sector can be addressed if the government is willing to accept outsourcing in principle

⁸ The PEFA framework for assessing public financial management assesses – at a high level – the functioning of a country's PFM systems and economic risks to government revenues. For large infrastructure projects with central government dependencies, reports from PEFA framework are a useful source of information when assessing this sustainability option and others where there is a high dependence on PFM. See: https://pefa.org/sites/default/files/PEFA_2016_Framework_Final_WEB_0.pdf For smaller projects where the dependence is on local government finances, a similar analytical approach can be used if data are not available.

⁹ The level of assessment of governance arrangements will depend on the size of the proposed programme, and may be informed by a Country Governance Assessment or political economy analysis conducted by the donor or implementing partners.

Option	Pros	Cons	Necessary conditions for effectiveness	Complicating factors / FCAS specific issues
<p>2.) <u>Community ownership</u></p>	<ul style="list-style-type: none"> Community owns the asset (has invested own cash); therefore has an incentive to maintain it and keep it operational to enjoy continued benefits Can help to rebuild trust with communities, and prioritise investment based on community needs. No long term costs to donor Evidence that community owned interventions can have a positive effect on stability in volatile contexts by enhancing interpersonal trust and social cohesion through the process of collective action¹⁰ Investments not affected by the dynamics that take place at a national level - can channel resources directly and quickly to the people who need them Can improve the capacity of local governments to 'co-produce' with local communities¹¹ Can contribute to employment for local community 	<ul style="list-style-type: none"> Community may not have required skills and expertise, or reliable funding source, for O&M Replacement parts may not be readily accessed or able to be purchased by the community; limited ability to source from overseas Difficult model for complex interventions that address comprehensive planning and integration issues and require government involvement Not a magic solution: short term injections of funds and an imported model for collective ownership / decision making will not alter local community dynamics that reflect long histories and real distributions of power and wealth.¹² Risk that consulting with those who present themselves as spokespersons for local communities do not actually have the mandate to speak on behalf of these populations¹³ 	<ul style="list-style-type: none"> Overall, this option is likely to work only for smaller community based infrastructure when local capability and income is available, and no significant government involvement is required. Extensive process of mobilisation and capacity development of the community-including detailed community consultation to understand needs. Community needs adequate and certain revenue stream for funding O&M – the community must be willing to pay and able to afford Adequate technical skills in community required for O&M (including local supply chains) Replacement parts / materials and necessary labour are available locally, or it is practical / achievable to source from overseas Good governance exists in community groups; low level of corruption Extensive monitoring to understand what works, including intensive use of field monitoring and programme assessments is still required in this space in general. This type of monitoring is not always possible (especially for projects in areas that are still quite inaccessible) 	<ul style="list-style-type: none"> Good for remote and decentralised management of O&M where the community values the asset and see its benefits. The type of asset and its technological complexity may be a limiting factor for community based ownership. The ability to use local maintenance may be a trade-off with the project outcomes. For example, earth roads can be maintained with labour based methods by a local community, but are far less hard wearing than bitumen roads. Due to security concerns in conflict and post-conflict areas, the level of community engagement required for this approach to work may carry an unacceptable level of risk. Additionally, if communities have been displaced due to conflict and an objective of infrastructure investment is to encourage communities to return home, there may not be anyone living in the areas where infrastructure is to be delivered with whom to consult The value of the asset itself may create an issue. There may be higher risk of theft or vandalism where assets contain small, valuable parts. For example, the theft of solar panels or batteries can be common. The ability of the community to manage this issue needs to be factored into conflict sensitivity / do no harm analysis with specific consideration for the type of infrastructure, and identification of the level of control a community has over its environment. Good for programmes that have a broader agenda of community cohesion, and those which use community based monitoring and community based contracting approaches

¹⁰ Danish Refugee Council (DRC) – Danish Demining Group (DDG), Evidence underpinning the approach CDD'.

¹¹ World Bank, Social Development Department (2006). Report No. 36425 – GLB, *Community-Driven Development in the Context of Conflict-Affected Countries: Challenges and Opportunities*.

¹² World Bank Institute (2009). 'Evaluating Community-Driven Reconstruction: Lessons from post-conflict Liberia.'

¹³ UNOPS and the Danish Institute for International Studies (2017). *Roads to Peace? The role of infrastructure in Fragile and Conflict-Affected States*, pg. 6. Available at: <https://d3gxp3iknbs7bs.cloudfront.net/attachments/36f42fa9-98ff-496e-b0f4-f5f6e6fdb2de.pdf>

Option	Pros	Cons	Necessary conditions for effectiveness	Complicating factors / FCAS specific issues
<u>3.) PPPs and comparable arrangements</u>	<ul style="list-style-type: none"> • Working PPP model creates commercially viable project supporting long term O&M funding • A means to attract investment and a cost effective way for governments to deliver public goods • No long term costs to donor • Can create positive impacts for local business and employment 	<ul style="list-style-type: none"> • Private sector representatives who possess undue influence can affect the process and seek rents – this results in PPP agreements unfavourable to the government/community • Supporting commercial legislation and regulation often not enacted in FCAS, making PPPs unattractive to investors who do not have relationships with Government officials and/or clan support • Financial sector weakness (e.g. no commercial banking) is a constraint to SME participation 	<ul style="list-style-type: none"> • Most importantly, this option will only work for commercially viable projects with a risk/return profile attractive to private sector investors. • Government needs to have the supporting regulatory and legal processes to support a PPP or a viable opportunity must exist for donor to build government and private sector capacity to understand and operate the PPP process • Strong oversight and control of the PPP process by donor / implementer to ensure donor and community interests are represented • Detailed economic / financial appraisals must be undertaken for all PPPs to confirm viability • Government (or other party) may need to guarantee demand risk • Terms of PPP agreement need to specify private partner investment and must be credibly binding • Detailed political economy analysis and due diligence in selection of PPP partners must be undertaken • Consultation of all relevant government bodies must be undertaken sufficiently • Monitoring of how the additional value from new infrastructure is distributed between market participants is crucial for understanding success 	<ul style="list-style-type: none"> • The business enabling environment – and moreover, the willingness and ability of the private sector to operate in the given FCAS context is the most important consideration here • Costs are likely to be higher, and the kinds of companies willing to operate in such environments may present ethical and duty of care challenges; these need to be assessed • PPPs are highly unlikely to be an effective avenue for donors within highly unstable environments, but may be more viable where only a small area of a country is affected by conflict – for example North East Nigeria, where there remains a stable National government block to guarantee contracts

Option	Pros	Cons	Necessary conditions for effectiveness	Complicating factors / FCAS specific issues
<u>4.) User pays (e.g. road maintenance fund)</u>	<ul style="list-style-type: none"> • Sustainable funding stream for O&M (dependent upon sufficient demand) • No long term costs to donor • Some evidence to demonstrate effectiveness (e.g. Tanzania Road Fund) • Can increase employment in operation / maintenance of infrastructure 	<ul style="list-style-type: none"> • Need to collect tax, toll, or levy from users to fund O&M, which may not be politically viable or may create adverse incentives (e.g. over use of local roads instead of toll roads) • Mechanisms like road maintenance funds are complex to set up, require substantial governance, regulation, and operational capacity • Financially, ring-fencing funds for future maintenance costs means less budget flexibility - cannot allocate those funds to alternative investments that may provide higher return • There is evidence that effective prioritising and forecasting of road expenditures can sometimes be as effective in getting sufficient funding from central government as a second generation Road Fund¹⁴ • Risk of users paying higher maintenance costs for 'over engineered' infrastructure¹⁴ 	<ul style="list-style-type: none"> • Most importantly, needs to be a commercially viable infrastructure project with sufficient demand, and affordability thus user charges / willingness to pay. • In Road Fund context, direct deposit of user charges into the Fund via independent bank account and / or strict controls around timing of deposits and reconciliation of funds¹⁴ • Strong government commitment is essential including adequate level of resources and a secure system for channelling revenues to the fund • Pricing needs to be efficient and affordable in order to optimise demand / revenue stream • Good governance practices such as independent auditing, separation of functions (revenue collection and allocation) • Clear legal basis such as Act of Parliament to support establishment¹⁵ • Good working process for procurement of contractors and disbursement of funds • A strong monitoring and evaluation system – weak processes for M&E in the past means there is not enough data currently to properly assess the overall success of road funds¹⁶ • From the evidence available, the quality of government and social leadership seems to be more important in achieving good results than the methods and systems implemented.¹⁷ 	<ul style="list-style-type: none"> • The ability to implement user pays models is dependent on the type of asset; severity of conflict; and issues affecting access to site, users, and payment collection. In general, the already small number of situations where all necessary conditions are met is likely to be even smaller in FCAS contexts • Payment administration is more difficult in FCAS. Cash based systems are at risk in more remote and conflict prone areas – or those where government control is weak. Mobile money solutions have common issues including network coverage and banking regulations which can be harder to resolve in FCAS • Long-term repayment models are likely to be riskier in more unstable environments where a dependable cash flow cannot be guaranteed for the asset • User pays models can work well for remote/cut-off communities, which receive little government investment in infrastructure. Successful implementations are grounded in the individual needs of each community and their ability to pay at a viable price point • Could be hijacked by conflict actors seeking rents, and / or traditional leadership hierarchy in remote areas

¹⁴ UNOPS prepared for the World Bank (2016). South Sudan Road Sector Project reports (not publically available).

¹⁵ Sub-Saharan Africa Transport Policy Program RMI-Matrix (SSATP) (2006). Road Maintenance Initiative policy reform status by country, available at: www.ssatp.org

¹⁶ World Bank Independent Evaluation Group (IEG) (2007). Evaluation of Bank Support for Road Funds (prepared by Hernan Levy and Peter Freeman).

¹⁷ UNOPS prepared for the World Bank (2016). South Sudan Road Sector Project reports (not publically available).

Option	Pros	Cons	Necessary conditions for effectiveness	Complicating factors / FCAS specific issues
<u>5.) Donor funding of longer term O&M</u>	<ul style="list-style-type: none"> • Donor can put in place necessary skills and expertise to operate and maintain effectively • Necessary funds can be allocated by donor • Can create local employment • Can be very effective in shorter term for achieving urgently needed outcomes that will not wait for local sustainability to become viable 	<ul style="list-style-type: none"> • Costly to donor • Does not reduce aid dependence in the longer term: performing capacity building alongside donor funded maintenance creates a disincentive for recipient government to increase its capacity for O&M • Moral responsibility for continued maintenance may rest with donors 	<ul style="list-style-type: none"> • This should only be considered as part of a sequenced sustainability plan that makes use of one of the other options before the end of the asset's life. This option may be good VFM in some cases in the short run (e.g. increased length of donor funded O&M beyond a one year defects period, due the difficulty and length of time involved in negotiating agreements with the government to take on long term responsibility for O&M). However, this must be considered against the competing disincentive for beneficiary governments / communities to build their own capacity and capability for the job. Extending donor funding should be considered on a project by project basis taking into account the marginal cost and risks of providing additional support, against the likelihood (and resulting cost) of maintenance not being carried out at all. • Opportunity cost of spending funds on maintenance needs to be assessed – in some cases ROI will be greater than investment in new infrastructure. But donor funded maintenance will rarely be sustainable in the long term. A higher degree of donor funding is being explored by DFID Somalia in Somali Development Fund Phase2 and Somali Investment Forum (SIF). Effectiveness of the approach employed should be evaluated in the longer term • Need effective plans in place to transfer funding to host government eventually. E.g. imposing conditions that must be met, or milestones that must be reached prior to funding being released. This will require an adequate level of capacity and skills, the supporting governance and legal institutions, and an environment with minimal corruption (as per the above options) 	<ul style="list-style-type: none"> • This option is likely to be considered only in support of broader stabilisation / PE objectives, where achieving these outweighs the cost of a solution that is not internally sustainable (e.g. immediate post-conflict stabilisation). The approach can be part of a sequenced sustainability plan that makes use of one of the other options above before the end of the asset's life • There may be strong pressure to increase O&M funding duration beyond an initial commitment if a sustainability strategy does not work as planned. There can be a strong case for this if it is delivered as part of a planned exit strategy. The number of years or overall budget ceiling set aside for O&M should be commensurate with safeguarding DFID's capital investment, and the economic benefits provided by the asset

3. *Other mechanisms to foster sustainability*

In an FCAS environment, particularly if there is ongoing conflict, it is never possible to eliminate all risks of an infrastructure investment (nor is it desirable from a VFM perspective to try to do so). However, there are many actions that can be taken to reduce and mitigate risks, improve prospects for sustainability, and thus improve a programme's long term VFM. This chapter considers four possible additional mechanisms to foster greater infrastructure sustainability: use of funding conditionality, monitoring infrastructure beyond the programme lifecycle, establishing a programme focussed solely on maintenance, and improving strategic coordination between donors operating in the same geography.

3.1 Use of funding conditionality

Donors cannot fund maintenance of infrastructure for ever, as this is not sustainable and will not reduce aid dependence. The use of 'conditions precedent' to require ministries or other government bodies to meet milestones or other triggers before releasing programme funding can be a useful tool under the right circumstances. For example, by withholding funding to build new infrastructure until relevant legislation is passed to support PPPs, the PPP process can be improved and will be likely to result in better sustainability outcomes. For this to work, the legislation or policy changes required need to be in line with host government objectives. Most evidence concludes that setting conditions does not change government decisions or actions when interests and objectives are not aligned with those of the donor.¹⁸ Conditionality can be employed in different ways:

1. Directly: if x does not happen, we will not do Y. (E.g. if assets are not maintained, we will not fund new construction)
2. Indirectly: Factor conditionality into the logframe by including outcomes for maintenance. It is important to explain to government recipients that if maintenance is not performed properly, the programme will score poorly against this outcome, which means funding is less likely to be renewed.
3. Horizontal conditionality: using a broad portfolio approach for direct conditionality. (E.g. if assets are not maintained in programme x, no funding for programme y will be provided).
4. Positive promotion of government recipients to other donors. E.g. when government recipients undertake all of their maintenance responsibilities, DFID has the ability to make this fact known to other donors, to support further funding for infrastructure.

Further guidance on conditionality and possible instruments to be employed are detailed in Annex B of DFID's *'Framework for all financial aid to partner governments'* April 2016.

3.2 Monitoring infrastructure beyond the programme lifecycle.

An additional consideration for better sustainability in infrastructure is monitoring beyond the programme lifecycle. Within the FCAS context there are high risks to the ongoing maintenance of infrastructure after it is constructed, and hence an even greater need for longer-term monitoring. It is understandably difficult to incentivise this – both for donors and for implementing partners. It could be undertaken by a separate monitoring programme (such as the Somali Monitoring Programme (SMP)), which contracts third party monitors (TPM) to undertake verifications of programme activities including construction of infrastructure. Or it could be built into contracts so that the monitoring does not necessarily happen post-completion, but represents a phase of the programme itself that goes beyond construction, into the operational phase. While monitoring in itself is not a complete solution (funding to fix problems identified is also required), it helps to identify maintenance and operational issues, which could otherwise go untended.

¹⁸ Department for International Development, 'Framework for all financial aid to partner governments' April 2016, page 4.

The purpose of monitoring beyond the programme lifecycle is two-fold:

1. To obtain information and data on sustainability of constructed infrastructure – is it being used and maintained for its entire expected functional life? If not, why not? How can this information help to inform infrastructure programming in the future and improve return on investment?
2. To inform donor funding decisions – if monitoring of infrastructure shows that there are maintenance issues with an asset, can a donor decide post-programme to allocate additional funds for maintenance and / or repair? While this may be at times a stop-gap approach, repairing existing infrastructure (especially if at the stage where repairs needed are relatively minor) can be a lot more cost effective than replacement by building new infrastructure.

3.3 Establishing a programme focused solely on maintenance

In FCAS environments, where market failure in sustainability of infrastructure is common for the reasons outlined in this paper, it may be helpful to consider establishing a market systems type programme for O&M of infrastructure. This could include building capacity and skills within ministries or other governing bodies on what their maintenance needs are, how to: develop governance around maintenance, undertake procurement of maintenance, manage maintenance contracts, etcetera.

This type of programme would provide a better return on investment than constructing and repairing / reconstructing infrastructure that has fallen into disrepair. The programme could include capacity building around inventory management, spare parts management, and cost recovery between government departments for infrastructure maintenance (and operation in some cases). It could also be undertaken in coordination / cooperation with other donors operating in an infrastructure delivery capacity in the same location.

3.4 Improving strategic coordination between donors

Strategic coordination between donors operating in a conflict or post-conflict environment can significantly improve productive use of infrastructure, and collective approach to negotiating recurrent budget for O&M with government authorities. Coordinating funding for infrastructure delivery with health, education, and / or governance programmes can be an effective way to increasing the benefits derived from infrastructure enabled services. For example, coordinating a hospital construction project with a training programme for medical staff could help to improve the effectiveness of health service provision.

A collective approach to negotiating recurrent budget for O&M with relevant Government authorities could also help to improve donor bargaining power, and make it easier to incentivise commitment from government officials to long term O&M funding.

4. Case Studies

Case Study: DFID Sustainable Employment and Economic Development (SEED) programme Somalia (2014)¹⁹

Background: The SEED programme, funded by the UK Department for International Development (DFID) aimed to improve stability in Somalia through promoting economic growth and sustainable employment, and supporting private sector reform. Programme interventions entailed market-related infrastructure development along the meat and livestock, and fisheries value chain. This included the rehabilitation of the meat market in Borama, Somaliland; rehabilitation of the livestock market in Hargeisa; construction of a slaughterhouse in Burco; and rehabilitation of a fish market in Garowe, Puntland. The programme also worked towards improving the investment climate and providing support to strengthen regulatory frameworks in Somalia.

Description of project and delivery mechanism: Construction of the market infrastructure was managed through a public-private partnership (PPP) process. This was run by the programme implementer, and included training and workshops for municipal councils and local associations to build capacity in regards to the PPP process. Through the PPPs, local authorities were expected to improve revenue collection and the private sector realise profitability; while ensuring effective delivery of services to value chain actors and consumers. At the time of the programme's 2014 annual review, a PPP agreement for the Burao Slaughterhouse was signed, but the circumstances of the PPP arrangements were found unsatisfactory. The agreement was signed between the Mayor (representing the municipal council) and a director of Tayyib Burao Abattoir Company. ***The terms of the lease appeared to amount to a significant subsidy to the operators, which was not conditional on additional private investment – leaving the long term sustainability of the infrastructure in question.*** According to the implementing organisation, the negotiations were performed 'out of the public eye' making it difficult to see if there was a viable justification for this. At this time there were a number of other PPPs still to be negotiated.

Key learnings:

The key issues contributing to the problems experienced with the PPP process and hindering sustainability were:

- **Weak legal and regulatory enabling environment:** The Government in Somalia is yet to enact legislation to put in place an effective legal and regulatory framework for PPP arrangements, making them unattractive to investors who do not have relationships with Government officials and strong clan support. This constrains the ability that implementers have to demand due process is followed in PPP contracting, when it is common practice for individuals within the community to try to influence the process. This also creates adverse incentives for market participants. E.g. Review of the Garowe Fish Market PPP found that the market was being undermined by the Municipality, which continues to licence fish vendors with lower overheads and lower quality standards. Key legislation must be enacted if future PPP programming is to succeed.
- **Financial sector weakness:** There is only limited capacity in commercial banking in Somalia (5-6 licenced commercial banks not yet operating with the needed functionality) presenting a major constraint to growth and capacity of small and medium enterprises (SMEs). The government has not enacted a crucial Commercial Banking law in Somaliland. Without stronger market players, the PPP process is unlikely to lead to effective PPP agreements that foster the long term sustainability of the infrastructure.

Recommendations:

Recommendations from the programme's 2014 annual review that have important implications for the sustainability of the infrastructure include:

- Commissioning of a political economy analysis which examines the role of District and Municipality level actors, as well as Ministries in PPPs.
- Longer term monitoring of the PPPs to understand how the additional value from the new infrastructure is distributed between market participants. Formalisation of markets can lead to negative impacts on a range of informal service providers for example.
- Implementing partners need to have better oversight and control of the PPP process. They need to be on the procurement panel for negotiations to ensure that the interests of communities and donors are represented.
- PPP agreements should specify what investment private partners will bring and where possible these terms should be binding.

¹⁹ Case study developed from Sustainable Employment and Economic Development Programme II (SEED II) Annual Review July 2014.

Case Study: Task Order 14 – USAID road maintenance in Afghanistan²⁰

Background: Between 2002 and 2016, the US Agency for International Development (USAID) and Department of Defence (DOD) spent billions of dollars on road construction in Afghanistan, but have only had limited success in ensuring the long-term sustainability of those roads. The work included construction of more than 2,000 kilometres of Afghanistan's national highways, linking the five largest cities and connecting 80 per cent of the population to within 50km of a national highway.

Description of project and delivery mechanism: In 2007, in an effort to provide road maintenance and build capacity at the Afghan Ministry of Public Works (MOPW), USAID initiated a road maintenance and capacity building programme known as Task Order 14. Its objectives were to develop a new independent organisation (the Road Management Unit) within the MOPW to manage road maintenance subcontracts, plan annual maintenance work, and therefore develop a sustainable road maintenance programme for Afghanistan. As part of the programme, the MOPW was to transfer staff to the road maintenance unit, while USAID's contractor was to further enhance the unit's capacity by training those employees. Task Order 14 also provided direct funding for maintenance activities. After 4 years and \$53 million spent, USAID terminated the programme. According to the Task Order 14 Performance Evaluation report, Task Order 14 did not meet its reform goals due to a lack of cooperation from the MOPW's senior leadership. The report concluded that, by providing funding for road maintenance without regard to whether the MOPW implemented needed organisational reforms, the programme inadvertently created a disincentive for the MOPW to make those reforms.

Key learnings:

Task Order 14 was unsuccessful in establishing a sustainable road maintenance plan and programme because:

1. Weak capacity, corruption, funding issues, and insecurity limit the MOPW's ability to maintain Afghanistan's road infrastructure.

- **Capacity:** Lack of technical capacity in the ministry was a long standing challenge. MOPW was in need of structural reform – there were ongoing critical weaknesses including a lack of skilled staff, poor communication, antiquated systems and processes, and a lack of will to implement necessary reforms
- **Corruption** had a direct impact: according to a senior MOPW official, the MOPW stopped collecting tolls on the roads due to high levels of corruption. Since the tolls were collected in cash, drivers would pay bribes to the toll collectors in exchange for reduced tolls or to avoid fines.
- **Funding:** The estimated annual cost of road maintenance was \$100 million. However the ministry received on average \$21.3 million annually from the Afghan Ministry of Finance.
- **Insecurity:** The ministry could perform maintenance only where security conditions allowed. The ministry is beginning to use local Afghan contractors to perform road work, because they have fewer problems with insurgents than international contractors.

2. Performing capacity building programmes alongside the road maintenance programmes caused a disincentive for the MOPW to improve its capacity.

When discussing the road maintenance needs for Afghanistan, one MOPW official stated that Afghanistan was working to conduct and fund its own road maintenance, but also insisted that donors would fund and perform necessary road maintenance if it could not.

3. Assurance given by the Afghan government to take on road maintenance funding were unrealistic.

DOD followed guidance requiring it to obtain assurances from the Afghan government that road projects would be sustained. According to a former U.S. Forces-Afghanistan official, in FY2015 DOD were aware that the Afghan Government would always sign the required statement of memorandum acknowledging that it had the responsibility and capability to sustain a project, despite not always having the capability to do so.

Recommendations going forward:

In November 2013, in an effort to continue capacity building at the MOPW, USAID initiated the Road Sector Sustainability Programme (RSSP), focussed on capacity building activities through the creation of new entities within the MOPW and does not concurrently finance road maintenance activities. The success of RSSP will ultimately be contingent upon USAID receiving and maintaining buy-in and tangible commitment from the Afghan government to implement necessary reforms.

The Special Inspector General for Afghanistan Reconstruction (SIGAR) recommends that the USAID Administrator condition future RSSP and MOPW funding to the successful creation of an independent Road Authority, Road Fund, and Transportation Institute.

²⁰ Case study developed from: Special Inspector General for Afghanistan Reconstruction SIGAR 17-11 Audit Report October 2016. Afghanistan's Road Infrastructure: Sustainment Challenges and Lack of Repairs Put U.S. Investment at Risk.

Case Study: DFID Solar Nigeria Programme investment in Social Solar in Borno (NE Nigeria), a state with ongoing conflict²¹

Background: In 2016-17, the *Solar Nigeria Programme (SNP)* secured a total of £12.3 million funding to install solar energy systems in public health facilities in Borno State, a conflict affected area in North Eastern Nigeria, including:

1. *The pilot phase (£4.3 million):* Successful installation in three hospitals completed in 2017.
2. *Additional installations (£8.0 million):* Installation in five further hospitals, one college for nursing and midwifery in Maiduguri, and two pilot village installations is expected in 2018.

DFID investment in solar energy in Borno State is part of the UK Government's *North East Strategy*, which is a UK National Security Council priority, owing to the ongoing Boko Haram insurgency and its links to international extremism. Investment in solar energy is important to begin to support stabilisation and reconstruction of the state, as well as improve health outcomes for the people of Borno.

Description of project and delivery mechanism: The SNP contracted Nigerian firm Em-One Solutions to design and install the solar systems in Borno State, and provide O&M support for a one year defects period following installation. In March 2017, DFID Nigeria signed an agreement with the Governor of Borno State for State Government provision of 'adequate budget and timely funding' for O&M of the pilot installations. Discussions are currently underway to support a similar agreement for the second round of installations. This is the first (difficult) step in the right direction to promote State Government accountability for the infrastructure, and a long term sustainability. However, further work is required to agree second round funding, and to assist the State Government in carrying out its future obligations. The budget approved for the Borno work included only a nominal allocation of £126,000 for technical assistance related to the pilot installations, and no separate allocation for the second round of installations. Insufficient funding for O&M focused technical assistance is a major risk to the project's sustainability. This could put £12.3 million worth of DFID investment at risk.

Key learnings: From the SNP's solar installation work in Borno so far, key learnings include:

- Sufficient technical assistance and consistent on-the-ground support is required to build capacity for and undertake sufficient dialogue with the Borno State Government to establish a successful ongoing O&M regime.
- Sufficient programme budget flexibility is required to address unforeseen risks to sustainability. For example, monitoring and evaluation found that there were challenges to get medical staff to return to health facilities in conflict areas where solar was installed. If relatively minimal budget could be redirected to address issues like this, it could improve prospects for sustainability of DFID's capital investment.
- Challenges in efficiently coordinating investment with other development actors in a constantly changing donor landscape must be overcome. For example, it was identified that Medical Sans Frontier (MSF) was providing free medical care and drugs at a temporary facility less than 100 metres away from one of the hospitals where solar power was installed, reducing the number of patients accessing improved healthcare from solar investment.

Recommendations: In the context of the SNP's, DFID's and other donors' plans for further investment in North and North East Nigeria; including the recent EU commitment of 30 million euros to the SNP to fund additional solar installations, the following recommendations could help to improve sustainable programme outcomes:

1. **Greater programme budget flexibility for the SNP to adapt to unforeseen sustainability challenges.** In a conflict environment like Borno, it is not possible to identify at the design stage, all challenges that will arise during programme implementation. Having the flexibility to manage adaptively would allow the SNP to quickly and easily direct relatively small amounts of budget into activities that safeguard large sums of DFID capital spending, as and when unforeseen challenges arise. This would help to address challenges such as delays in agreeing and establishing government funded recurrent maintenance, and barriers to medical staff returning to work at facilities where solar power is installed.
2. **Increased resource for dialogue with the State Government, and technical assistance to support building capacity and capability for O&M.** Dialogue about O&M needs to be systematic, regular, and begin as early as possible. It must continue until O&M governance arrangements are practically established, and O&M activities are being carried out on a regular basis.
3. **Increased coordination at the strategic level between the SNP, other DFID programmes, and other donor programmes, to support productive use of solar infrastructure in Borno.** This will help to identify the best available opportunities for coordinated, productive, and sustainable solar investment. It could help to increase beneficiary use of solar powered facilities (e.g. by working with MSF to provide free medical care and drugs within solar powered facilities rather than in temporary facilities nearby). A collective approach to negotiating recurrent budget for O&M with the Borno State Government could also help to improve donor bargaining power, and make it easier to incentivise commitment from government officials to long term O&M funding.

²¹ Case study developed from Infrastructure and Cities for Economic Development (ICED) work with SNP to apply sustainability guidance to its social solar investment work in Borno State.

Case Study: Community based ownership and management of rural water resources in Gwanda, Zimbabwe²²

Background: There is evidence that community based water resources management (CBWRM) in Africa as a water provision strategy has gone a long way in promoting access to clean water amongst rural African communities. In Gwanda, Zimbabwe, 72% of water resources are communally owned and provided through a CBWRM strategy. Water resources are mostly in the form of boreholes and protected wells.

Description of project and delivery mechanism: Construction and installation of the water resources was funded by a number of development organisations including CARE International and Dabane Trust. Responsibility for management and maintenance was then handed over to community based Water Point User Committees (WPUCs). The committees are responsible for enforcing the rules and the regulations in the use of boreholes, mobilising financial resources for the payment of pump minders in case of breakdowns, reporting breakdowns, conducting regular meetings so as to identify and solve problems related to the maintenance of the water sources.

The paper this case study is derived from found that 60%-70% of water sources were non-functional at the time of investigation. The feeling of ownership of the water sources was observably low. Communities still expected the providers of water sources for repairs and maintenance, and were approaching the agencies that constructed the water sources to assist with their repairs when they broke down (years later).

Key learnings: Several issues were found to contribute to the community water resources not being operated and maintained. Two key issues were affordability and heterogeneity in assumed homogeneous 'communities' of water users.

- Insufficient consideration was given to long-term costs of operation and maintenance of the water infrastructure by the funding organisations (which are three times higher than the cost of new installation), and who would pay for O&M. The communities that are served by these resources have major financial challenges due to high poverty levels, and are not able to afford the maintenance costs involved. This has led to some community members being excluded from use of the water infrastructure, forcing them to seek alternative unsafe sources and exposing them to water borne diseases.
- The smooth running of CBWRM is based on the assumption that communities are homogeneous groups with the same interests. Findings show that water users differ vastly and this often results in conflicts when it comes to contributions for repairs and maintenance. Findings also showed that WPUCs were becoming increasingly dysfunctional due to lack of training.

Recommendations: The programme could have increased its chances of long term sustainability in a number of possible ways:

1. **The programme design should have included consideration of whole-of-life infrastructure costs and affordability issues; and included an approach to building capacity within the community for financial management.** Establishing long-term, dynamic operation and maintenance practices requires a financial plan and enforceable operation standards. The financial plan should calculate and determine sources of funding for direct operation costs, future repair costs, institutional and training costs, including monitoring, and expansion costs.
2. **Considering an approach that included community contributions for the infrastructure upfront.** This could have increased the feeling of ownership by the community over the infrastructure (although this would not help affordability issues).
3. **Increased upfront consultation and political economy analysis to understand the political differences between community members / groups to understand where conflict was likely to arise from differences between water users.**
4. A hybrid approach that includes both community and government involvement in operation and maintenance funding, governance, planning, and execution could help to bridge affordability issues and community capacity and skills gaps.
5. Future programs embarking on the installation of water infrastructure could include some income generation side-project such as vegetable gardening to raise funds for the maintenance of the water infrastructure.

²² Case study developed from Dube, Thulani (2012). *Emerging issues on the sustainability of the community based rural water resources management approach in Zimbabwe: A case study of Gwanda District*, International Journal of Development and Sustainability 1 (3), December 2012.



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