



Key points

- The state has important choices to make on subsidies between capital grants, shadow tariffs, concessional loans and sovereign risk guarantees
- The 'bundling' of interlocking productive agricultural infrastructure could both improve the commercial attractiveness of PPP projects and help overcome coordination failures
- An alternative to direct subsidies is to grant concession holders rights to develop other income streams on the back of the infrastructure, such as the sale of land

Overseas Development Institute

ODI is the UK's leading independent think tank on international development and humanitarian issues.

ODI Project Briefings provide a focused and specialised summary of a project, a country study or regional analysis.

This and other ODI Project Briefings are available from www.odi.org.uk

Market-oriented agricultural infrastructure: Appraisal of public–private partnerships

Michael Warner and David Kahan

A major source of competitiveness in agricultural value chains is access to affordable physical infrastructure. This includes infrastructure that: supports on-farm production (e.g. irrigation, energy, transportation, pre- and post-harvest storage), ensures efficient trading and exchange (e.g. telecommunications, covered markets), adds value to the domestic economy (e.g. agro-processing and packaging facilities), and enables produce to move rapidly and efficiently from farm-gate to processing facilities and on to wholesalers (e.g. transportation and bulk storage).

Low population densities, remote locations and weather-dependent production systems make participation by the private sector in agricultural infrastructure highly risky. An analysis of the World Bank's comprehensive database on Private Participation in Infrastructure in developing countries attributed just 1% of total infrastructure investment value directly to the development of agriculture between 2003 and 2005. The persistent challenge seems to be to know when and where public–private partnerships are a value-adding proposition for infrastructure in market-orientated agricultural development, and how best to formulate the financial and institutional arrangements for such collaboration.

Clearly, collaborative approaches will not work in all cases, and 'a public-private partnership (PPP) can never turn a poor investment into a good one'.¹ However, with a renewed commitment of governments and donors to investment in rural infrastructure, and an emerging bull market for global trade in cereals, horticulture, meat and milk products, as well as experimentation with new forms of infrastructure-financing and contracting, there are real opportunities to broaden the role of the private sector in infrastructure for agricultural development through PPP models.

The project

In 2007, the UN Food and Agriculture Organization

(FAO) commissioned ODI to assist in analysing a range of PPP models and model-variants that promote market-orientated agricultural development. The models are informed by case studies, commissioned specifically for the report, in the following categories: (i) farm-to-market roads; (ii) water for irrigation; (iii) wholesale markets and trading centres; (iv) agro-processing facilities; and (v) information and communications technology.² Full discussion of these PPP models and illustrations are to be found in the project report.³

What are the building blocks for effective infrastructure PPPs in agriculture?

Efficient strategic planning

Planning the role for public–private collaboration in the construction, operation or maintenance of infrastructure for agricultural production needs to move beyond focusing only on questions of commercial finance and risk transfer. It needs to look also at the likelihood that such arrangements will deliver improved outcomes aligned with both the government's intended growth strategy for the agricultural sector — be that improved productivity, greater crop or livestock diversity, technology transfer or employment generation — and the intended market, be that local, urban or export. To this end, better use could be made of Value Chain Analysis. This method can be applied to prioritise infrastructure for different locations, technologies, scale, sequencing, and co-ordination, and to identify the best fit for the private sector in infrastructure financing, construction, operation and/or maintenance.

Attracting the private sector

Public subsidies are increasingly relevant to achieving commercial viability and attracting the private sector into high-risk infrastructure. Infrastructure in remote rural regions that is

‘Too much risk transfer, and the private sector will not be attracted to the PPP proposition. Too little, and the inefficiencies in public sector provision of agricultural infrastructure services may simply be perpetuated by the private operator’

dependent on agricultural production to recover capital and operational costs (irrigation, wholesale markets) is rarely ‘bankable’ without financial support. When financing is adjusted for risks, projects cannot service the resulting credit terms, and may fail to command a competitive return for investors. It therefore seems likely that in this sector the allocation of subsidies by the state will continue to grow.

Subsidies include: grants, concessional loans (sourced, for example, from the International Development Association) and various forms of risk guarantee. Such subsidies can be supported by public investment budgets, the profits of urban-based concession agreements (e.g. cross-subsidy in the telecommunications sector) or provided by donors (e.g. the multi-donor Global Partnership on Output-Based Aid facility, which provides performance-based grant subsidies).

An advantage of capital grants or shadow tariffs over the provision of large-scale concessional loans or credit/demand risk guarantees is that the private party remains exposed to a higher degree of commercial credit risk. Arguably, capital grants and shadow tariffs incentivise the private party to maintain a strong focus on cost efficiencies and performance. Too much risk transfer, however, such as providing only highly targeted and short-duration partial shadow tariffs, and the private sector will not be attracted to the PPP proposition in the first place. Conversely, too little risk transfer, such as fully guaranteeing demand risk, and the often high costs and inefficiencies in public sector provision of agricultural infrastructure provision may simply be perpetuated by the private operator.

Experience so far suggests that when financing agricultural infrastructure PPPs in cases where full cost-recovery cannot be commanded, it is important to use subsidies to position projects as ‘close to market’ as possible. This improves the project’s attractiveness to investors and strengthens the possibilities for commercially financed expansion. Capital and consumption-based public subsidies, along with credit risk and demand risk guarantees, can be designed to ensure that a project remains financially viable.

Attracting the private sector into a PPP deal requires public authorities to answer three essential questions:

- What the source of revenue will be (user fees, subsidies, purchase agreement etc.) and whether this will be sufficient to cover investment costs and return a profit;
- Whether the commercial scale of the opportunity will warrant the high costs involved in project development including competitive bidding by private parties; and
- Whether the proposed infrastructure offers growth potential for the private party – for example, is located in a rapidly developing agricultural area, or offers potential for design innovations, operational changes or expansion to raise revenues over time.

The right regulatory framework

It is essential for PPPs to operate within a suitable regulatory framework so that the wider public interest is protected. Important regulatory considerations include:

- Whether there is need for an independent regulator, for example, if state-owned companies (such as in telecommunications) are effectively in competition with private operators, as is the case in parts of India;
- Protecting customers against monopolistic abuse, whilst ensuring the commercial viability of investments and profits for the private sector sufficient to support further network expansion; and
- Institutional capability to manage open bidding and evaluation procedures, and to undertake comparisons of private sector performance data over time.

PPP models

Further to the details in the main report, key findings for different infrastructure types are as follows:

Farm-to-market roads

Low income levels and low vehicle volumes mean that in many rural areas neither road construction, rehabilitation, nor routine maintenance can be financed from user fees or tolls alone. Here subsidies are essential. At present, the private sector remains primarily attracted to urban and intercity projects, where traffic volumes are high and reliable.

One exception is where a rural processing facility and its outgrowers are prepared to combine resources to support road development. Such a model is illustrated by the Kakira Outgrowers Rural Development Fund, Uganda. At the centre of this model is a not-for-profit infrastructure financing and maintenance services management company. This company receives capital grants from donors and the processing facility, together with a levy on outgrowers’ sales to the same facility. A success factor is the ability of the company to raise additional funds to meet recurrent asset maintenance costs, for example by offering services such as microcredit.

An alternative approach is to bundle together interlocking productive agricultural infrastructure, with roads as only part of the package. This carries possibilities for improving the commercial attractiveness – the bankability – of the project. The Kalangala Integrated Infrastructure Programme in Uganda is a case in point. This project brings together infrastructure for roads, ferry operations, power and water supply. Infrastructure bundling not only enables a PPP project to reach a size that renders it of interest to both equity investors and commercial lenders, it also offers multiple sources of revenue that help mitigate volatility in demand risk and (in some cases) generate tax revenues that can be recycled to support construction and maintenance – e.g. through shadow tolls. It is serendipitous that the financial advantages of bundling infrastructure aligns with the need to address infra-

structure coordination failure, i.e. to overcome the multiple, interlocking constraints in infrastructure provision along agricultural supply chains.

The task of identifying and developing individual infrastructure projects in low-income areas can be a complicated and protracted process, and represents a high risk for those investing capital. Attempting the same for the type of integrated infrastructure programme noted above is even more risky. The role played by InfraCo (part of the PIDG multi-donor family of infrastructure facilities) as a dedicated project development company has been pivotal to progress with this project.

Water for irrigation

The vicious circle of inadequate irrigation operations and insufficient funds for maintenance can be broken in part by positioning private third parties between farmers and the public entity. The aim here is to professionalise irrigation asset management, operations and maintenance functions. This third party can be a financially autonomous government agency, a professionalised Water User Association (WUA) or a private company (see Box 1).

On a larger scale, the World Bank is funding the West Nile Delta irrigation programme in Egypt. This project highlights the stark choice of public sector concession planners between whether a government should provide grant subsidies or take on the principal credit risk. In this case the project demonstrates the latter — i.e. how irrigation projects might be financed without granting capital or consumption-based subsidies to the private sector. The key is to (i) adopt a demand-driven approach to planning, where the growers' willingness to pay for connection guides the technical design options and commensurate tariffs; and (ii) to maintain the principal credit risk with the public sector, thus facilitating concessional donor finance and avoiding costly and complex third-party credit guarantees for borrowings by the private parties at commercial rates.

Wholesale markets and trading centres

Across the developing world, the development of regulated trading and exchange centres has been unbalanced, with some provinces investing in such facilities whilst in others progress remains inadequate. In India, for example, more progressive states have amended their regulatory framework to enable participation of the private sector and cooperatives in the construction and operation of wholesale markets. The same amendments also allow for financial assistance and subsidies to be made to private companies and corporate bodies involved in these activities.

User demand associated with wholesale markets and other types of trading centres is a heightened risk. This highlights the importance of regulatory authorities retaining the option of allowing concession holders to develop land for lease or sale, for example through appropriate land use re-zoning (as adopted in the World-Bank-supported Gdansk fruit and vegetable

Box 1: The Nakhlet small-scale irrigation scheme in Mauritania

The project pumps water from a tributary of the Senegal River. A farmers cooperative (essentially a WUA) has been given management control over the irrigation assets by the government agency. The project is reported to have achieved an internal rate of return to farmers per season of 103%. Such success depends on farmers contributing both a fixed charge (as an annual subscription) to guarantee the servicing of the WUA's own debts accrued in raising capital to lend on to farmers, and variable user fee payments to cover agricultural inputs, irrigation services, equipment maintenance and the depreciation of irrigation equipment.

wholesale market in Poland). Such alternative income streams reduce the need for state subsidies, improve commercial credit terms and can significantly raise the attraction of the project to private equity investors.

Agro-processing

Agro-processing facilities are often viewed as essentially business-to-business private operations. It is therefore unlikely that the raising of debt for investment in agro-processing PPP projects or the high risks of debt repayment, or both, could be transferred to a public body. The public sector is more likely to contribute in the form of land through concessions, or provide capital grants (perhaps backed by donors). The expectation is that farmers or private interests will assume the main commercial risks.

An example is the heat-treatment facility for fruits in Fiji — a public-private partnership between an owner-operator, Nature's Way Cooperative (Fiji) Limited, and the Fiji Ministry of Agriculture, the Civil Aviation Authority and USAID. Here USAID provided grant funds to purchase the treatment chamber and ancillary equipment, and the ministry a capital grant to fund the physical structures. The Civil Aviation Authority granted land for the facility. This arrangement means that the facility started operations debt-free and thus better able to manage supply risks and raise capital for expansion. The model also involves both growers and exporters as equity partners in the agro-processing facility project, which ensures that the facility is developing in a way that aligns with market needs and supplier capabilities.

Private participation in financing agro-processing facilities is inherently risky, with the risks higher the less diversified the range of processing services on offer and the greater the dependency on single commodities and on rain-fed farming systems. Broadening infrastructure services to include not only specialised agro-processing but also wholesale trading and marketing is likely to reduce the volatility of user fees and make the venture more attractive to potential funders and investors.

Information and communications technology

By 2010, it is estimated that cellular communications networks will cover 80% of the world's population. In 2006, there were already 2.67 billion cellular subscribers, up from 640 million in 2000 (a rise of 417% in six years). In other words, circumstances are changing fast. Mobile coverage is already fairly com-

'It is serendipitous that the financial advantages of bundling infrastructure aligns with the need to address infrastructure coordination failure along agricultural supply chains'

'The opportunities for sourcing public subsidies in order to attract private participation into risky agricultural infrastructure has rarely been greater'

prehensive on a global scale, and the need for state subsidies is declining. Key challenges that remain in which PPPs might play a significant role include: (i) how to finance physical telecoms infrastructure (relay stations, base stations and broadband) in remote rural areas, as opposed to mobile networks, which require little subsidy; and (ii) how to utilise information and communications technology (ICT) infrastructure in value chains to stimulate growth of smallholder agriculture.

The first of these challenges is answered in part through the process of least cost subsidy auctions, which is explained further in our main report.³ The second is illustrated by the Drumnet project in Kenya, which shows how public and private parties can collaborate to use information technology to create the elements of a 'virtual' outgrowers programme. In this programme, farmers have co-ordinated to achieve the volumes necessary for agro-processors, and in return have access to affordable credit, extension services to meet quality standards, specified agricultural inputs and secure purchasing agreements. Central to this PPP model is an ICT-driven Supply Chain Management (SCM) system, which links information about the standards required by major purchasers to producer groups and suppliers of agricultural inputs, as well as data on credit flows, transactions and accounting.

The organisation for this model is complex, but essentially involves concessional public funding to purchase ICT equipment, customise the SCM ICT-platform and cover staff overheads; and a third-party implementing agent (either for-profit or not-for-profit) to manage the operation, drawing on income from farmer membership fees, credit spreads (shared with the bank), credit risk guarantee fees and brokerage fees for securing long-term contracts with purchasers.

The SCM ICT-platform enables transactions in the supply chain to be cash-free, with costs deducted directly from the same bank account into which purchasers make payments and source credit. This brings a number of benefits: farmers are more willing to pay insurance against failing to meet purchase agreement obligations; deductions of interest and principal payments are made directly from product sales, reducing

the risk of farmers defaulting on debt repayments; and payments for inputs to suppliers are immediate.

Conclusions

The opportunities for PPPs to have a role in market-oriented agricultural infrastructure are varied. Some of the models outlined here,³ are essentially donor grant-funded projects. Here, the private sector (either for-profit or not-for-profit) carries little commercial risk beyond working capital. Other models are almost entirely privately financed projects — such as the Kakira Outgrowers Rural Development Fund for road maintenance in Uganda — with virtually all commercial and political risks transferred to the private entity via a complex arrangement of equity, debt and guarantee instruments.

Knowing which financing or subsidy model will work best is in part about applying the three tests on source of revenues, commercial scale and growth potential. It is also about selecting the right contractual arrangement to execute the project. Concession arrangements offer incentives to the private sector to invest in agricultural infrastructure in the long-term. However, the nature of agricultural production, with its inherent physical risks, need for downstream infrastructure coordination and volatile commodity markets, suggests that concession agreements are only part of the answer.

Other ways need be found to enable private parties to manage the main commercial risks, in particular demand risk. The strategy of 'bundling' infrastructure adopted in the Kalangala integrated infrastructure programme in Uganda is one option. Another, as illustrated by the Gdansk wholesale market project, is to broaden the terms of concession agreements to allow the raising of indirect revenues from land development and on-leasing.

Finally, there is the question of public subsidies. Donors are pledging aid for infrastructure, and fiscal surpluses are accruing in sovereign funds and may act as a new source of aid. Through these trends, and recognising the emerging bull market for certain agricultural commodities, the opportunities for sourcing public subsidies in order to attract private participation into risky agricultural infrastructure has rarely been greater.



**Overseas Development
Institute**

**111 Westminster Bridge
Road, London SE1 7JD**

Tel +44 (0)20 7922 0300

Fax +44 (0)20 7922 0399

**Email
publications@odi.org.uk**

Readers are encouraged to quote or reproduce material from ODI Project Briefings for their own publications, but as copyright holder, ODI requests due acknowledgement and a copy of the publication.

© Food and Agriculture Organization of the United Nations 2008 and Overseas Development Institute 2008
ISSN 1756-7602

Endnotes and project information

- 1 Amos, P. (2004) 'Public and Private Sector Roles in the Supply of Transport Infrastructure and Services: Operational Guidance for World Bank Staff', Transport Paper 1. Washington, DC: World Bank: www.worldbank.org/html/fpd/transport/publicat/Transport%20Papers/tp-1_pp-roles.pdf
- 2 A decision was taken by AGS during the study not to formally investigate rural energy, although clear linkages are acknowledged between energy and other infrastructure sectors, e.g. irrigation and agro-processing.
- 3 Full discussion of these PPP models and other models and illustrations are to be found in the project report: www.odi.org.uk/iedg/Business_Development_Performance/Papers/ODI-FAO_PPPsRuralInfrastructure.pdf

This briefing is based on a study funded predominantly by the FAO under its Rural Infrastructure and Agro-industries programme. David Kahan, Senior Officer in FAO's Agricultural Management, Marketing and Rural Finance Service, provided the technical direction of the project. ODI Research Fellow Michael Warner (m.warner@odi.org.uk) managed the project and drafted the report. The authors would like to acknowledge the following FAO staff and associates for their inputs to the project: Szilvia Lehel, John Douglas Tracey-White, Susanna Chiabolotti and Gavin Wall, as well as the individuals commissioned to prepare case studies upon which many of the findings are based. Views expressed in this briefing are those of the authors alone and do not necessarily reflect the views of FAO, ODI or any other authors or organisations associated with this report.