

Discussion paper
No. 2009–4

Institutions and Sustainable Development: The case of Water,
Waste and Food

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This version: December 2009
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Preface

This paper was prepared for the Seminar “Food and Water – resources in crises!” at Norwegian Agricultural Economics Research Institute 28. November 2008. See <http://www.nilf.no/Seminarer/Bm/2008/sn20081128En.shtml>. The paper puts emphasis on the fact that institutional structures and path dependency can be and are major constraints for development and dissemination of many innovations that have obvious environmental benefits in the long run. Facilitation and arrangement of appropriate institutional regimes are therefore of great importance for “big ideas” to come through. Ecological sanitation is an example.

A shorter Norwegian version of this paper was published as a chronicle in the newspaper Nationen, 2. March 2009. See <http://www.nilf.no/Forsiden/Bm/2009/S20090302-Nationen.shtml>.

Oslo, December 2009

John Bryden and Karen Refsgaard

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Copies of this discussion paper are available at <http://www.nilf.no/Publikasjoner/DP/Bm/2009/DP-2009-04.pdf>

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1 Introduction

There are strong ethical and distributional arguments on a global scale for focusing on food for the rural poor, as there are 920 million people going hungry today. Of these 80% are rural people divided between 50% being smallholder farmers, 20% being landless and 10% being pastoralists, fishers, or forest dependent. The undernourished are mainly in India with 212 m., Sub-Saharan Africa with 206 m., and China with 150 m.

Food production per capita is at its highest historically but highly uneven distribution of both income and population means that the undernourished population cannot access food or produce enough themselves. Moreover, the high food production we have today is the consequence of environmentally damaging agricultural practices as well as the subsidies given to encourage food production in the richer countries since World War II, and which are being progressively dismantled. Finally, population growth is expected to continue for the foreseeable future, leading some to predict future food scarcity and higher real cost.

There is a need to ensure that the small farmers in Africa, India and elsewhere who form the bulk of the poor and undernourished are provided with ways of improving their agricultural production and productivity, accessing better off-farm work close to the farms, and tending to their other needs. There is a parallel need to ensure that the rich countries do not bid up the price of luxury land and water-based products demanded by their own populations (for example, meat, cut flowers, ‘nutraceuticals’, bio-diesel etc) in ways that diverts efforts from basic food production for personal and domestic consumption.

The history shows that decline in poverty comes mainly from improved rural conditions, not from migration to cities. Among others, there has been a big decline in poverty in China and Vietnam due to agricultural and other rural resource-based production (e.g. fish, hydro-power). And agriculture offers pathways out of poverty through productivity increases in the staple foods sector and through generation of income and employment in rural areas. The role of rural industrialisation must not be ignored in this respect.

In Africa and probably elsewhere, the situation can be improved through a focus on rural women. Rural women produce up to 80% of basic food both for consumption and sale in Africa. Furthermore income controlled by women is more likely to be used for food expenditure, caloric intake, and expenditure on health and education than income controlled by men.

However, in this paper we argue that Institutional Arrangements are crucial for sustainable development, rural or otherwise, and that our economic social and political institutions create a kind of ‘path dependence’ in many domains of ‘unsustainability’. We will illustrate this general argument with a ‘case study’ of the institutional issues surrounding systems for the

disposal of 'human waste', which is also linked to water and food issues, but we could equally have referred to systems for the production and transmission of renewable energy, or a large range of other issues where the sustainability of inherited systems and structures is increasingly questioned.

2 The need for institutional arrangements for big ideas

One of the "big ideas" behind a recent NILF seminar¹ in Oslo was that there are ways of recycling human waste (faeces and urine plus grey water from domestic use) which can produce clean water and fertilisers, and possibly energy as well. Petter Jenssen² has written and taught extensively on this topic as an engineer specialising in this field, and, while capable of improvement, the technology to do this already exists. One can certainly observe some of this technology working in houses and communities in Ås and Oslo, as well as in many other districts and countries. However, it is an idea that seems very slow to catch on with the public authorities and indeed the general public. As Ottar Brox (2006) would say, there seems to be a significant amount of popular resistance out there.! And again as Brox would argue, we should try to understand the nature and causes of this resistance rather than treating it as a kind of "Luddism"³.

To the rural development economist and social scientist, as well as the ecological economist, the big idea itself is a very attractive one. First of all, it is or can be a 'decentralised' solution, which can be constructed and managed by small local communities, and provide direct benefits to them as well as to society at large. Secondly, it is a 'sustainable' solution in the sense that it can bring local income and employment benefits (improving livelihoods) while at the same time saving energy and reducing pollution (reducing carbon footprint and improving quality of life), as well as leaving the environment in a better state for future generations. Thirdly, by creating a new and sustainable local activity bringing material and environmental benefits, and being potentially self-managed by a community or municipality, it has the capacity to improve what many summarise as 'social capital'. Finally, the materials required for capital investment in infrastructure are nearly always locally or at least nationally available, and do not require large imports using scarce foreign exchange (of particular interest to developing countries and countries involved in the 'credit crunch'!). These are very significant potential benefits in a world where sustainable development solutions in the remoter rural areas seem few and far between. It is therefore worth devoting some thought and energy to the issue of 'why not'?

¹ "Food and Water – resources in crisis!" 28 November 2008.
<http://www.nilf.no/Seminaren/Bm/2008/sn20081128En.shtml>

² Petter Jenssen is a Professor at the Norwegian University of Life Sciences, UMB, and an ecological engineer.

³ Brox (2006) Political Economy of Rural Development. Eburon..

There may or may not be more or less straightforward economic reasons, at least in terms of private economic calculus. That is to say, that the private profitability of the conventional system (System A) may be greater (taking into account the amortisation of capital) than that of the new system (System B). Before going further, let us first summarise what our understanding of System A and System B is.

In System A, typically all communities (even farms and remote housing in some countries) are connected to mains sewage and water pipes. Sewage is piped to large centralised purification stations, often a long distance from the community, and typically on the edge of cities or larger towns close to the sea. These stations use high energy treatment to create water of acceptable standard for discharge into the sea. In Europe, this standard is laid down by EU and comparable national legislation. In many countries, however, the sewage may be directly piped into the sea, with serious environmental, ecological, food quality and health impacts. Indeed this was the case in much if not most of Europe until very recently. Water on the other hand is taken from reservoirs, purified, and piped to communities and households. This water must also meet minimum standards, even it is used for bathing or flushing toilets, or, in practice, washing the car or watering the garden plants. Typically this is also a relatively centralised operation, although less so than sewage treatment. Both water and sewage use large pipes, originally made from wood, then steel, now concrete or plastic. There is therefore a large 'sunk cost' in the System A infrastructure.

In System B, household and community 'waste' can be separated at source into black water, grey water and semi-solids either at the household level or the community level or the municipality level, with different treatments applied to the three categories. Black water (urine) is a high nitrogen and relatively sterile component which can be utilised more or less directly for fertiliser. Grey water can be purified using ecological systems of soil or clay filtration, and returned to the water table or storage. Solids can be composted to provide both balanced fertiliser (high in phosphates), and, potentially, energy. The energy and water balance of this system is positive. It requires a very different kind of infrastructure, and also sound local management which is relatively labour intensive (but can in appropriate conditions become less so using microprocessor and other new technology?). The infrastructure costs are relatively low, but the running costs (other than for the energy needed) are potentially higher than System A.

Even such a simple and no doubt totally inadequate description of the two systems reveals some important comparative features. First, it seems that System B has relatively large non-market benefits, both social and environmental, while System A has relatively large non-market costs. This tells us immediately that we need something approaching a full social cost-benefit analysis to compare the two systems if public policy decisions are involved. Second, because System A has large sunk costs (pipes and pumping and treatment plants), and along with those considerable intellectual investment and materially interested parties (producers of

pipes, contracting firms, engineers, and others) – vested interests! This is at least part of the potential explanation of ‘resistance’.

However, there is more, which we can sum up as attitudes, not just among the public, but also embedded in our systems of public health, religion and education. Basically, human waste is viewed as ‘dirty’, or ‘unclean’. When the Victorians popularised the flushing water closet (not to mention elaborated baths and showers for domestic dwellings in richer countries), the public benefits were immediately evident to those in towns and cities – particularly in terms of health and odours. The WC was and is seen as ‘modern’, ‘healthy’, ‘clean’ etc. WC’s are the stuff of dreams, it seems (see inset below). And along with the flushing WC came the pipes. This is still true today. In India and China, to name but two large developing countries, it is largely the WC technology which is rapidly advancing. There are WCs stacked up everywhere! And pipes! No doubt there are also Aid schemes promoting this technology, even today. One New York Times article reproduced below in summary, is introduced in Google as ‘Halliburton strikes again’, and deals with huge investment by the US in sewage systems in Iraq. However, people’s experience of pit latrines and the like has not often been a positive one! Elaborate social systems have also evolved around the separation of those who deal with human waste and those who prepare and eat food, with those dealing with human waste being at the bottom of the social order. A good example is provided by the caste system in India.

WC's

More commonly known as toilets, WC's form the backbone of every bathroom whether it be traditional, contemporary or designer in style! On this page you'll find all of our WC's helpfully separated into three main categories: Close Coupled WC's, Back to Wall WC's and Wall Hung WC's. We hope that this will make it easier for you to choose the WC's of your dreams.

www.bathroomheaven.com

[Iraq Sewage System A \\$100 Million Failure, US Inspectors Say](#)

NY Times | JAMES GLANZ | October 27, 2008 09:52 AM



A huge American-financed wastewater treatment plant in the desert city of Falluja, which United States troops assaulted twice to root out insurgents in 2004, was supposed to be the centerpiece of an effort to rebuild Iraq, a country smashed by war and neglect, and bring Western standards of sanitation.

Instead, the project, which has tripled in cost from original plans to \$100 million and has fallen about three years behind schedule, has become an example of the failed and often oversold program to rebuild Iraq's infrastructure with American dollars and skill.

The project was so poorly conceived that there is no reliable electricity to run pumps and purification tanks, and no money left to connect homes to the main sewer lines, which now run uselessly beneath Falluja's streets, according to a report by federal investigators to be released Monday.

“ Given the extremely volatile security situation previously encountered in Falluja, we are very encouraged to see that this project is nearing completion,” Ms. Cordell said. “ This has been unbelievably challenging and indescribably dangerous, both from a security and a construction safety standpoint. People have died in an effort to bring the city its first wastewater treatment system, a fundamental service, with health and environmental benefits most Americans take for granted.”

http://www.huffingtonpost.com/2008/10/27/iraq-sewage-system-a-100-_n_138104.html

This brings us to our main point, which is that **Institutions matter** in this, as in most other, behavioural issue. First, a short discourse on ‘Institutions’.

In the social sciences we can find a wide range of interpretation of the concept of institutions. In sociology, the traditional use of the term ‘institutions’ covered the dominant social structures that regulate social (economic and political) life, notably: the family, church, school, law, property, political institutions, voluntary associations etc. This regulation may be formal or informal⁴. Some writers stress the regulatory role of institutions in organizing most activities of individuals in society⁵. Yet others consider the mutability of institutions over time - thus legal conceptions of institutions as ‘fossilised conventions’ were challenged by Marcel Mauss and others who claimed that they were rather living social facts which ‘form, function and change at different moments’ of their history⁶. We can think of the formal and informal structures of rules and practices which are present in any society as being a critical element of the concept of institutions. In economics, the social institutions which were usually considered important for economic performance were governments, banks, land tenure, inheritance law, and contracts. For the most part institutions were largely taken for granted by modern economists - they were simply assumed to facilitate rather than block economic progress⁷. The main exception concerns so-called ‘institutional economics’, mainly associated with Commons, Mitchell and Veblen. Veblen in particular was concerned with the origin and development of economic institutions which he roughly viewed as habits of thought and conventional behaviour, and hence closely linked with notions of culture.

A moment’s reflection will tell us that almost all of these various interpretations of ‘Institutions’ matter in the case of individual and public choices between System A and System B. The church and school help to form attitudes, even tacitly through their own choices of technology, or discussion of the relevant issues or its absence. These are linked also with Veblen’s ‘habits of thought and conventional behaviour’ so important in the sphere

⁴ For example, disciples of Durkheim, Fauconnet and Mauss, defining ‘Institution’ in the Grande Encyclopedie consider it as a set of ways of acting and thinking which an individual finds pre-established, and normally transmitted by education

⁵ Eisenstaft, S. Social institutions. International Encyclopaedia of Social Sciences.

⁶ Bourricaud, F. (1988) Institutions. Encyclopaedia Universalis, Paris.

⁷ Not so in Adam Smith, however: Smith recognised the incentive effects of different kinds of organisational and institutional arrangement, and regarded an appropriate and effective institutional framework as essential to the functioning of the market. Wealth of Nations, 1776.

of human waste. The law defines what we may or may not do to deal with our own 'waste' or provide our own water, both individually and as a geographical or interest-based 'community'. Political institutions affect our ability to organise and finance public investments and services, including water and sewage, at local levels, as well as the treatment of social and environmental costs and benefits in public decision-making processes. Clearly too the economic institutions of government, the banks, land tenure and contracts will also matter for the decisions we are debating.

The main point for present purposes is that if we are seeking to analyse the reasons for a preference for System A over System B, and so move to change the balance of preferences, then we cannot do so without paying considerable attention of the role of a range of human institutions. These institutions create a form of 'path dependence' which prevents or at least retards the adaptation of systems (such as those connected to human waste and water, or to land ownership, or renewable energy) to new conditions and circumstances. In this was they can hold up responses to 'unsustainable practices', and so the quest for a more 'sustainable' form of development.

To conclude this case study, in seeking to assess whether or not a shift from System A to System B is a 'good idea' (or to move directly to the promotion of System B over System A) in whatever context we must pay close attention both to the valuation of social and economic costs and benefits and to the role and performance of human institutions. It is of course necessary, but not sufficient, to develop new technologies and engineering solutions.

3 Conclusions

We cannot solve the problems of unsustainable practices without paying close attention to the attendant institutional issues. We are inventing new systems all the time in an effort to deal with such practices, and frequently these fail to produce the desired results because they do not recognise or comprehend the significant of institutions when dealing with the particular issue. Examples are legion. They include the failure of fishery quotas to solve the problem of unsustainable fisheries, the anticipated or real problems surrounding carbon credits, the 'unconnected' windmills of Sicily, the unused ecological toilets in India, the banking crisis, and the global climate changes, and the prospect of food shortages, to name but a few. We cannot address the problems of human and environmental sustainability without changing the institutions that have brought us to this precarious point.

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