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Caleb Wall

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Local and External Knowledge in Development Research

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Department of Political and Cultural Change
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Authors' address

Dr. Caleb Wall
Center for Development Research (ZEF), University of Bonn
Walter-Flex-Str. 3, 53113 Bonn, Germany
Tel. 0228-734912; Fax 0228-731972
e-mail: Caleb.Wall@uni-bonn.de

www.zef.de

Knowledge for Development: Local and External Knowledge in Development Research

Caleb Wall
Center for Development Research (ZEF) University of Bonn

Abstract

The contribution that science and technology can make to development is well understood – but for new 'knowledge' to have an impact it must connect with existing local knowledge. Presented in this essay is a discussion of how development research projects can make a positive contribution to development, through the use of new science and technology – coupled with local knowledge. Drawing on field research conducted in rural Uzbekistan, under the aegis of a natural science driven project, I reflect here on the meaning of 'development research' and make a case for combining external scientific research with practical development interventions. Specifically, through the use of participatory methods, accepting that development research is a process. This is argued both as academically challenging and interesting as well as ethically necessary for projects choosing to work in the developing world. I discuss my experiences in learning from local knowledge, outlining the principals of affording dignity to local partners, respecting local knowledge and experts, understanding the cultural context of knowledge and maintaining a constant willingness to learn. With these principals I present how it is possible to work in a collaborative manner towards developing locally appropriate and accessible technologies, and the importance of doing so in a sustainable manner.

1. Introduction

I explore in this essay the contribution that local and external knowledge can make to development – and how development research can contribute to this. For whilst the idea that knowledge contributes to development is well established, having been 'authorised' (cf. Evers, 2005) as knowledge by the World Bank and others[1], exactly how this works and the role that development research can play in contributing to this, is less well understood. To attempt to understand this I draw upon field research conducted in 2003-2005 in the Khorezm region of Uzbekistan, a region acutely affected by environmental and economic problems, to which a technical solution (external knowledge) is often proposed. To this end, I worked under the aegis of a specific development research project, managed by the Centre for Development Research (ZEF) and conducted under the auspices of the United Nations Educational, Scientific and Cultural Organisation (UNESCO)[2]. The aim of the project being; to conduct research on the economic and ecological problems in Khorezm, and to develop potential technologies to meet these problems. At a conceptual level, the introduction of external technologies and the use of science and technology for development is a well established method in international development. Provided in this essay is an attempt to unravel this concept and to position it within development research projects such as the ZEF/UNESCO project. Likewise, local knowledge and the contribution of indigenous 'know-how' and technology to development is accepted, although less prominent, in development interventions (Richards, 1985). I draw upon examples from the literature and from my field research in Uzbekistan to illuminate the contribution that local knowledge can make to development and ultimately how development research projects can assist in this.

2. Conceptual Framework

Whilst the role of science, technology and local knowledge are well discussed in the literature (Gerke & Evers, 2005), the role of 'development research' organisations is poorly defined. Development studies and development research projects, such as the ZEF/UNESCO project, often suffer from a lack of clarity in how to use science, technology and knowledge for development. Moreover the extant literature on participatory development is not well applied to development research. Thus I attempt here to clarify how participation can be utilised, with a focus on rural development and the role that a development research projects such as the ZEF/UNESCO project, can play in promoting development. This is not so say that doing this is easy, it is not easy; rather it is a considerable challenge. I believe it a worthy challenge, and thus I provide some of the compelling ethical and academic justifications for addressing this challenge.

1. Defining 'Development Research'

Conceptually, 'development research' is a difficult notion. It requires us to bring together two divergent schools of thought, paradigms, which are not immediately reconcilable. I provide here

[1] For instance, with the 1998 World Development Report subtitled 'Knowledge and Information for Development' as well as the technology led development approach of many donors, such as Germany

[2] "Economic and Ecological restructuring of land and water use in Khorezm", funded by the German Federal Ministry of Education and Research. www.khorezm.uni-bonn.de

a working definition of each concept in order to provide an insight into what 'development research' can mean.

i. The Hydra of Development

By 'development' we are talking specifically about third world development and the discourses that come with this, not the other uses of development as in 'research & development' or 'human resource development'. Rather a specific understanding of 'development' in the poor (or developing) world. These discourses are recent academic constructs, as prior to the Second World War there existed "an almost absolute absence of systemic theories which attempted to understand and explain the process and trajectory of change from 'underdeveloped' to 'developed' societies" (Baber, 2001: 73). What did exist prior to WWII, was interest in the social and economic structure of colonies, and it is this discipline which became the hydra of 'development'. Yet 'development' has always been an inherently politicised discipline, with contests between modernisation and dependency theories, and others, largely informed by the political persuasion of the theorist, all set against a cold war backdrop. In the post-1989 period of the 'Impasse in Development Studies' these debates only grew, between those who promoted a 'teleological' view of development as a movement towards greater similarity with the Western 'developed' countries and those who promoted working towards locally identified priorities (Arn, 2002: 171). Academically, the discipline of 'development studies' vacillates between studying development and the application of these findings, usually through normative publications or more latterly through 'action research'. Useful for understanding this, Thomas (2000) usefully defines three main senses or contemporary meanings of the term 'development':

> (i) "as a vision, description or measure of the state of being of a desirable society;
> (ii) as an historical process of social change in which societies are transformed over long periods;
> (iii) as consisting of deliberate efforts aimed at improvement on the part of various agencies, including governments, all kinds of organizations and social movements". (Thomas, 2000: 777, emphases in original)

The first meaning fits in well with the modernisation concept, which defined a certain end goal or objective, of what it was to be developed. In a sense this is the mistake that the 'technological fix' approach to development makes, in that it defines under-development purely in terms of technical advancement, and thus sees the introduction of 'modern' technologies as the solution to this state of underdevelopment. Whereas the second conception of development, is a detached study of the processes of development and underdevelopment, situated within an historical perspective. This detached study is certainly adopted by different academic disciplines, yet it has typically seen as insufficient within the development studies and development research paradigm. Whereas the third conception of development is a practical, applied, understanding of development – and development studies is thus an analysis of how these efforts fail and succeed. This helps us to understand why the development studies discipline is by its nature on the constant cusp between conducting research on development and utilising research for development. These different senses of development are important in understanding the divergences in view over development research, discussed below.

ii. Researching Development

Development studies and its contributory disciplines (geography, political science, economics etc.) all conduct research on the process of development in poor countries and communities. Thus critical studies of how different countries have and have not developed have lead to the emergence of theories to explain the phenomena of development and under-development. From this theory, development studies and development economists have set out normative frameworks on how to develop poor regions. The successes (and more often) failures of these frameworks are in turn studied, reflected upon, and improved. This could be said to constitute 'normal' science (cf. Kuhn, 1996). The development studies discipline has largely, though not entirely, concerned with this type of study. This is the application of various social science research tools to both understanding the historical (and current cultural) causes of underdevelopment and of studying the interventions to promote development. What is somewhat more difficult to conceptualise is the conduct of natural science research in developing countries. In projects such as the ZEF project, whereby natural scientists play the major role as researchers and managers, there is some question as to what research is being conducted and for what purpose. Generally speaking research on specific topics is conducted by scientists working within their discipline. The choice of these topics is partially on the basis of scientific interest and to varying degrees on the perceived importance of this problem to the poor country. Despite this there is sometimes a disconnect between the ecological problems identified by scientists and those identified by the local community. Moreover there is very often a lack of clarity about how the research findings will assist in promoting development. Instead what occurred in my field setting of the ZEF/UNESCO project was a wide range of (agreeably high quality) research being conducted, with little explicit explanation of how this research either related to development problems in Uzbekistan or how this could assist in the development process. Thus one is prompted to question whether such research actually constitutes 'development research' (i.e. research on or for development) or whether it is scientific research which just so happens to be conducted in a developing country. The justification given for such an approach is that this research could be utilised later on for the purpose of 'development'. The argument being that first an understanding of the technical problems is required before proposing solutions, which is certainly reasonable. This 'research for development' concept is addressed below.

iii. Using Research for Development

I do not dispute the importance of high quality scientific research in promoting development, especially in rural development where improved technical solutions necessarily constitute part of the solution to underdevelopment. Nor do I have a problem with research that just so happens to be conducted in developing countries so long as it is labelled honestly, does no harm and does not use extant poverty as a justification for funding. Rather I suggest that if research is to be utilised for development, and is thus to be labelled 'development research' it must learn from the lessons of development studies. One of the key concepts to emerge from development research, in all its guises, has been the importance of process in development. That is to say, how research is conducted is as important as what research is conducted. Thus if research is to be used for development, this research must be carried out in a way which itself promotes development. The consensus on this issue within the literature is that development interventions must promote participation and empowerment. This requires that the central actors in development research are the intended 'end-users' of the research, and that these "agents of change" act with ownership and control of their own development "rather than as passive

recipients of development assistance" (Rathgeber, 1990: 494). Central to understanding this conception of development research is that the two factors are in fact linked. The research is not only on development (as a phenomenon) but also for development (as a process). Doing this requires the participation of the developing community in partnership with researchers, certainly no easy task. Exactly how this participatory approach can be applied to development research is discussed here in light of the constructive role that local and external knowledge can play in development.

2. Applying Participatory Development to Development Research

The literature on participatory development and the need for agricultural research in the developing world to implement participatory practices is considerable (Swanson, 1997; Richards, 1985). Of interest in this thesis are the theoretical implications of this for knowledge management practices within a development research project setting. The immediate application of this is a need to recognise indigenous and local knowledge, and its holders, as key partners in the research process. As Richards (1985) points out, it is no longer sufficient to identify farmers as 'end users' of technology, but rather they must be recognised as partners. This means that their knowledge must be integrated into the knowledge system of the project and that research findings are developed in co-operation with them, not simply 'transferred' to them from the top down. Doing this requires an alteration of the epistemic culture of development research projects, towards one which is more accepting of different types of knowledge, as well as creating a greater openness to sharing this knowledge. Such an epistemic culture is not easily created nor changed, yet the management of development research projects should employ existing tools (such as policies, formal processes and through showing leadership) to affect incremental change. Similarly, knowledge sharing between different project partners (in-country partners such as Universities and NGOs) needs to take account of the different 'cultures of science' that exist. This is more than a practical step towards greater interaction with farmers, although this is also necessary. Rather a paradigm shift away from 'top-down' research towards participatory research is required. To affect this, the design of a project must be re-engineered away from seeing 'research' as discrete activity, instead viewing it as a process which is grounded in a certain environment and cultural situation. There is an inherent tension here between universalistic scientific knowledge and localised knowledge, a challenge discussed in the following section. But the two are not irreconcilable. Instead I would suggest that integrating local priorities and knowledge can also serve to improve the efficacy and accuracy of research. It is too easy to discount local knowledge as 'un-scientific' and local perceptions on development as 'un-informed'. It is immensely more difficult, yet immensely more rewarding, to utilise these different forms of knowledge and to integrate these into the research process. I see this challenge as being very similar to the debate on 'interdisciplinary' research, whereby the different scientific cultures of very different disciplines need to be integrated into one co-operative effort. All too often interdisciplinary research projects fail to adequately account for the real differences in 'science' between the disciplines. Thus, in conducting development research, across borders and epistemic cultures, and incorporating different disciplines and local knowledge, development research seeks to bridge between science & technology (external knowledge) and local knowledge.

3. The Challenge of Development Research

Conducting genuine 'development research' which utilises external science and technology is an immense challenge. It requires researchers from a variety of academic fields to work in an interdisciplinary manner towards a collective research effort. Moreover this research is conducted in a developing region which, aside from the practical challenges involved, requires the project team to take responsibility for the process by which they operate. This process must be one which works directly with local partners, not as end-users or recipients of the research, but as active partners in the research project. For researchers accustomed to laboratory conditions this can be a considerable problem. Indeed, for all those involved it requires dexterity in the methods of research of adopted, as it is not acceptable to simply supplant Western methods of research into developing countries. Doing so wilfully excludes the local community from the development process. Such an approach is often justified as it is important that 'world class' research is carried out which 'should not be undermined' by adapting to local methods. There is a certain legerdemain to this argument as what it ensures is that the findings of this research will often be inappropriate to the conditions in the developing country. If not necessarily technically inappropriate, then socially inappropriate by failing to understand the cultural context in which these technologies must operate (e.g. labour organisation, farmer educational levels etc.) Yet sacrificing the research goal and adapting a purely practical approach is also unacceptable, as it discounts the benefits of critical reflection and scientific analysis of the developmental problems. I present here some detail on the academic pressures involved, followed by an ethical case in favour of 'development research'.

i. Academic Pressures

There are pressures on every academic researcher, regardless of their discipline, to produce work which is novel and unique. Their work must provide new insight or research a previously unexplored area or phenomenon in order to be classified as 'new' knowledge. Likewise, whilst they may work in collaboration with others, there must be evidence of individual effort and achievement. In producing this work, researchers are aware that their work will be judged against established standards for their discipline. Thus in conducting any form of interdisciplinary research, academics must confront several barriers. In stating this we should be aware that such a situation is not abnormal or even unexpected. It is a challenging ambition to conduct interdisciplinary development research in a country as problematic as Uzbekistan. For example Sillitoe (2004), notes that:

> "The problems of poverty are complex, and tackling them demands cooperation between specialists with diverse backgrounds in both the natural and social sciences … Yet facilitating such interdisciplinary work … has proved difficult." (pp. 6).

The difficulties come from a lack of shared understandings of what the problem is and how best to address these problems. To confront this collaborative research projects need to allow sufficient scope for individual research to express 'the state of the art' and to research something new. The nature of interdisciplinary research often has a senior and junior partner, whereby the senior partner establishes the research agenda and the junior partner contributes to this aim, which does not allow much scope for advancing their discipline. Similar pressures exist within disciplines, as different approaches are favoured and senior partners pursue their research interests through junior partners (cf. Knorr-Cetina, 1999). In development research this pressure is exacerbated, as the junior partner often has to 'bridge' between the local community and foreign science, leaving them in a situation whereby they are looked down upon as 'less

scientific' because they are conducting 'low' science[3]. Equally the requirement for evidence of individual contribution to science makes it difficult for researchers to operate in a development context, as traditional rules on collaboration become blurred. When working between disciplines, indeed between entire cultures, divergent expectations and differing norms on academic collaboration strain the research process. Internal pressures within disciplines remain and indeed can be exacerbated by the need to collaborate with other disciplines. This places pressure on individual researchers, aware that they will be judged according to the standards of their own discipline, with many retreating into their own 'disciplinary seclusion'. That is continuing to conduct research as they would were they in the home country, treating the developing country more as an applied laboratory than as a practical challenge. From this disciplinary seclusion the researcher can more safely conduct their own research, knowing that their discipline will accept their work as conforming to the shared rules and norms of understanding which are established. In cases where there are junior and senior (dominant) disciplines, it is the dominant discipline which defines the research agenda and establishes what is scientific. Thus the challenge in conducting development research is firstly an interdisciplinary challenge, of managing the knowledge resources of a project in such a way as to harness the potential of each discipline. These pressures overcome, it is then necessary to balance between the requirements of each discipline and the developmental obligation to affect positive outcomes through local collaboration. This requires flexibility and openness to learning by both sides and in this regard there are perhaps benefits that come from working in an interdisciplinary centre over traditional University departments. As development research requires equilibrium between academic pressures and developmental need, yet it is a crucial balance to strike.

ii. Ethical Case

Conducting research in developing countries raises a number of ethical questions, especially the need to promote justice and beneficence and to prevent harm. The issue of not doing harm to other cultures or peoples is well established, for instance Bourdieu argues convincingly that the concept of 'habitus' when working in the field places a large ethical obligation on the researcher not to do harm (Robbins, 2003: 12). This fiduciary 'duty of care' of the field researcher is moral in nature, the responsibility for which rests primarily with the researcher themselves. The principle of justice in this research implies that the benefits and burdens of the research should distributed evenly, ensuring that disadvantaged groups gain from the research and are not exploited by it (Antle and Regehr, 2003: 138). The concept of justice is inseparable from the principle of beneficence, the injunction that research must be of potential benefit to the participants. It is this beneficence that must be weighed against the potential for malfeasance and harm, to determine whether research should be conducted (Orentlicher, 2002: 407). This judgement cannot be made in aggregate, but must also consider the just distribution of the costs and benefits, amongst at-risk groups and minorities. It must also recognise that different people and cultures attribute different value to certain costs and benefits, and that it is wrong to impose Western value systems in this regard (Wall & Overton, 2006). Aware of the challenges of conducting development research, it is often easier to simply conduct research in a developing country, leaving the 'development' aspect for 'experts' to implement at a later stage yet justifying the research on the potential benefits if the findings are applied. I believe that such an approach is ethically unjustifiable. If we accept the ethical principals of Justice and

[3] The exception is anthropology, which values this bridging skill, yet this discipline has traditionally frowned upon 'impure' anthropology which seeks to change (develop) the community which is studied. Here there is another, although very different, challenge to interdisciplinary collaboration.

Beneficence and the principal that academics need to ensure that the beneficiaries of their research are, by and large, the subjects of their research – then simply leaving development for the 'experts' at some indeterminable future date, is unacceptable. Of course this need for a connection between the subjects and beneficiaries of research is somewhat more complex, as often elites in developing countries play a role in arresting development. It would be wrong to not study this group out of a fear of reinforcing their position, yet in practice this problem can be surmounted by recognising that elites are not a vulnerable group as such and thus do not necessarily need to benefit from research. This issue can also be resolved by funding decisions by donors. Development research projects are funded both of the rationale of good science, because of the perceived developmental needs in the field site, as well as pragmatic political decisions and real politik. Were it not for these needs, be they poverty or ecological degradation, then a 'development research' project could reasonably be placed in any country or region, regardless of developmental need. In fact in the project proposals for the ZEF/UNESCO project (Vlek et al., 2001, 2003) considerable discussion of the poverty levels and that these are used as a justification for the project. Yet the main beneficiaries of development projects tend to be the scientists, PhD students and 'development research' organisations that advance their own careers and academic standing on the basis of the project. To a lesser extent local institutes have their research capacity improved, yet this is no guarantee of development outcomes in Uzbekistan where state sponsored research is largely detached from the problems of poverty. If the research findings from the project do not lead to an appreciable improvement in the livelihoods of vulnerable groups, whose very vulnerability was used as justification for the research, then the 'development research' project could be accused of a cynical manipulation of this vulnerability to gain donor funding. This is not to say that development researchers need to take responsibility for all poor regions, rather, that when they use this poverty as a justification for funding – then they must reasonably contribute to the alleviation of this poverty. Development research projects take on a mantle of responsibility to the regions in which they conduct research, especially if they use the extant poverty to gain funding. To not contribute to the development of these communities, means that they are in fact not development research organisations, but rather research projects that just so happen to conduct research in poor countries.

3. Experiences from the field

The best word to describe life in rural Uzbekistan is poverty. In every sense of the word, be it the poverty of opportunity and the poverty of optimism, or poverty in an economic sense of an insecure food supply and the paucity of paid work. In a scientific and technical sense there is a poverty of understanding and it is fair to say that Uzbekistan in general and especially rural Khorezm is 'knowledge poor' and would certainly benefit from new science and technology to promote development. This is not to say that there is no indigenous knowledge, on the contrary the community possesses collective knowledge in a wide variety of areas and the specialised knowledge of the Masters that I researched, illustrated what knowledge does exist. But much of this knowledge 'wealth' is being lost in the post-Soviet period, with little evidence of new knowledge filling the void. There are two external mechanisms through which indigenous knowledge could be accessed and utilised as a tool for rural development, in the process reducing the knowledge-poverty and socio-economic poverty of the community. These two avenues are internal government action and external assistance. Internal government action has been largely unsuccessful in the post-1991 period, with the state continuing to focus on extending political control over agriculture rather than promoting development, and I hold no

cause for optimism that this will improve in the foreseeable future. This sad conclusion leaves quite an onus on the international community. I discuss here how local knowledge and participation can be utilised to improve the effectiveness of foreign assistance projects in rural Uzbekistan. Firstly, there is a general need to appreciate and access indigenous knowledge, as a means to work towards the co-operative development of appropriate and accessible technologies. Secondly, these must address locally articulated desires and indigenously defined priorities for development. Thirdly, succession planning, whereby control over this process if gradually transferred from the external agency towards local groups and individuals, is crucial if the development process is to be sustained. None of this is unique; indeed it reflects well established developmental thinking (Swanson et al, 1997; Chambers, 1984; Cohen & Uphoff, 1977). Rather I set out below how these three tenets of development can work at the local level in rural Uzbekistan.

1. Appreciating and Accessing Local Knowledge

If local knowledge to be utilised for development it must appreciated and valued. This local knowledge should then be tapped in a way that allows further local knowledge to develop. What I set out here are some key principals for dealing with local knowledge, based upon my reflections from a year in the field. These range from the need to accord dignity to local knowledge holders, respecting local specialists, understanding how local knowledge is culturally embedded and how accessing local knowledge requires a constant willingness to learn and accept. I argue that it is only once local knowledge, and its limitations, have been appreciated and accessed that a proper assessment of development needs can be made.

i. Accord dignity to local knowledge holders

If a scientific researcher or development practitioner wishes to engage with the local knowledge system, they must do so realising that it is they who are the outsiders. Coming from the outside, from a very different epistemology of science and typically from a much wealthier homeland, carries with it a different perception of what knowledge is and on the relative value of different forms of knowledge. For instance a European expert on vegetable production has specific ideas on how their 'expert' knowledge relates to lay knowledge, with an assumption that scientific knowledge is superior knowledge[4]. Yet in a local context the concept of superior knowledge is a dangerous one, as it often leads to scientists looking down on local knowledge practices as outdated, outmoded and antiquated. I was certainly guilty of this from my early time in the field and I have observed such opinions in my colleagues on numerous occasions. From the benefit of my field experience, I learnt during the year the importance of affording dignity to local holders of knowledge. I found that by respecting local knowledge, and by doing this, recognising local knowledge holders as capable individuals worthy of respect – I was more able to access the local knowledge which was so crucial for my thesis. Yet perhaps as important, once I had established a position as an individual who was eager to learn (even if this sometimes meant that I was perceived an ignorant, for being so unaware of seemingly universal knowledge) I found myself in a situation whereby I could introduce new ideas and knowledge (for example improved potato varieties) much more readily. By respecting local knowledge holders and learning from them first, when I later introduced new ideas I was able to do introduce ideas more appropriate to the local knowledge system. In the same way so should research activities

[4] This is not to diminish the need for experts, domestic and foreign. For a discussion of the role of experts in advanced 'knowledge societies' see Evers & Menkoff, 2005.

in the development research projects explicitly seek to access local knowledge and work with local farmers at each stage of the research process. From the setting of the research agenda, determining their own goals for development, through the research and experimentation stages. Not only will the research be more relevant, but I argue it will be more effective, as it will be able to tap the local knowledge of the stakeholders.

ii. Respect local specialists

'Masters', or local specialists are key to understanding local knowledge in Khorezm. These masters are local individuals who are recognised within the community as holding superior, specialised, knowledge on various aspects of rural life and their technical specialisation owes much to their social role as experts. As discussed above it is crucial that these masters be respected for their knowledge and I would recommend that their participation in any research or development activity is essential. Doing this would empower these Masters to extend their role as 'knowledge brokers'. They already fulfil such a function advising others within the community and acting as a central source of information, as well as a conduit for new knowledge as it is passed down from the state. I would advise foreign projects working in rural Uzbekistan to co-opt these masters, providing them with the training and skills required to disseminate throughout the community. This needs to be more that a formulaic 'training of trainers' approach. Rather masters, as local specialists, must be recognised and respected as thought leaders within their communities. This entails involving them in the research process, allowing them to form their own opinions on which technologies are appropriate and which are not. Crucially, foreign projects must accept these opinions as valid and act upon them. All too often the assumptions of scientific superiority are made by foreign projects, resulting in ill-advised and undesired interventions in the rural community. In my time in Uzbekistan other foreign projects, seeking to introduce new technologies for rural development, were certainly guilty of this. Much better is to work with local masters and to allow them to continue and expand their role as knowledge brokers. There is an inherent risk in this approach if the masters selected are those who are seeking to extend their social position, especially if these masters are part of the knowledge governing system, for example agronomists in the hakimyat (mayors office) who play a crucial role in supporting the state procurement plan (Wall & Lamers, 2004). I instead propose working with indigenous masters, who operate within the community, and are not part of the external power structure. Identifying such masters is necessarily difficult, it requires specific knowledge of community level social interaction, yet I see this is a necessary precursor to any knowledge sharing activity. Thus a deeper involvement in rural communities, working daily at the personal level, is necessary for development research projects if they wish to begin extension activities in Uzbekistan. If such contacts do not exist before the 'extension' of technologies, then one must be very cynical how appropriate and well received these new technologies will actually be.

iii. Understand how local knowledge is culturally embedded

Local knowledge does not exist in a vacuum. Rather the system by which local knowledge is created, shared, stored and used, is determined by the cultural context in which it operates. Certain aspects of Uzbek culture in Khorezm lead to certain social constructs – such as the primacy of the master and the gendering of agricultural labour – yet many organisations fail to account for the culture and society in which they seek to work. For instance a German NGO working in Khorezm in 2005 invited a German national to lecture local farmers on livestock and

dairy production. Leaving aside the egregiously inappropriate nature of much of the training (which assumed access to a sterilisation plant) the training was organised during the cotton picking period (the busiest weeks in the rural calendar) and perhaps worst of all – involved only men. Without engaging in a down-stream study, one must be pessimistic about the chances of women (those who feed and milk cows) gaining much from this training seminar. This is just one example of the dangers of failing to recognise that local knowledge is culturally bound and that any intervention into this system must be done in a manner, both cognisant and sympathetic, to the culture. In the Khorezm case this needs (at a minimum) to recognise the authority of agronomists (because of their function within the state), it must account for the risk of political interference (especially in the case of cotton and wheat), it must be aware of the important role that gender relations play in agricultural production and should have some knowledge of the historical 'development' of Khorezm during the Soviet period. From a development research perspective, the greatest challenge to understanding local knowledge in its cultural context is the recognition that knowledge is culturally embedded. The top-down approach which scorns 'local' knowledge as 'unscientific' is unhelpful. The first step is thus an acceptance of the validity of local knowledge, followed by an effort to engage with local knowledge on an equal basis. Assuming scientific superiority may well be justified from an academic perspective, yet as a way of ensuring development outcomes, it will almost surely fail.

iv. Maintaining a constant willingness to learn and accept

My final reflection on this point is that when dealing with local knowledge it is vital that one remains constantly open to learn. The local knowledge of any community is a complex set of, at times conflicting, ideas and concepts – these are seldom explicitly understood by the entire community – rather local knowledge is constituted of all the parts of the community in which it is based. One should not under-estimate the complexity or depth of local knowledge. From my year of field research I found that for each discrete area of knowledge I researched, I found it interlinked with every other area of rural knowledge. It is not possible to define local knowledge into neat disciplinary areas and you just miss a great deal if you try. Thus it is insufficient to try and catalogue local knowledge in a short period. Doing so is not interacting with the local knowledge system, and the results of these surveys always seem to come up wanting. One example from the ZEF/UNESCO project was a survey of local opinions on trees, which identified some interesting findings, yet completely missed the issue of tree ownership – a crucial question in a system of post-collective agriculture where private ownership is only now being established. Yet my own investigations found that there is significant knowledge of tree ownership in Khorezm, with each person owning certain trees in discrete areas, and planning planting on the basis of anticipated future need. Yet this knowledge, will often be (and in this case was) entirely missed in an attempt to catalogue local knowledge. To institutionalise this 'learning' approach to knowledge within a research project is not easy. It involves a culture shift within the project, engineering a culture of learning and openness which may sometimes seem inimical to 'scientific' research. This involves leadership, policy changes, staff training and most crucially a shared vision of why learning is important and how this contributes to a clearly articulated goal. Yet, if science and technology are to be used for development – then the local knowledge of the community needs to be acknowledged and respected – and research conducted in terms of joint learning rather than as an extension exercise, a process I explain below.

2. Working towards Appropriate and Accessible Technologies

Applying the four principals outlined above is very much in line with current development studies thinking, moving away from the 'Transfer of Technology' approach. This was the prevalent mode of extension used in the introduction of 'Green Revolution' technologies to the developing world in the 1960s, and much of the 1970s. Here technology was transferred by way of a "top heavy and top-down" approach of central governments (Swanson et al., 1997: 9), either national governments in the North, or post-colonial ministries run "under the aegis of their new administrators" in the South, funded by international donors (Swanson et al., 1997: 9). In either sense the assumptions made by the administrators was one of institutional superiority. That extension workers and officials were development plenipotentiaries, in possession of 'superior' knowledge, which (if properly applied) would solve the problems of 'backward' farming systems. An almost identical approach was adopted simultaneously, if independently, in the Soviet Union. Elements of this approach still present themselves in development thinking today; certainly the ZEF project proposals reflect this uni-linear approach to technology development and transfer (Velk et al., 2003: 9-10). Likewise Institutes in Uzbekistan still adhere to this view. What I would argue for from a science and technology for development perspective, in line with contemporary development studies thinking, is a partnership approach which reflects the different types of knowledge held by the local users and foreign donors. For whilst external knowledge (science and technology) is 'universal' knowledge and reflects Western scientific values, local knowledge is concerned at the immediate level and is a reflection of the culture in which it is situated. In conducting research and working to develop locally appropriate technologies, it is vital that both forms of knowledge are employed. To do this effectively will require the values of dignity, respect, cultural awareness and openness to learning. These values should be exhibited by both the local community as well as the foreign projects; however, as outsiders it is important to foreign projects to accept this is foremost their responsibility.

3. Succession Planning and Sustainability

In engaging in the development process with a rural community and in utilising the local knowledge which it contains, it is necessary to be aware of the fact that development and research projects all come to an end. The wider issue of sustainability in development is well discussed in the literature. I would like to draw on the concept of sustainability to introduce the importance to succession planning in conducting development research. Ensuring that at the conclusion of the project that local actors are equipped and trained to such a level that they not only continue using the new introduced technologies, but ideally that they are able to continue the development of new technologies. Knowledge creation and the strengthening of local knowledge capacity should not finish with the conclusion of a project. Rather it is the responsibility of foreign projects to ensure that their local partners are able to continue developing their scientific and technical base, after the termination of the project. The planning required ensuring this must be part of the project from its inception, with constant and conscientious efforts at local capacity building. The rebuttal normally given to this suggestion is that certain technologies are not able to be used in the poor country. If this is so, then a case should be made to exclude the technology altogether. If a new technology or piece of scientific equipment is not able to be used locally (given extensive training, resources and support) then the technology itself is probably inappropriate. I have certainly observed very expensive equipment introduced into the field setting, sometimes this technology is well received and can be localised into the knowledge system. Other technologies can evince reactions ranging from

awe to repulsion to indifference. In these cases the project should not be afraid to disabuse itself of this technology – whilst it may be interesting for the external researcher – if there is no local interest then it will not be utilised in the long run. Evident from my research is the importance of adapting technologies to fit the culture of Uzbekistan, taking into account the history of forced technical adoption and the considerable issue of knowledge loss in the post-Soviet context.

4. Conclusions

Science and technology have an important role to play in promoting development, but the introduction of 'external technologies' or new knowledge must take account of the local knowledge of the community. I have set out in this paper a conceptual framework in which we can begin to better understand the idea of 'development research'. I present this as a combination of both 'development' in a specific sense of studying the process and of taking deliberate actions for third world development. This development studies approach is then combined with the idea of academic research, in the case of this paper ecological and economic research in rural Uzbekistan, to analyse how 'development research' functions. What we find is that the pressures of interdisciplinary research and academic strictures militate against working with rural communities in the development of new technologies. Yet science must work with local knowledge in devising new technologies for development in order to ensure that the technologies devised are appropriate to the local situation. This participatory approach is not only essential for achieving development outcomes from the research, but an ethical case is constructed in this paper that argues it is essential. The paper then goes on to present a series of reflections on my time in the field, working in a development research project in rural Uzbekistan. I discuss my experiences in learning from local knowledge, outlining the principals of affording dignity to local partners, respecting local knowledge and experts, understanding the cultural context of knowledge and maintaining a constant willingness to learn. With these principals it is then possible to work in a collaborative manner towards developing locally appropriate and accessible technologies, in a sustainable manner. The experiences from rural Uzbekistan are in this way applicable outside of post-Soviet Central Asia, and have application in the field to development studies and development research. If science and technology are to contribute to development, development research must involve local knowledge and indigenous actors are partners in the development process.

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