

Supporting the invisible technologists: The Intermediate Technology Development Group

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What constitutes 'technology', and who can be described as a technologist? In trying to answer this, the ITDG has uncovered the role of women in areas of production previously considered 'male'. They now try to bridge the gulf between development professionals and poor producers.

The nature of poverty is complex: it is the result of a series of power relationships which affect our whole lives, even our chance of life itself. Perhaps the most important of these relationships in terms of our opportunities for a fully productive life is that which all societies define between the sexes. Development interventions which aim to promote poor people's access to technological support in order to relieve drudgery all too often end up benefiting the better off and the more powerful — who are usually men (Appleton and Scott 1994). Drawing on the experience of the Intermediate Technology Development Group (ITDG), this article argues that technology transfer must be a two-way process, recognising the uniqueness and complexity of the lives of people living in poverty, and the skills and knowledge that they have developed to cope. It must allow those women and men who seek support from development interventions to define their own needs, and to participate in the design and transfer of technology through a dialogue between poor people and project staff. Further, the women and men who live in poverty must

retain sufficient control to ensure that an intervention fulfils its objective from their point of view.

ITDG is an international NGO founded in 1966 by the economist Fritz Schumacher, author of *Small is Beautiful: A study of economics as if people mattered* (1973). The organisation is now working from seven self-managing country offices, in Bangladesh, Sri Lanka and Nepal in Asia, Kenya, Sudan and Zimbabwe in Africa, and Peru in Latin America, in addition to its head office in the UK. Since the 1970s, ITDG has been working at improving its own, and others', recognition of the part played by poor people in technology and technological innovation. People's understanding of appropriate technology (AT) and the role of AT organisations has altered over the last 33 years: 'this shift has been primarily towards giving due emphasis to the technological capabilities of people rather than just the characteristics of technologies. The work of IT (and other AT organisations) is therefore now as much about enabling disadvantaged people to identify and develop technologies to address their needs, as these needs change over time, as it

is about identifying or developing specific technological options for specific locations at a particular time' (Scott 1996, 4).

This article charts the evolution of ITDG's approaches to gender and technology, and the discovery of poor women 'invisible technologists'. I also focus on our current work with women in industries and sectors traditionally thought to be closed to women, and on the ongoing development of a training tool which aims to bridge the gulf between development professionals and poor producers.

ITDG, GAD and understandings of technology

The prevailing western traditions of technology — even 'appropriate' technology, defined by Schumacher as simple, small-scale, low-cost, and non-violent (Schumacher 1973) — are rooted in a male-dominated culture. Technology has been associated with machines, with hardware located outside the home, with engineering, with men. During the 1970s when ITDG began its project work with communities, the artisans with whom western male experts worked were invariably, although often unconsciously, imagined to be male. This undoubtedly hampered AT organisations from arriving at a useful definition of what constitutes technology, and who the poor producers — the proposed target population for their projects — actually are. It has also made it particularly difficult for ITDG, as an organisation working exclusively in developing-country contexts, to integrate a gender perspective into its work; and yet this is critical if it is to fulfil its aim of effectively targeting the poorest people.

Conducting and recording research carried out since the early 1970s for ITDG, Marilyn Carr considered 50 case studies in 22 poor countries of women involved in 38 unconventional projects which aimed to

boost their earning power. The outcome of this work was her book *Blacksmith, Baker, Roofing-sheet Maker* (1984). As the title suggests, Carr found women engaged in light engineering work, as well as work more commonly associated with women. She emphasised the importance of considering women's involvement with technology in a broad context of production and commercial activity, and moving beyond this context to give attention to women's access to credit, raw materials, and markets where their enterprises stood a fair chance of success. In order to promote these ends, she suggested promoting linkages between women's groups, to ensure that the women retain control at all stages of the production process (Carr 1984). This work was conducted in liaison with the Commonwealth Secretariat's Women and Development Programme.

Both within ITDG and outside, understandings of the key role that technology plays in economic development have become more sophisticated as a result of such research and analysis by both academics and practitioners. It is now clear that technology is concerned with so much more than simply making machines work: it includes not only the hardware or product, but an appreciation of the skills and knowledge, as well as the social organisation, which are necessary for sustaining and adapting technologies in the face of changing circumstances. 'The four Schumacherian characteristics which defined AT and which helped to decide questions of the choice of technology, have given way to a view of technology as one element in a dynamic socio-economic system. Technology is now perceived as having four inter-related constituents: technique, knowledge, organisation and product.' (Scott 1996, 2)

As views of the role of technology in development have evolved, so too has a growing awareness and respect for the technologists living in poverty in deve-

loping countries — so many of them women. In the 1980s and early 1990s, ITDG embarked on the 'Tinker, Tiller, Technical Change' project, discussed in the next section, and, later, on the 'Do It Herself' research programme. These programmes worked with local researchers in Africa, Asia, and Latin America to explore the role of poor women and men in technology (Appleton 1995).

Identifying the invisible technologists

The 'Tinker, Tiller, Technical Change' project was the result of case-study work planned and executed by 17 researchers from the 14 countries represented. Each researcher selected a technology in common use in their own country, and carried out detailed field studies of its evolution, its socio-economic importance, and its limitations. The researchers then collaborated with colleagues from their region to identify common issues to consider in more extensive field studies. They shared this work at a seminar in London in 1989. The resulting book (Gamser 1990) was thus a product of both field work and discussion.

Although not primarily focusing on women, the study was alert to the links between gender roles and technological change. 'In all cases, the various activities of the technologies considered were traditionally carried out by women. However, it was observed in each case that, as the technology evolved, the role of women changed. They ceased to be operators and became merely users of the technology. This was observed in all cases but was more vivid where mechanisation was introduced.' (Gamser 1990, 4). Many researchers also noted for the first time the subtle relationship between the producers of technologies (often assumed to be male) and the user (usually a woman). 'The interaction between users and makers of the products under study provided a major

impetus for the development, adaptation, and diffusion of the technologies. Such an interaction continuously transmitted users' experience to the fabricators.' (Gamser 1990, 100). In the course of the debates which took place as a part of the research, the distinction between producers and users became increasingly unclear: suddenly, women were appearing as innovative technologists, previously unrecognised and therefore 'invisible'.

The research confirmed to ITDG that women not only constituted the majority among those living in economic poverty, but that many micro-enterprise producers, and most agro-processors, are women. In the studies, there was a shift away from the view of an end-user of technology being a male artisan working in a small workshop, towards the view of a woman or a family enterprise based within the home. There was, inevitably, another shift away from the concept of technology as complicated machinery, towards the realisation that women, in their everyday work to support their families, use myriad technologies concerned with food production and processing, with fuel economies and provision, animal husbandry, horticulture, with nursing, medicine, child-care, house construction, and many others. For example, women in Sudan carry out extremely complex fermentation processes using little more than gourds and knives (Dirar in Appleton and Scott 1994). 'Recognition of the value of peoples' technology is the necessary first step towards strengthening this technology, and organisations behind it ... At the same time, support for people's technology has to respect the informality under which it thrives' (Gamser 1990, xvi).

As the research progressed, and the value of women's contribution to technology became clearer, it became obvious that the implicit undervaluing of women's skills, knowledge, and organisation of technology must have serious implications for their

involvement in processes of technology development. 'Traditional models of technology development may fail women simply because they do not address the differences between men's and women's technological needs, uses and contributions' (Appleton and Scott 1994, 1). This finding is echoed in an example of a research programme in Peru, which aimed to document local knowledge of livestock diseases. Researchers contacted male heads of households, only to discover that men knew little about the subject. When researchers questioned the women, the true extent of local knowledge of livestock was revealed (Appleton and Scott 1994).

'Do It Herself': Investigating women and technical innovation

The 'Do It Herself' research programme, which culminated in an exhibition, conference, and book of the same name (Appleton 1995) was designed to investigate the contributions of women to technical innovation at grassroots level. The research programme started from the assumption that women in developing countries have specialist technical knowledge, and looked at how they use their technical knowledge and skills to develop, modify, and adapt the techniques and technical processes with which they work.

'A major challenge for the research was to be the obtaining of information about an area — women and technological innovation at local level — that was to some extent invisible, and therefore unlikely to be easily accessed by conventional research methodologies' (Appleton 1995, 3). The solution to the methodological quandary about how to see the invisible was solved by involving the users in the research, thereby creating an opportunity for them to express their views. Researchers with good community links were identified, and support offered to strengthening regional capacity with regard to women's contributions to technical innovation.

As a result of this research work, and the parallel evolution of participatory technology development (PTD) concepts within AT organisations, evidence was collected that strongly suggested that ITDG and its partner organisations had made progress over the past seven years in developing a participatory approach to technological development; in recognition of women's important role in food production and agro-processing, we had worked in close consultation with host communities.

Discovering the invisible engineers

ITDG's experience to date challenges the idea that traditional producers are resistant to change. Although technical change is the result of a complex interaction between processes of technical design, and a society's ways of interacting and making decisions, small-scale producers make rational choices based on their own perception of their needs, and the resources available to them (Gamser 1990). Such an understanding of the ways in which producers adapt to changing situations through technological change is a firm basis on which to develop technology interventions in ways that reflect local skills, priorities and needs. It has been an important consideration in the design for many ITDG projects, including the Sri Lanka Forum on Rural Transport Development, and projects focusing on food-processing for income generation in Bangladesh, small enterprise promotion in Bangladesh, and dissemination of building-materials technologies in Zimbabwe.

It is becoming clear that women are increasingly tackling productive work not only in sectors associated with 'women's skills', and their traditional domestic role. Against all odds, they are endeavouring, out of necessity, to compete with men in more traditional engineering tasks. Marilyn Carr recognised the existence of such women

producers in 1984, but according to her findings they were few in number. Today, it appears that there are still relatively few, but we now know that our increasing awareness of them is not only due to their numbers. Our preconceptions, and problems in finding an appropriate research methodology, may have obscured the true extent of women doing jobs of this nature, many of whom see themselves as 'helping out' within family businesses. In a recent report, Kusala Weththasinghe of IT Sri Lanka reported a 'small but significant involvement of women in [light engineering], a sector that most of us believed to be "closed" to women ... The project really aimed to involve women by helping small-scale artisans to consider women's needs when designing and making tools and equipment. Now, at the initial stages we see two types of involvement by women. One is supporting the business by maintaining financial records. The other is actually being involved in the production' (internal report, 1999).

The women who assist and support their male relatives within such family enterprises by using business skills, keeping books or doing the marketing are involved in a powerful function in traditionally male-dominated sectors 'through the back door'. An avenue for research is how the status of the women responsible for the financial viability of their businesses rises in their family and their community. In addition to playing this role, these women, their daughters or others who have watched them, may feel able in the future to attend engineering training to enable them to participate as engineers in the business, either alongside male relatives or in their stead. In the IT internal report, Kusala Weththasinghe stated: 'In a village where the project is promoting a collective effort to help a cluster of very poor blacksmith families, we have met a woman who is involved in the production side by side with her husband. She says she learned the

craft as a school girl. Her brother was a blacksmith and she took time off from her studies to work with him. In the blacksmithing sector women may be collecting coconuts, burning them to prepare charcoal, cleaning up the workshop, helping pull the blower (most blacksmiths still use a traditional blower) etc. but the share of their contribution is not recognised even by themselves ... if I ask outright what they do at the workshop, they promptly reply "Oh. It is my husband (son/brother) who does that work. I cannot do these things".' Kusala Weththasinghe believes that the perception of women's role in light engineering by communities and by project workers is similar to that of the agricultural sector some years ago: 'It is generally assumed that only men are involved in the production. The work done by women is invisible because it is seen as "help". The fact that most small-scale light engineering workshops are located in part of the house is another reason why the contribution of the women may not be noticed' (ibid.).

Kusala Weththasinghe reports being informed by a partner organisation about a woman welder in Hambantota, south Sri Lanka, who took up the job after the death of her husband: 'The lady has learned the craft because she had no other way to support her children. She cannot use any helpers in the workshop because the society frowns upon men spending time in a house where a man does not live! For the same reason she is reluctant to go for training to develop her skills' (ibid.). The partner organisation is currently trying to arrange for an experienced craftsman to visit her workshop and train her. They will make sure that some of their women community development workers are present while the training is conducted.

Another example of women engineers comes from Bangladesh. Significantly for organisations who are committed to promoting a change in gender power relations, Mahjabeen Mukib in IT Bangladesh reports

unexpected support from the community towards women are involved in engineering in a project supported by ITDG. In her view, 'to consider women only as consumers of the sector leads to the fallacy of sustaining the perception of outsiders (us) who assume that women cannot be employed in light engineering. Small interventions through our project will not increase women's participation in the sector immensely but will dispel the myth of this sector being a 'male domain'. It is necessary to set up examples in order to boost women's self-confidence and position in society vis-à-vis men. This is also in an attempt to increase life's options ... We went with an open mind and were surprised to find out that we (as outsiders) have more resistance within ourselves and in our attitudes as opposed to those who are a part of the sector or who have links with the light engineering sector ... There is enough support and willingness on the part of the community members to the idea of women's involvement in light engineering activity but there is still a lot to be done ...' (internal report, 1999).

Current challenges

Promoting learning among 'outsiders'

Growing awareness of the issues faced by women technologists has focused attention not only on the methods used to communicate with them, but on the skills and training needed by field workers and project staff to equip them to work in cooperation with the women. ITDG 'is aware that addressing gender relations is usually the most difficult aspect of project implementation' (IT Kenya Gender Impact Assessment Study Report for the Pastoralist Project, Luta Shaba 1999, 6). It is a great challenge to understand the gendered nature of poverty, of productive and reproductive survival strategies, of what women actually do and how outside intervention

affects their jobs and benefits. Both these reports highlight the fact that much more awareness is needed from us as 'outsiders', and that our assumptions about the productive activities of poor women must be continuously questioned. A 'large amount of skill and knowledge may exist within a community, but much of this is not recognised by outsiders. Even where it is recognised, local people may not have the self-confidence to draw upon this store of experience and see ways in which it can be used as the basis for understanding and using a "new" level of technology. This means that when outsiders work alongside rural people they have to be able to bring an holistic viewpoint with them, rather than one constrained by the boundaries of an academic discipline' (Appleton and Croxton 1994, 3).

'Mainstreaming' gender in a technical organisation

ITDG faces the particular challenge that it has always been an organisation for promoting the transfer of appropriate technology, but that technology itself is a concept imbued with male bias. However, it is not an organisation made up of 'technologists' alone. It aims to draw on the skills of both social scientists and technologists, and not to create an artificial divide between these two disciplines. Increasingly, ITDG technicians are moving towards listening, learning, and facilitating development in partnership with the communities they serve. ITDG does not have gender project officers as such; in fact, we are against the idea, preferring to 'mainstream gender' by expecting all project staff to take responsibility for including a gender perspective in projects.

Recognising development as a gradual process

The time-scale against which development practitioners measure change is important for those projects which confront deep-

rooted attitudes involving gender roles and responsibilities. In these interventions, there is a challenge to maintain accountability while at the same time being ready to take risks, to follow tentative leads, and to await gradual transformations with patience. The current emphasis in many NGOs on short-term impact measurement may obscure more important long-term issues. This appreciation of slow change over time is very much part of the participatory approach to community energy development in ITDG-supported interventions in Zimbabwe and Mozambique. In Nepal, reports on IT's support to the micro-hydro sector talk of small beginnings, of 'a small step forward'. In Bangladesh the small enterprise unit talks of 'gradually moving towards a gender-sensitive direction.' (internal reports, 1999) Sometimes the most valuable impacts are slow-maturing, unexpected, and difficult to measure. You cannot quickly build peer respect, foster self-confidence, or have an impact through a solitary role model. Attitudinal change can take a generation.

Developing a tool to meet these challenges

In the face of these challenges, there is a growing awareness that information and training are required, to help those working directly with poor women and men technologists understand how gender differences underpin the acquisition and use of technical skills, and also examine the social status given to different technical tasks performed by women and men. We also need to revolutionise the way information about these technologists and their knowledge and skills is communicated between poor communities. 'The possibility of local people, especially women, being able to contribute to courses, and to assess, modify, adapt and innovate technologies themselves, was formerly not considered and did not form part of the thinking behind training design. As a result, such courses, because they 'talk at' rather than 'work

with' producers, fail to build or strengthen existing technical innovation skills among women and men, and have a particularly limited impact on women, whose domestic roles render them less visible.' (internal draft training manual, 1998). Training courses such as these may have actually reduced the confidence and status of women as producers.

ITDG has been developing an improved training method with a manual entitled 'Discovering Technologists: Women's and men's work at village level' (unpublished, 1998). Videos, slides, cartoon illustrations, posters, and a manual are included in the training pack. This manual is intended to be a tool which can be used in every project, to help highlight the existing technical capacity of poor women and men, and to show that this is flexible and adaptable. It should assist partner NGO field staff to communicate more effectively with the people involved in projects, and quickly disseminate the information gathered during the training (with the permission of participants). The modules are participatory, and include the opportunity for debate and involvement in technology development. They also explore ways of designing the project which will minimise the danger that benefits will be appropriated by the better-off. In short, the training endeavours to involve local people in the development, acknowledgement and dissemination of local technical capacity.

The training method was tested by local NGOs in Sri Lanka, and subsequently tested and discussed by ITDG gender and technology co-ordinators who participated in a workshop in Sri Lanka in January 1999. Two people responsible for co-ordinating the pilot training from each country where ITDG works attended; staff in the Sri Lanka, Bangladesh and Zimbabwe offices are particularly enthusiastic and committed. Currently, the manual is being further pilot-tested; training has already been held for participants from local NGOs in Kenya

and in Zimbabwe, using funds made available through Comic Relief. Funding is currently being sought for the workshop to be held in Sri Lanka, Bangladesh, Peru, Sudan, and Nepal. A copy of the training pack — which includes the exhibition resources from the Do It Herself research, the video, slides, posters, and books of illustrations for illiterate participants — is issued to each participant at the end of the workshop. Since the Sri Lanka workshop, ITDG has been able to draw on the views of a very active international 'team' who continue to share experiences on integrating gender issues into their work. It is encouraging that this team is not made up only of social scientists, or only of women, but in fact includes women and men technicians, communications specialists, and social scientists.

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References

- Appleton, H (1995) *Do It Herself: Women and technical innovation*, IT Publications, London.
- Appleton, H and Scott, A (1994) 'Gender issues in agricultural technology', development paper presented at a workshop for agricultural engineers for FAO, 1994.
- Croxton, S and Appleton, H (1994) 'The role of participative approaches in increasing the technical capacity and technology choice of rural communities', paper presented at a workshop on Technology for Rural Livelihoods: Current Issues for Engineers and Social Scientists, September 1994.
- Gamser, MS, Appleton, H, Carter, N (1990) *Tinker, Tiller, Technical Change*, IT Publications, London.
- Schumacher, Fritz (1974) *Small Is Beautiful: A study of economics as though people mattered*, Abacus Edition, Sphere Books Ltd.
- Scott, A (1996) *Appropriate Technology*, Vol.23, No.3, pp.1-4.