Ground Realities of Agro technologies Transfer: Points for Intervention

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ABSTRACT

Economic survey 2011, talks of robust growth and steady physical consolidation as the Hallmark of the Indian economy. After all, with a growth of 5.4 percent for agriculture and the allied sector on the back of the increase in food grain production this year, countries GDP has been worked out at 8.6 percent. Agro technology transfer among the states and regions in the country has constraints and problems additional to those associated with the diffusion of innovations (L. D. Swindale, 1978.). Site factor constraints the appropriateness of the technology, social, economic and institutional constraints must all be recognized and conceptualized. Environmentally Sound Technologies (EST) has the fewest constraints and has been a major means for agro technology transfer.

The technology is complex and complete involving many factors and many new practices, however, as scientists have shown, it can be adopted piecemeal although, none of the pieces bring the advantage that the entire technology does. How, now, do we transfer this agricultural technology?

We need a revolution. The present paper will discuss the successful transfer and uptake of Environmentally Sound Technologies. It is time to reverse the clock and provide a ray of hope.

Technology Transfer in Support of Sustainable Development:

Technology transfer must be recognized as a broad and complex process if it is to avoid creating and maintaining the dependency of the recipient, and if it is to contribute to sustained and equitable development. The end result for the recipient must be the ability to use, replicate, improve and, possibly, re-sell the technology. Transfer of technology is more than just the moving of high-tech equipment from the developed to the developing world, or within the developing world. Moreover, it encompasses far than equipment and other so-called “hard” technologies, for it also includes total systems and their component parts, including know-how, goods and services, equipment, and organizational and managerial procedures. Thus technology transfer is the suite of processes encompassing all dimensions of the origins, flows and uptake of know-hw, experience and equipment amongst, across and within countries, stakeholder organizations and institutions.

If the transfer of inadequate, unsustainable, or unsafe technologies is to be avoided, technology recipients should be able to identify and select technologies that are appropriate to their actual needs, circumstances and capacities. Therefore, a key element of this wider view of technology transfer is choice. There is no single strategy for successful transfer that is appropriate to all situations. Desirably a technology recipient will choose a technology which at least meets the definition of being “environmentally sound”. Suitable technologies are technologies that have the potential for significantly improved environmental performance, relative to other technologies. ESTs protect the environment, are less polluting, use resources in a sustainable manner, recycle more of their wastes and products, and handle all residual wastes in a more environmentally acceptable way that the technologies for which they are substitutes. Preferably a technology recipient will go even further, and select a “sustainable technology” – i.e. a technology that is not only environmentally sound but also economically viable and socially acceptable. Such technologies contribute to the three pillars of sustainable development.

Elements for the Transfer and Uptake of Environmentally Sound Technologies

Environment/Situation: Technology transfer does not
take place in a vacuum. The performance of a given technology is dependent on a wide range of factors, making identification of an environmentally sound or otherwise appropriate technology somewhat problematic. For example, a technology that is assessed to be environmentally sound in a given locale, culture, economic setting or stage in its life cycle may not be in another. Its performance may be influenced markedly by the availability of supporting infrastructure and by access to the expertise necessary for its management, maintenance and monitoring. Moreover, a technology that qualifies as being environmentally sound at one point of time, may not do so at another – the performance criteria against which it is assessed may change as a consequence of new information or changing values or attitudes; a technical breakthrough may give rise to more desirable alternatives. It is therefore vital that recipients and users of a technology are able to choose an option that meets their specific needs and capacities, while also being environmentally sound in its operating locale and over its operational life cycle. It is, of course, highly desirable that the technology is also found to be economically viable and socially acceptable, and hence sustainable.

**Obstacles to remove**

There are many barriers to successful technology transfer. All along the transfer path, from the supply side of technology transfer (the innovators and developers) to the demand side (the recipients and users), impediments occur at every node and, due to restrictions on the movement of information and materials, for every linkage in the technology transfer chain. While some generalizations are possible, the specific nature and severity of the challenges depend on the prevailing circumstances, varying with the type of technology, its specific application and the characteristics of the technology providers and recipients. Examples of challenges include shortfalls in technology creation and innovation, underperformance in technology sourcing, sub-optimal enabling environments, and insufficient and unverified information. Small and medium enterprises are disproportionately impacted by these challenges.

**Choice**

A key aim of barrier removal, that is of facilitating technology transfer, is ensuring that technology recipients and users are able to make informed choices by being able to identify and procure the most appropriate (in environmental and preferably also in economic and social terms) technology for a given application in a given locale. Several requirements must be met, including:

- Needs well defined, documented and understood;
- Several technology alternatives, all of which are well and reliably characterized in terms of environmental and economic performance and potential social impact;
- Rational and functional methods (decision support tools) that facilitate choice of an optimal technology; and
- Capability to make the chosen technology fully operational, so that it fulfils its potential, and meets the identified needs, without detrimental side effects, including during decommissioning.

**Certainty**

A lack of certainty, and the consequential high levels of risk, both real and perceived, are recognized as major impediments to the successful establishment and ongoing operation of functional markets for ESTs. The common perception that many ESTs are “emerging”, and hence “unproven”, means there is little confidence in their economic, commercial or technical viability. Removing barriers to technology transfer often translates into increased certainty, and decreased risks, for the key stakeholders such as the developers, suppliers, financiers, insurers, recipients and regulators. One example is ensuring access to sufficient, verified information. Risk assessment and management capabilities for financial institutions are also of special importance.

Policy instruments can also be used to enhance certainty, in two principal ways:

- Through consistency in policy goals and measures over time, and with long lead periods for substantive changes in policy directions and the measure that implement them; and
- Use of policy instruments to reduce regulatory, investment and other uncertainties in the market.

Macroeconomic conditions that favour technology transfer include those which will deliver low inflation, stable and realistic exchange and interest rates, pricing that reflects the true (marginal and fully internalized) costs of material, energy, labour and other inputs, deregulation, free movement of capital, operation of competitive markets, open trade policies and transparent foreign investment policies.
Effective Communication

The technology transfer chain is often long, in terms of both distance and time. Effective communication is thus another essential ingredient in the recipe for successful technology transfer. Efficient and effective two-way communication and cooperation between key stakeholders will do much to remove barriers. Information management systems, knowledge management tools and formal and informal networks, both centralized and dispersed, can all make important contributions. Technology transfer often involves a dissonant mix of informal actors (e.g. innovators) working in formal and highly regulated settings. Effective communication is a requisite to harmonizing the contributions to the processes of technology transfer being made by diverse players.

Creating ability

Enhancing the transfer of technologies that support sustainable development is largely about creating favourable circumstances for technology transfer – ensuring all stakeholders have the ability (potential and realized) to fulfil their roles and meet their responsibilities, expeditiously. Generally speaking, government is the principal player in creating an enabling environment for technology transfer, but financial and insurance institutions and international organizations can also be influential.

Circumstances which are supportive of technology transfer include:

• open and competitive market;
• comprehensive and credible specifications on the technology performance;
• financiers who are at least technology neutral;
• the most cost competitive technology also has the most favourable environmental and social performance specifications; and
• policy risks are addressed.

All key players and stakeholders must have the necessary knowledge and skills to perform the roles and tasks expected of them. High levels of awareness, motivation and empowerment within the public and private sectors and in civil society will help ensure that people, communities and wider societies are able to adapt continuously to new circumstances and challenges that drive and arise from technology transfer.

Effective and efficient national and regional systems of innovation, research and development should be in place, to facilitate such procedures as adaptation of traditional technologies for use in current settings. The enabling environment also benefits from policy implementation that fosters an appropriate mix of government and private sector investment in ESTs and address such issues as lack of access to appropriate sources of capital, high or uncertain inflation or interest rates, subsidized or average-cost (rather than marginal-cost) prices for material and energy inputs, high import duties, uncertain stability of tax and tariff policies; investment risk (real and perceived), loss of rights to intellectual property and to productive resources and risk of expropriation.

Commitment

If there is to be an improvement on the last decade or so, where technology transfer failed to deliver the anticipated and much needed advances in development and sustainability, we must make a commitment to overcoming the challenges, providing technology users with the choice they deserve and desire, increase certainty, thereby reducing risks, enhancing communication between technology transfer stakeholders and building and strengthening the enabling environment and thus the capacity for technology transfer.

Key actions that will foster technology transfer include:

• Needs assessments, including identification of shortcomings in the enabling environment, with relevant organizations and agencies helping to address these;
• Evaluation and strengthening of policies that influence the enabling environment;
• Greater communication and interaction between key parts of government
• Intra- and inter-governmental coordination, cooperation and assistance;
• Protection of intellectual property rights and legal contracts;
• Political support for programmes and institutions that foster technology transfer;
• Seed investment programmes to stimulate private sector investment;
• Capacity enhancement for major stakeholders;
• Delineation of the roles of the private and public
sectors in both developed and developing countries;

- Economic incentives targeting industries that have the potential to make critical and major contributions to technology transfer; and

- Ensuring that technology transfer initiatives are compatible with national sustainable development agendas;

- Increase communication among technology transfer bodies across various multi-lateral environmental agreements (MEAs) with a view to leveraging limited financial and human resources on issues of common interest, integrating and strengthening regional and country level activities through information sharing and joint activities and providing a platform for multilateral approaches and consistency in technology transfer.

As part of its catalytic and facilitation role in creating and implementing strategies for transformation and change, UNEP and its partners are working together to develop and implement a strategic framework for promoting the adoption and use of ESTs. UNEP is well-positioned to provide an effective platform for meaningful interaction and dialogue in support of the harmonization of assessment approaches and methodologies related to ESTs. To demonstrate the benefits of ESTs, UNEP has established an EST Initiative with a number of partner organizations. A key objective is the transparent and credible acquisition and reporting of environmental performance information related to technologies.

REFERENCES