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Pro-poor technology, innovation and entrepreneurship policies

Note by the UNCTAD secretariat

Executive summary

The experience of a number of developing countries shows that development policies need to actively promote pro-poor entrepreneurship and innovation strategies, taking into account the particular characteristics of poor regions and communities. This note addresses the important role entrepreneurship and science, technology, and innovation (STI) play in promoting sustainable economic development, poverty alleviation and inclusive growth. The first part of the note highlights pro-poor opportunities offered by global value chains, including to disadvantaged groups such as women and youth, and discusses the relevance of UNCTAD's Entrepreneurship Policy Framework in helping policymakers determine appropriate actions to promote pro-poor economic growth. The second part of the note discusses the sources of innovation and how these are different in the context of poor communities. It also takes up the issues of innovation and gender, pro-poor innovation in agriculture and renewable energies. The note concludes with a range of policy recommendations.

Introduction

1. Sustained economic development and poverty alleviation require the continuous improvement of productive capacities. This note focuses on promoting entrepreneurship and science, technology, and innovation (STI). Entrepreneurship is key to job creation and inclusive growth. Technological innovation is essential to achieving progress on primary global economic issues, such as climate change or energy, as well as in the development process, on issues such as health, education and gender empowerment.

2. Data from 2005 indicates that the number of people living on less than \$1.25 a day amounted to 1.4 billion, while the proportion of people living in extreme poverty worldwide hovered around 25.7 percent.¹ The experience of a number of developing countries shows that development policies need to actively promote pro-poor entrepreneurship and innovation strategies, taking into account the particular characteristics of poor areas and communities.

3. The term pro-poor entrepreneurship encompasses both necessity-driven micro-entrepreneurship by the poor and entrepreneurs operating in economically poor areas. It also entails increasing the market participation of both of these types of entrepreneurs. In value chains as varied as agriculture, manufacturing and retail, for example, transnational corporations (TNCs) are creating new entrepreneurial opportunities for the suppliers, small farmers that can develop farming as a business, service providers and vendors with whom they do business. However, in order to put in place improved products or processes that are compatible with international standards, or may be finally traded and consumed by people, poor communities need to identify, diffuse and absorb technology and innovate.

4. Human and social factors are critical because innovation starts with learning, while technology diffusion and absorption are as much social as technological phenomena. Often, innovation will occur through creative imitation involving the commercialization of existing products and services or the establishment of new or improved public services. A case in point is innovation in agriculture: regardless of proposed technologies, the chances of success will depend on learning and understanding local specificities, both of the natural and physical environments, as well as the social, cultural and economic environment and relations: the improved products or processes will need to be finally traded and consumed by people.

5. The Investment, Enterprise and Development Commission, at its first session recommended² holding an Expert Meeting on Pro-poor entrepreneurship and innovation policies as part of the multi-year expert meetings on Enterprise Development Policies and Capacity-Building in Science, Technology and Innovation. In order to provide a background for the discussions, the first part of this note will look at the pro-poor opportunities that are increasingly offered by global value chains, including in disadvantaged groups such as women and youth. It will then illustrate the relevance of UNCTAD's Entrepreneurship Policy Framework to pro-poor economic growth. The second part of this note will discuss the sources of innovation and how these are different in the context of poor, and in particular rural poor, communities. It will also take up the issue of innovation and gender, following which it will discuss pro-poor innovation in agriculture

¹ <http://www.un.org/en/development/desa/newsletter/2011/february/feature.shtml>.

² Report of the UNCTAD Investment, Enterprise and Development Commission on its first session, Geneva, 4–8 May 2009 TD/B/C.II/5.

and biomass in order to give a real-world backdrop to the discussions. This will be followed by conclusions and policy recommendations.

I. Creating pro-poor entrepreneurial opportunities through global value chains

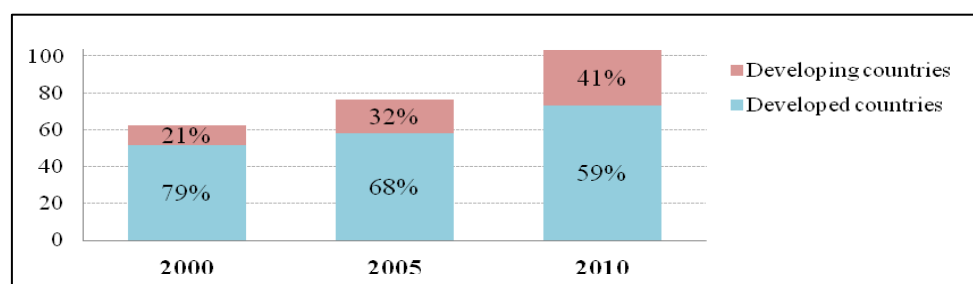
6. With supportive policies and the right kind of enabling environment, transnational production and distribution networks and global value chains hold the potential to create opportunities for the poor to gain better access to essential products and services, generate more income and expand their skills (UNDP, 2008). As the work of UNCTAD and others has shown, creating sustainable business linkages between domestic firms and subsidiaries of TNCs represents a vital channel for expanding economic opportunity and poverty alleviation through a wider and more equitable distribution of the gains from integrating into the global economy. However, many poor people also participate in global value chains much more directly as micro and small entrepreneurs. In value chains as varied as agriculture, manufacturing and retail, for example, transnational corporations create entrepreneurial opportunities for the suppliers, service providers, small farmers and vendors from which they source.

7. Evidence shows that incorporating the poor into global value chains may frequently result in tangible benefits for TNCs as well, such as reduced operating costs, increased product quality or access to new local supply and distribution channels that help to strengthen their business in both home and host countries (WEF, 2009). An increasing number of TNCs are therefore regarding doing business with low-income populations not simply as part of a CSR strategy but as an inherent part of business operations (figure 1). Indeed, a case can sometimes be made that TNCs which themselves originate from developing countries – and therefore recruit, produce, source and sell in these markets more extensively than their developed country counterparts – might often dispose of particularly relevant insights and resources in this regard (GIZ, 2011; Lall, 1993).

8. The Indian TATA group of companies, for example, has long epitomized these trends, extensively engaging with the poor as costumers as well as suppliers across the entire range of its value chain. Brazilian cosmetics company Natura Cosméticos has built a high-end product line around local ingredients sourced from indigenous Amazonian communities and created pro-poor entrepreneurial opportunities for more than 400,000 Brazilian women micro-entrepreneurs working in the direct sales of its products (Casanova and Dumas, 2010). South African beverage manufacturer SABMiller has been sourcing local ingredients, such as sorghum, from thousands of small farmers across the African continent, working with cooperatives, international agencies, such as UNCTAD's *Business Linkages Programme*, and non-governmental organisations (NGOs) to transfer agricultural knowledge and business skills.

Figure 1

**Number of TNCs from developing and developed countries, 2000, 2005 and 2010
(in thousands)**

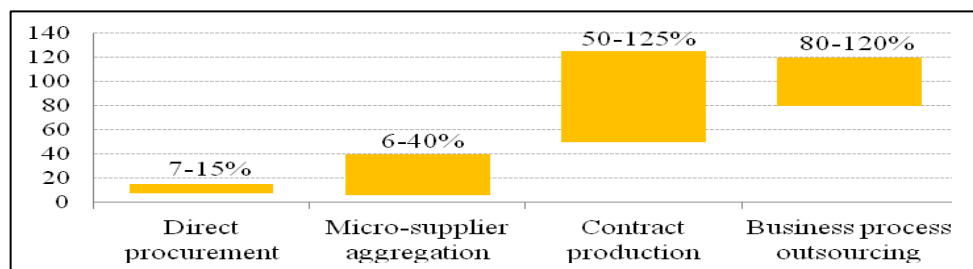


Source: UNCTAD (2011).

9. As noted by UNCTAD's *World Investment Report 2011*, the investment and ownership modalities of TNCs in host countries are growing increasingly complex. Many TNCs are creating pro-poor entrepreneurial opportunities through a variety of non-equity business and operating models, such as (a) engaging low-income entrepreneurs as retailers, distributors and franchisees; (b) aggregating micro-suppliers through secure demand from a large anchor buyer; (c) contract farming and contract production; and (d) pro-poor business process outsourcing (figure2). Many of these operating models have been shown to substantially increase incomes for poor entrepreneurs and policymakers have an important supportive and facilitating role to play in each of them. However, employment generated can be highly cyclical and easily displaced and the value added contribution may be low in terms of the value captured out of the total global value chain. Thus, developing countries need to mitigate these risks by promoting and facilitating the building of domestic productive capacity.

Figure 2

Observed income increase for poor entrepreneurs due to selected business opportunities



Source: Monitor Inclusive Markets (2011).

10. It must be noted, however, that none of these models are necessarily “more pro-poor” than others. Rather, the challenge for policymakers and responsible businesses is to find an appropriate mix of business strategies and policies that create pro-poor entrepreneurial opportunities and engage low-income producers in ways that are appropriate and economically sustainable in any given context.

(a) Retail, distribution and micro-franchising. Many low-income entrepreneurs operate in global and national value chains as retailers or distributors, bridging the “final mile” to consumers in settings with poor infrastructure. From an economic perspective, such networks appear to function best for simple products for which awareness and demand already exist among consumers. TNCs often also directly engage poor entrepreneurs as

sales agents for their products. A special form of agent-based distribution by low-income entrepreneurs is “micro-franchising”. The franchise model – with its inherent characteristics of replicability and scalability – promises franchisees an affordable, pre-packaged, low-risk business model, compared to independent entrepreneurship, with the franchisor typically providing training and operational support. Figure 3 lists some examples of successful micro-franchise schemes in developing countries. Recently, agent-based distribution models and micro-franchises have been regarded as a promising channel for distributing socially beneficial pro-poor products and services. Available evidence suggests, however, that many such products require substantial support in training and consumer protection and education.

Figure 3

Examples of successful micro-franchises

Organization	Country	Outreach	Description	Start-up costs
Fan Milk	Ghana	Food <i>25,000 agents</i>	Nutrition and refreshment products, mainly dairy	\$250; bike, freezer and daily inventory
VisionSpring	India and others	Health <i>9,000 agents</i>	“Business in a bag” low-cost eyeglass sales through trained agents	\$150; start-up kit, training and uniform
Solar Sister	Uganda, Rwanda	Energy <i>150 agents</i>	Women-centred direct sale of solar lighting products	\$500; start-up kit, training and inventory
Vodacom Community Services	South Africa	Telecoms <i>5,000 centres</i>	Entrepreneur-owned and operated phone shops that serve poor communities	\$3,450; Phone shop, equipment (in modified container)

Source: Dalberg Global Development Advisors (2009); UNCTAD.

(b) Micro-supplier aggregation. Given the large volatility observed in many agricultural and commodity markets, obtaining a stable demand for their products – for example in form of a large anchor buyer – is important to the livelihoods of numerous small-scale farmers and micro-suppliers. Policymakers may support this process by facilitating the formation of cooperatives and other organizations that combine small producers into larger aggregates that can capitalise on economies of scale, for instance via small farmer outgrower schemes (IFAD and Technoserve, 2011). However, micro-supplier aggregation also functions beyond agriculture, in any sector – such as furniture and textiles – where low-cost, distributed labour can be aggregated efficiently. The successful Indian fashion chain Fabindia, for example, sources its entire product range from thousands of small artisan producers across the country.

(c) Contract production. Contract production is an “assured buy-back” arrangement that directly involves small-scale farmers or micro-producers in the supply chain. The contractor (either a TNC lead firm or an SME which is itself further sub-contracting) typically organizes the supply chain from the top – providing critical inputs, specifications, training, and credit to its suppliers – and later collects outputs, essentially outsourcing all production to the supplier. Contract production is an appealing model for providing pro-poor entrepreneurial opportunities and can build stable networks of suppliers in a way that creates cost and quality advantages for the lead firm in the value chain. Importantly, the model covers poor entrepreneurs’ cost of market participation and reduces their risk by guaranteeing a market for their output, typically at a fixed minimum price, frequently above spot-market value. A strong enabling legal and institutional framework, securing contract enforcements needs to be in place.

Box 1. Small-farmer aggregation through purchasing guarantees

Uganda Breweries, a subsidiary of East African Breweries Limited and a joint venture with Guinness Breweries Worldwide, is one of the premier breweries in Uganda. The company had been procuring barley from abroad for its beer brewing operations, but reconsidered its sourcing options to demonstrate its commitment to supporting the local economy. The main challenge to this new sourcing strategy was finding an intermediary between Uganda Breweries and small-scale farmers scattered across Uganda. The Kapchorwa Commercial Farmers' Association (KACOFA) was identified as a possible intermediary, and in 2005 the two parties signed a memorandum of understanding with additional capacity-building provided under the framework of UNCTAD's *Business Linkages Programme*. Key to the agreement, Uganda Breweries guaranteed KACOFA farmers a concrete minimum purchasing quantity at a set minimum purchasing price, protecting the farmers against commercial risks. In turn, Uganda Breweries was able to purchase an uninterrupted supply of barley at better than import prices.

Source: UNCTAD (2010).

(d) Pro-poor business process outsourcing. Over the past two decades, many TNCs have leveraged new communication technologies to outsource not only physical production but also business process activities to low-cost markets. "Business process outsourcing" (BPO) has become a further driving force for an increasingly interconnected global economy, estimated, for example, to have created more than 270,000 jobs in the Philippines between 2005 and 2008 (Monitor Inclusive Markets, 2011). Other countries with low labour costs and comparative advantages in education and language that are emerging as BPO locations include Egypt, Viet Nam, Colombia and Kenya, providing enormous scope for creating pro-poor entrepreneurial opportunities in the digital economy (UNCTAD, 2010). For example, Jana (formerly TxtEagle), a United States-based market research firm that gathers data in emerging and developing countries via mobile communications, offers low-income entrepreneurs assignments that can be accomplished via mobile phone or at an internet cafe in return for payment in the form of airtime credit or mobile money. Policymakers can seize these opportunities by integrating BPO into national development strategies. For example, as part of its "Vision 2030 Strategy", Kenya identified BPO as a priority sector, aiming to create 80,000 jobs by 2014.³

II. The role of pro-poor entrepreneurship in supporting women and youth as the next generation of leaders

11. Sometimes pro-poor entrepreneurial opportunities in global value chains may be particularly suited to specific segments of a country's low-income population. Health and personal care products beneficial to families, for instance, may often be especially effectively marketed by women entrepreneurs. Entrepreneurial opportunities in the business process outsourcing industry are often suited to urban entrepreneurs with at least a high school education and some degree of ICT knowledge, and may therefore be particularly appealing to youth entrepreneurs.

³ <http://www.vision2030.go.ke>.

Box 2. Replicating Unilever's "Shakti" Scheme to women entrepreneurs in Africa

To expand its market in India, the challenge for Unilever was how to reach millions of potential consumers in remote villages with no retail distribution network, no advertising coverage, and poor roads and transport. The solution was "Project Shakti", launched in 2000 in partnership with NGOs, banks and local government. Women in self-help groups across India were invited to become direct-to-consumer sales distributors for Unilever's soaps, detergents, shampoos and packaged foods, with the company providing training in selling, commercial knowledge and bookkeeping to help them become micro-entrepreneurs. Originally started with just 17 women in two states, the scheme now boasts 45,000 women entrepreneurs serving more than 3 million households in 100,000 villages in India alone, and has also been rolled out to Bangladesh, Sri Lanka and Indonesia. Unilever is now seeking to tap into accelerating economic growth in Africa, where the company presently generates annual sales of more than \$7.2 billion. In order to do so, Unilever is seeking to replicate the success of its Asian "Shakti" scheme, initially focusing on the Kenyan and Nigerian markets.

Source: Financial Times (30 August 2011).

12. Moreover, additional efforts are required to ensure that entrepreneurs from various backgrounds, such as women and youths, are able to fulfil their true entrepreneurial potential and contribute to their country's national economic development as the next generation of innovators and leaders. Women and youth can contribute to economic development through their entrepreneurial potential characterized by creativity and the motivation to test out new approaches. These marginalized groups are more vulnerable than other segments of society and are often the first ones to be laid off by their employers, particularly in financially difficult times. This led to the fact that unemployment among women and youth has increased significantly during the economic crisis. Additionally, access to support services and finance is frequently limited for these groups. Policymakers can support pro-poor women and youth entrepreneurship by providing and facilitating adequate assistance in terms of training and education and access to finance.

Box 3. Improving entrepreneurial skills of young graduates in Uganda

Against the backdrop of rising unemployment rates among youth, Enterprise Uganda, UNCTAD's counterpart for the Empretec programme in Uganda, launched the Business and Enterprise Start-Up Tool (BEST) in 2007. The initiative aims at providing entrepreneurship and business skills to youth to enable them to start their own business as an alternative to chasing one of the few jobs available on the labour market. Based on UNCTAD's Empretec training methodology, aimed at enhancing the entrepreneurial skills of business people, the five-day training focuses on personal competencies and behaviours and helps participants to gain both the confidence and the practical skills to run and improve their business. One of the training's core elements is to teach participants the ability to identify and exploit business opportunities and to build up their capacity to enable them to create jobs in order to reduce unemployment rates. Since inception more than 20,000 young people have attended the workshop and according to Enterprise Uganda 50 to 60 per cent of them have either started their own enterprise or joined their family's enterprise.

III. The UNCTAD Entrepreneurship Policy Framework: Towards inclusive pro-poor entrepreneurship ecosystems in developing countries

13. UNCTAD has developed an Entrepreneurship Policy Framework for policymakers in developing countries to use in devising entrepreneurship policy. The goal is to help policymakers determine the appropriate actions to take to develop the entrepreneurial ecosystem as well as to build effective implementation, monitoring and evaluation. While there is no one-size-fits-all answer to promoting entrepreneurship, research by UNCTAD has identified six priority areas for policy focus that have a direct impact on entrepreneurial activity. The next section highlights the relevance that each of these priority policy areas has in contributing to fostering pro-poor entrepreneurship opportunities and promoting inclusive growth:



(a) National Entrepreneurship Strategy: This aims at providing a baseline for building the enabling environment for entrepreneurship development and includes creating and strengthening institutional mechanisms for policy implementation and monitoring. A

multi-stakeholder dialogue process is a necessary starting point for developing a national entrepreneurship strategy. Often, policy dialogue processes are not inclusive enough and do not take into consideration the perspectives and interests of the poor and disadvantaged sectors of society, such as women, youth and rural micro entrepreneurs. Some countries, however, have begun to make special efforts to promote inclusive dialogue processes. The 2011 Agribusiness Forum in South Africa included a public-private dialogue which will bring together the public sector, private sector and small holders to agree on a common vision of inclusive agribusiness in Africa and explores how agribusiness initiatives reduce poverty and contribute to the MDGs.⁴

(b) The regulatory environment: This includes policies that provide a conducive regulatory framework which enables entrepreneurs to successfully create, operate, manage, expand and close a business. Where administrative and legal barriers for entrepreneurs exist, the result is a disproportionately negative impact on micro and small enterprises. For the vast majority of the world's poor entrepreneurs, and an extremely high number of women that find themselves in the informal sector, these also represent barriers to enter into the formal economy. Many developing countries have made great strides in implementing enabling regulatory reforms. To name just one, Zambia has made several efforts in its regulatory framework in the past years. For example, in 2011, it eased business start up by eliminating the minimum capital requirement.

(c) Education and skills: These include policies that build the entrepreneurial capabilities of the population. Poor micro-entrepreneurs in developing countries often require training in both basic literary and financial business skills as well as training in the development of entrepreneurial behaviours including seeking opportunities, persistence and developing self confidence. This contributes to the efficiency and growth of their enterprises as well as to their personal development. Government policies on entrepreneurship should ensure that entrepreneurship is embedded into the formal educational system as well as offered through informal community, rural and apprentice training programmes. UNCTAD's Empretec programme is targeting rural micro entrepreneurs in provincial Panama, helping them develop personal entrepreneurial competencies and behaviors that will allow their businesses to grow.⁵

(d) Innovation and technology: This includes policies that promote science and technology development as well as their commercialization and diffusion into society. Since the majority of technical changes introduced in developing countries for the poor are the result of incremental innovation, special vehicles for its dissemination should be considered. This implies recognizing that technological innovation takes place when products or processes that are new to a country or to an individual enterprise are commercially introduced, whether or not they are new to the world. Enormous opportunities exist for needs-based innovation in developing countries, because of the large unmet needs in their societies, especially those of lower income people. In particular, there is an overall lack of investment in pro-poor technologies and agricultural innovations. For example, in the Kenya cut flower industry, which accounts for 6 per cent of world market shares and grew at an annual growth rate of 27 per cent in the last five years, a government institution, the Horticultural Crops Development Authority (HCDA), played a key role in identifying early markets and licensing all farmers engaged in horticultural exports, and went as far as creating companies focused on export packaging. These issues are discussed in further detail in chapter IV.

⁴ The Forum is organized by EMRC, an NGO promoting sustainable development in Africa through business partnerships, and UNDP. Source: <http://www.emrc.be/en/events/agribus-forum-2011.aspx>.

⁵ Source: MDG-F Joint Programme, "Entrepreneurial Network Opportunities for Poor Families" available at: <http://www.mdgfund.org/program/entrepreneurialopportunitiesnetworkpoorfamilies>.

(e) Access to finance: This includes policy measures that seek to improve entrepreneurs' access to finance and include facilitation of access to loans, credit guarantees and equity. Micro-entrepreneurs from the most disadvantaged sectors of society face several barriers to access finance. These include physical barriers in terms of a lack of formal financial service provision in rural and remote areas outside of the main cities as well as structural barriers including very expensive terms for credit. Some countries are exploring creative and low cost solutions to improve access to finance to entrepreneurs in remote areas. Equity Bank in Kenya has developed a way of increasing its delivery financial services in rural area without incurring large costs in setting up a branch network. The bank has invested in vans as mobile branches, visiting areas on a frequent cycle. Each van is equipped with the hardware and communication capacity to provide a large array of financial services (UNCTAD, 2009). More discussion on this issue is provided in Section IX of this note.

(f) Awareness and networking: These include policy measures that increase the entrepreneurial mindset in the population, and generate a positive entrepreneurship culture. Negative cultural perceptions about entrepreneurship can act as significant barriers to enterprise creation. Often, there are negative biases and social norms which disproportionately affect certain groups, such as women, from becoming actively involved in the private sector and choosing to start their own businesses. Disadvantaged groups which are most affected by such social perceptions often lack local entrepreneur role models to emulate and break negative biases. Awareness campaigns, such as Global Entrepreneurship Week (www.unleashingideas.org) help develop a positive image of entrepreneurship. Entrepreneurship training programmes and competitions targeted and adapted to marginalized sectors of the population are effective promotion tools. In Argentina, for example, the Ministry of Agriculture, Livestock and Fishing through its Young Rural Entrepreneurs Project, has established regional entrepreneurship centres and organizes local business plan competitions for young entrepreneurs in rural provinces across Argentina.⁶ Targeted awareness initiatives can also be in the form of awards, such as UNCTAD's bi-annual Empretec Women in Business Award, which celebrates women entrepreneurs who have become role models in their communities.

IV. Pro-poor innovation: Characteristics and sources

14. Pro-poor innovation is innovation that serves the needs of the poor. Advanced commercial technologies that are current in the developed world more often than not may be irrelevant for poor people. This is because many leading technologies have been developed without considering the realities and needs of the rural poor, as they are not seen as possible consumers. To improve the relevance and increase the adoption of technology, policy needs to support local innovation at both the levels of invention and transfer of existing technologies that may satisfy the needs of poor rural communities.

15. Innovation, including pro-poor innovation, has many sources and often may be related to experiences of change. These may be new technologies, climate change, change in the international political economy (trade liberalization, aid fatigue, etc.) or domestic political or socio-economic change. Innovation may occur to address diminishing resources (e.g. lowering of the water table or emigration) or as an attempt to stabilize outcomes of established processes (e.g. to decrease the variance in crop yields, i.e. to counter excessive yearly change). Innovation may be random and accidental, or purposeful and managed by entrepreneurs or public institutions (Ijuri and Kuhn, 1988). Users (consumers) as well as

⁶ Source: http://www.jovenrural.com.ar/index.php?option=com_content&task=view&id=238&Itemid=84.

suppliers can be innovators. Innovators can be found in many places in a value chain (von Hippel, 1988).

16. The necessarily local nature of pro-poor innovation does not lend itself to being understood through linear models of innovation, which gave prominence to research and development (R&D) as the key phase in innovation. For pro-poor innovation, diffusion and absorption are the critical phases. Their social nature can move pro-poor innovation thinking towards a systems-of-innovation approach whereby the communities, local entrepreneurs, and development stakeholders engage in network of relationships without a strong hierarchical process or order. Current policy discussions are focused on a number of approaches which attempt to find appropriate and relevant technologies for the poor. Among such policy concepts are the bottom-of-the-pyramid, inclusive business, and appropriate technology (Iizuka and Sadre Ghazi, 2011). More recently, the concept of frugal innovation is gaining currency. Its defining characteristics are inclusiveness in developing technology solutions for “bottom of the pyramid markets”. The notion of inclusiveness is important in particular for gender and STI where policymakers face the critical task of removing obstacles to technology access for women.

V. Gender and pro-poor innovation

17. Governments that do not address gender issues in innovation policy should not expect innovation processes to produce gender-neutral results. This necessarily means developing an undue bias against innovation that has a strong poverty alleviation effect, and decreasing opportunities for women to participate in, and benefit from innovation processes (Berdegué, 2005). Pre-existing social notions of what is appropriate to each gender can work against inclusive development and innovation policy. An assumption of existing ‘natural’ roles for the genders can reinforce the exclusion of women from training education and entrepreneurship and thus diminish potential contributions in innovation, be it in design and diffusion or in sharing the benefits of improved processes and technologies.

18. The disproportionate number of women scientists, researchers, innovators or entrepreneurs, and the seemingly stalled pace of change towards a more equitable gender balance, is typical of many countries with large poor and rural populations, in particular in many African countries and in south Asia. The development implications are negative, as in any exclusion, primarily because this implies foregone contribution of able human resources. The potential involvement of women in innovation is fundamentally important when we consider where the main impact of both urban and rural poverty is felt – among its households and children. Inclusive and positive gender policies in STI can provide a base for innovations that directly address these deficiencies.

19. Policies that aim to address gender issues as well as innovation are mutually reinforcing as both aim to build awareness and develop human capacity, ultimately empowering the poor communities. Recent research (Malhotra et al., 2009) suggests that there are a number of core policy levers that can be engaged to accelerate the process of gender empowerment and thus enhance women’s innovation contributions. Establishing partnerships among development stakeholders that are designed to break gender boundaries and engaging women at all stages of innovation policy development can be important policy elements. Women who are leaders in their field can influence policy as well as the nature of innovations, in particular if these are aimed at public service, need to be permanently involved in policy development. The successful diffusion of an innovation, with its many social and cultural nuances, can greatly benefit through the visible involvement of women, in particular in areas of rural poverty where social networks are the main media through which new products or services, commercial or otherwise, are proposed, deliberated and accepted or rejected.

VI. Pro-poor innovation in agriculture

20. From a global perspective, the battle for the elimination of poverty will be won in the poor rural areas of developing countries (Anríquez and Stamoulis, 2007). Thus it is a policy imperative to support innovation processes in rural and agricultural economies in away that creates jobs and decreases urban-rural income disparities. The development of agricultural sector has in itself significant pro poor effects as it can potentially increase available income for farmers, reduces food prices, increases opportunities and earnings for linked non-farm business activity and improve wages and employment on farms.

21. Pro-poor innovation in rural areas can benefit more from policies that focus on small-hold farmers and small and micro-entrepreneurs associated with the agricultural economy (Sonne, 2010). This can be a major policy shift for developing countries that focus on large-scale and industrial agriculture and base their innovation policies on such economic structures. The underlying issue is that as long as rural communities are relegated to providing low-value labour services to large-scale business, they will remain outside innovation processes and in poverty. Thus, innovation that will reduce poverty needs to be nurtured and supported among entrepreneurs from the rural community proper, as well as through a network of extension services. Such policies call for an increase in STI and research and development relevant to small-scale farmers and accompanying human capacity building efforts. (UNCTAD, 2009b)

22. Successfully shifting the policy focus to small-hold farms and entrepreneurs will depend on establishing awareness about their role in the innovation process. Chances are better if policymakers embrace a systems-of-innovation model for managing STI policy: farmers and rural entrepreneurs are an established element in the system, together with their communities, local firms and other STI stakeholders, but in particular Government.

23. This is not to say that STI in large-scale agriculture should be left out of development policy; quite to the contrary, the Green Revolution of the 1960s which led to the elimination of starvation in many developing countries was based on a supply-push and science led STI strategy with a hierarchical, to-down, and linear model of innovation. However, such policies have not improved the livelihoods of all rural communities, in particular in the least developed countries of Sub-Saharan Africa where neither the proportion of the rural population nor the incidence of poverty has changed significantly – in fact several indicators have become worse – during the last 20 years (IFAD, 2011). The case of how policy influenced the growth of a commercial market in cassava in Zambia (Box 4), and its multi-stakeholder, innovative and pro-poor orientation can be considered as replicable in other poverty-stricken areas.

Box 4. The Cassava value chain: The case of East Africa^a

Cassava (or manioc), is extensively cultivated in many developing countries as a source of edible starch. It is the third-largest source of food carbohydrates in the world with global production exceeding 100 million tons. The Democratic Republic of the Congo, Nigeria, Indonesia, Brazil and India are the largest producers, while least developed countries are responsible for around 40 per cent of total world production.⁷ In tropical Africa about one third of the dietary energy comes from cassava. Zambia produces about 1 million tons of cassava annually.

In northern Zambia, cassava production has grown rapidly since the mid 1990s, at times overtaking maize – Zambia's other staple food. As a matter of development and pro-poor policy, in 2005 the Zambian Government established a multi-stakeholder taskforce that identified and addressed bottlenecks and analysed the cassava value chain, while a team of innovators developed and introduced new cassava varieties. The main challenge became how to develop a market to match the physical production potential of cassava. The absence of trading standards, poor market information, long transport distances and small volumes with high mark-ups, were identified as hindering factors. The taskforce proposed a demand-led strategy, focusing on market development in both trade and upstream processing industries. This was coupled with the introduction of new cassava varieties with improved tolerance to disease and pests, earlier maturity and vastly

Expanding commercial markets has motivated farmers to increase cassava production as a cash crop and, consequently, household food security in poor rural regions of Zambia has improved as well. The Zambian experience illustrates the advantages of an approach that combines value chain analysis with a multi-stakeholder to ensure that opportunities for pro-poor innovation are translated development.

^a UNCTAD, 2010b.

VII. Pro-poor innovation and renewable energy

24. Access to affordable energy is a prerequisite for achieving Millennium Development Goal (MDG) 1 – eradicating extreme poverty and hunger. If access is enabled in part from renewable sources, this would then contribute in an important manner to MDG 7 – ensuring environmental sustainability. The use of renewable energy sources can help bridge these two MDGs and set developing countries on a low-carbon development path, but only if policy support enabling such pro-innovation is in place and functional. (UNCTAD, 2011b) Many pro-poor renewable technologies are either non-electrical or provide off-grid electricity. This is in contrast with the conventional understanding that energy production is done on an industrial scale a distributed through nation-wide grids or distribution networks. The technologies also differ in scalability and point of impact – while some improve energy efficiency, others squarely aim at production. The following examples are limited to renewable technologies of biomass, to better illustrate issues related to rural poverty, which is the dominant form of poverty in most developing countries.

⁷ FAO Statistics, <http://faostat.fao.org>.

25. Biomass is perhaps the oldest energy technology known to humanity. According to recent research, half of the developing world's population, of which half a billion in sub-Saharan Africa, regularly use traditional biomass (fuelwood and charcoal) for household energy (Cotula et. al., 2008; IEA, 2006). Modern forms of biomass, such as biogas, have become widely used in many developing countries, including China, India and Pakistan. Their experience indicates that the policy challenge is how to stimulate the effective use of STI to promote better and greater biomass use, in particular in rural areas, to spur growth and support socio-economic development while maintaining a neutral environmental impact or even improving sustainability. In practice, in this case the sought outcome would mean that small-hold farmers would adopt farming practices favourable to biomass production and that rural communities would engage in the construction of biogas digesters in order to improve access to energy (both in terms of availability and stability of supply and the reduction of price volatility).

26. However, energy production is only half the story: the efficiency and effectiveness of energy consumption and its impact on health and sustainability are important factors as well. One example of improving efficiency in the use of energy is the use of improved cooking stoves, which still burn traditional biomass or fossil fuels, health problems brought on from the smoke from open fire cooking, and in particularly respiratory and eye diseases, as well as birth defects, are serious development issues for many poor communities. Modern stoves not only alleviate these problems but also, being more efficient, burn less fuel thereby freeing up income for other uses.

27. A critically important policy measure is to establish regulation that would restrict the allocation of arable land on which the rural poor actively depend for their livelihoods, to large-scale biofuel crops. This is a key issue given that the rural poor may not always be able to voice their concerns or represent their interests on par with representatives of large business and national institutions interested in industrial biofuel development. It is obvious that an innovations system approach, with its inherent focus on relationships and linkages among stakeholders – including the rural poor – can provide a better policymaking framework for developing and implementing STI policy in renewable energy.

28. Along with maintaining food security, the gender perspective is a particularly acute issue in the context of biological renewable energy. Faced by expanding commercial biofuel programmes and businesses, women are more vulnerable to displacement as their access to land is typically eroded faster than for male-held farms (IUCN, 2007). While agricultural labour in many developing countries is dominated by women, their participation in land ownership is often insignificant, either because they are too poor to own any land or because land ownership is controlled and registered by the male members of the family. General rural poverty also means that women have access to land of lesser quality which may be the prime target for large-scale biofuel development.

29. However, it should not be misconstrued that biomass development is, by definition, a negative for small-scale farmers. Biofuels can help to revitalize growth and innovation in the often stagnant agricultural economy of the rural poor and therefore reduce structural or long-term poverty in their communities. What is important is the correct assessment and choice of innovation policy model.

30. An interesting example of small-scale biofuel innovations is the cultivation and processing of *Jatropha curcas* in Mali. Small-scale jatropha cultivation was encouraged by the Government and jatropha-based biodiesel is being promoted for use for electricity generation and transport. A number of development agencies (GTZ, succeeded by Mali

Folkcenter Nyeta⁸) have been supporting rural communities in developing jatropha biofuel. The Mali Government has deemed the project successful and has ventured into a second stage, scaling up production to satisfy the energy needs of more than 10,000 people living in rural agricultural areas (UN-Energy, 2007). The technology has sparked interest and there have been projects in 16 African countries exploring its potential.

31. The objective of most Jatropha biofuel projects was to invigorate rural development. As Jatropha is non-edible and can grow on poor arid land, its cultivation does not necessarily conflict with food agriculture. However, such “advantages” are theoretical: in practice, Jatropha yields the most oil when grown on fertile soil in regions with adequate rainfall. Alternative Jatropha oil products are soap and soil enrichment with the oil cake left over after pressing, and these and other exploitations are subject to distinct innovation paths. While there have been many attempts to identify and harness the best technology for exploiting Jatropha, the final economic impact will be subject to many conditions, most importantly to the economic relations in land ownership and leasing. In general, it may not be an easy task to convince the rural poor to shift their land use towards biofuel production like Jatropha, as this in itself carries risks for which they may neither be prepared nor have the resources to bear.

32. What the jatropha example shows is the need to integrate STI policy with overall development policy and this means the scrutiny and consideration of economic relations and linkages, including those of ownership and position in the value chain. An equally important component of development policy is finance and its relation to STI is noted in the following section.

VIII. Financing pro-poor innovation

33. Innovation is an important factor for poverty alleviation and therefore a fundamental component of development policy. However, in order to put policy into practice, financial resources need to be available for pro-poor innovation and entrepreneurship. Finance, together with a supportive regulatory environment and human capital, is one of the pillars of entrepreneurship.

34. Financing innovation often means investing in a product or service that may (or may not) prove to be novel in its market and thus, due to uncertainties, information asymmetries and potential moral hazard issues, investing in innovation has more often been seen as a venture, while debt-based financing has traditionally held a minor role (OECD, 2006; Hall, 2010). In developing countries with nascent capital markets and a dearth of venture capital and angel investors with an appetite for risk, there can be a role for public policy in incentivizing creditors to engage with innovative entrepreneurs. (Aghion et al. 2007) suggest that relaxing credit constraints has an important positive effect on the start-ups financial development in a country (private credit and the size of market capitalization) strongly influences entry and post-entry growth of small. However, to develop policy to this effect would require a broader understanding of the innovation process and thus a more holistic systems approach to innovation, and by analogy to innovation financing, is required.

35. The relation between pro-poor innovation and financing can be complex. Investments in innovations may have benefited large-scale agriculture but would not necessarily be relevant for small farmers and the rural poor. Small-hold agriculture may not

⁸ Source: http://www.underutilized-species.org/Documents/PUBLICATIONS/jatropha_curcas_africa.pdf.

have access to finance from large or formal financial institutions and would have to rely on money lenders who, besides proposing usury interests rates, may not have a strategic stake in supporting or advancing innovation. Indeed, an increase in the availability of credit can lead to a reduction of finance for the rural poor as larger loans, being cheaper and easier to manage and having smaller transaction costs may crowd out small-hold farmers.

36. Mobilizing local resources and financing non-farming activities, mainly through micro-finance based policies, in the late 1990s and thereafter, have shown that the concepts of promoting entrepreneurship and including women through targeted gender policies, where critical components for success. This is coupled with the notion that financial institutions, including micro-finance, can be a key component in accumulating and diffusing knowledge and thus assisting innovation processes among the rural poor. In fact, from a policy perspective, access to knowledge needs to be considered as a basic development component, alongside the provision of health and education services, and clean water and energy (Peachey and Roe, 2006).

37. In general, and mimicking the established shift in innovation policy thinking towards a systems approach, policy on financing for development in poor and rural areas has moved away from developing credit supplies towards a systems perspective where a number of factors need to be considered beyond the elemental economic activities. While micro-finance has changed the view held that rural poor are un-bankable, as it deals with people that are emerging from the informal sector and subsistence agriculture, the focus will be on improving basic welfare and reducing vulnerability, rather than outright entrepreneurial innovation (Sonne, 2010).

38. Policy action can be targeted at several levels. One would be at educating entrepreneurs on the scope of options available from public or private financial sources, including micro-credit. Micro finance institutions can benefit from assistance in capacity-building that would enable them to better assess the potential of small but innovative start-ups and thus ease the award of finance. Risk sharing through joint-financing among development stakeholders can be encouraged. Finance schemes play an important role in developing countries and efforts should be made to boost their effectiveness and diffusion. Finally, Governments need to ensure that the tax, legal, and regulatory environment does not, at the very least, disadvantage small innovative firms.

IX. Conclusions and issues for discussion by experts

39. Policymakers in developing and transition economies should ensure coherence among national development policies affecting entrepreneurship and innovation, and more generally, pro-poor private sector development, in accordance with Poverty Reduction Strategy Papers (PRSPs) and other national development strategies. Further, a multi-stakeholder dialogue process is critical to ensure that the interests of the poor and disadvantaged sectors of society, such as women, youth, rural and micro entrepreneurs are adequately considered.

40. Governments need to support efforts to build domestic productive capacity, providing a strong enabling legal and institutional framework, as well as the involvement of investment promotion agencies in attracting TNC partners. Finally, policies need to address the negative consequences and risks posed by global value chains by strengthening the bargaining power of local partners, ensuring fair competition, and protecting labour rights and the environment. In order to achieve these objectives, the following recommendations are provided:

(a) Support the transition from the informal to the formal sector. National policies affecting entrepreneurship must focus on delivering support to entrepreneurs from

the transition from the informal to the formal sector – that is, facilitating business creation, registration, access to finance, business intelligence, training, etc. The focus on the business facilitation and the formalization of enterprises is key to position developing country firms to take advantage of opportunities to create and deliver value in national and global value chains. Further, formalization is a critical step for a large number of poor entrepreneurs, who find themselves in the informal sector, to be able to be active players in the entrepreneurship ecosystem.

(b) Highlight the role of entrepreneurship education to address negative biases faced by disadvantaged groups. In today's knowledge economy, education is a critical determinant of countries' abilities to overcome development challenges. It is therefore imperative that basic education take into account the importance of entrepreneurship in poor communities, to position prospective entrepreneurs to take advantage of business opportunities in national and global value chains. Pro-poor education policies aimed at promoting entrepreneurship development must therefore focus on adapting curricula to enable youth to understand the basic concepts of entrepreneurship. Effective education policies could also help to address biases or social norms that disproportionately affect groups such as women from becoming actively involved in the private sector and choosing to start their own businesses.

(c) Integrate poverty issues in innovation policy design and consider the innovation dimension in pro-poor interventions. Pro-poor innovation is a complex issue that deserves the acute attention of policymakers in the STI domain as well as within the concerns of overall development policy. Pro-poor innovation happens at many levels and policy action should address and support these processes. Policymakers should be aware that among the myriad of firms, public and civil society organizations, the poor are easily left out of the policy dialogue as they hover between the formal and informal economy. It can be difficult for the rural poor to define and communicate their STI needs to policymakers, given differences in culture, technological awareness and education. However, good communication can ensure that STI strategies result in the generation of jobs in poor communities and an improved sustainability of their environment.

(d) Consider local capacities as an important source of innovation capabilities. Entrepreneurs with most potential to positively effect poverty alleviation are the ones who innovate and who are continuously looking for new opportunities. They may often be working above the scale of micro-enterprise yet can be lost on the radar of policymakers looking to address innovation in large-scale and export-led manufacturing. Improving the capacities of these entrepreneurs needs heightened attention particularly in rural development policies. To match their dynamism and innovation capacities, the rural economy will need a skilled and educated population, with a positive gender policy and with special focus on skill development and education of youth and children.

(e) Issues for further discussion:

(i) What policies facilitate integration of the poor into global value chains and maximize positive spillovers of FDI in terms of entrepreneurial opportunity creation, technology upgrading and export growth?

(ii) How can the recommendations and tools provided by UNCTAD's Entrepreneurship Policy Framework be best applied to achieve pro-poor growth?

(iii) How can policy better assist poor communities in identifying, adapting and absorbing technologies through pro-poor innovation?

(iv) How can government improve the effectiveness of the interaction of development and technology stakeholders to release the innovation potential of poor communities?

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