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Linking Agricultural Innovations to Knowledge Sharing in Africa

Most recent African indigenous knowledge (IK) literature, especially in agriculture, emphasizes that Africans are informed innovators. This literature is filled with success stories (see for instance Chaiken 1998, Ndoum 2001 and Nwokeabia 2001). Excellent examples of local innovations and discoveries include crop breeding, grafting against pests, water harvesting, soil management, conservation and processing. Indigenous agricultural innovations have continued to be important as most of the locally-grown food is for local consumption.

In Nigeria, for instance, the informal agriculture sector, mostly using indigenous methods and techniques, has an estimated worth of about US \$12 billion, providing income for an estimated 81 million people.¹ The knowledge in the sector can be characterized as:

- rooted in particular places, experiences and unique climatic conditions,
- orally transmitted or transmitted through imitation and demonstration,
- widely relevant for poor women,
- constantly reinforced by experiences and trial and error and adapting, pragmatic,
- shared occasionally,
- usually asymmetrically distributed and preserved within a group,
- may involve specialists by virtue of experience or authority, and
- situated within a culture/society including technical information.

At a general level, new approaches may still be needed to address some of Africa's problems. There is some unique knowledge among the local producers that can contribute to help make hunger and malnutrition history, and reduce grass-root poverty, especially among poor women without changing cultural food

patterns in Africa.

But, too often African indigenous innovators are overlooked in the search process for new solutions. Two main reasons can be attributed for this: (i) the innovations and discoveries they produce are mostly incremental meaning that they do not carry high income gains; and (ii) culturally, there is little knowledge sharing due to lack of records and the application of innovations in isolation. Indigenous innovators face uncertainty because of a lack of organizing frameworks. They lack information as to who needs innovations, how to find the users, when to approach them, why they should be approaching them, and most importantly, whether the receivers will appreciate the effort.

The consequence of the lack of an organizing framework is that innovators mostly become indifferent to diffusing their knowledge, and not utilizing potential scale effects,

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efficiency and productivity gains from their innovations. The system can now be said to be caught in an ‘indifference-trap’. People thus hold back on productive innovations and discoveries that they would have otherwise passed to others.

This note explains the link between asymmetric information, the indifference-trap, loss of efficiency gains and stunting of the growth of indigenous innovations and proposes a pragmatic solution. The paper describes, with some empirical evidence, how indifference feeds into the process, motivations and dynamics of the indifference-trap.

The Indifference Trap

An indifference-trap occurs in a system when innovators no longer share potentially efficiency and productivity-enhancing innovations and discoveries. Commonly, an innovator in the traditional system has three options:

- being open and share knowledge,
- being secretive,
- being indifferent and doing nothing.

This paper discusses the third option, which often leads to a breakdown in the flow of information and innovation.

Mainly, the lack of a sharing network is the central factor contributing to asymmetric information among active agents, and hobbling secular economic and social development in indigenous agricultural activities relates to poor local knowledge sharing networks. Innovators just do not have enough information about their counterparts. In the presence of these uncertainties, the indigenous innovators adopt an indifference attitude, mostly leading to indirect restriction of the innovation, among the innovators and producers. The result is a deficit in the (incremental) technological progress.

The overall deficit in the incremental technological progress from lack of sharing is explained through what we call a “continuous but non-additive innovations” effect, instead of a “continuous and additive innovations” effect. In a continuous but non-additive innovations situation, one gets a rise and collapse of innovations and a highly unstable production process. Basically, this occurs when an economy is caught in the indifference-trap with isolated agents innovating on the same knowledge system over and over again. Because of isolation and barriers to flow of information and absence of a knowledge sharing network, these innovators are indifferent to the public utility/efficiency-impact of their innovations being widely diffused. Resulting innovations are also used in isolation and may collapse when the innovators die.

This rise and collapse of isolated innovations may explain

why formally self-sufficient African societies are suddenly becoming unable to take care of themselves. In an indifference-trap, the value of these innovations will continuously fluctuate between their current values and zero (the current innovation is not additive to the previous innovations and collapses to zero when the innovator ceases to apply it). Even though there may be infinite amount of innovations on a particular knowledge e.g. soil management, they do not become additive because of indifference and information asymmetry. The impact of such isolated innovation processes on general technological and economic growth is short-lived.

Testing for Indifference

As such, African agriculture, caught in a seemingly perpetual indifference-trap doomed to technological stagnation and low productivity. While accepting that local agriculture is of considerable value and that Africa’s local producers are both richly innovative and caught in an indifference-trap, the larger question is: how many African farmers are actually indifferent. Using a sample of 243 agriculturists, the author tested this through interviews.

In the survey of 243 local agriculturists, while about 90% admit generating new knowledge on their own, none cared to record or pass this knowledge on to other agriculturists. As a general response, only 1% of the sample was willing to pro-actively share its innovations, on the condition that it could identify in advance a person who needed them. Respondents make it clear that basically they consider sharing useless, thus illustrating the existence of the indifference-trap. The result also proved that indifference is a serious setback to the diffusion of innovations in Africa.

However, the responses changed significantly when the issue of public assistance was linked to the process of diffusion of knowledge and innovations. A much higher percentage - 75% -would now record its new knowledge/innovations, and 81% would pass on what it knew to other agriculturists in the locality.²

Need for a sharing network

However, in spite of an indifference trap, African agricultural producers continually need new environmentally-specific innovations and hence, processes and products to deal with changing supply conditions and to use core competencies in a profitable way. To continually increase efficiency and productivity, producers need the support and

advice of others. Lack of a cohesive learning and sharing network for innovations detracts from the ability of isolated individuals to take advantage of generally available skills. Therefore, an important obstacle to sharing indigenous knowledge in Africa, particularly in the low-income sector of agriculture, is the absence of a sharing mechanism.

Organizational conditions must be changed to gradually enable people to share and connect to those who may add to their knowledge. In fact, the author observed that indigenous African agricultural producers often do feel the need to learn and share knowledge with others and seeks to explain the role of a knowledge sharing network in this process.

It is generally accepted, that while innovations and discoveries do take place in Africa, they are largely unknown. Public policy, laws, institutions, customs and regulations - factors that affect a knowledge sharing network - determine the intensity and direction of people's innovative activities and the impact of innovation on the efficiency and productivity of innovations.

In a knowledge sharing network, indigenous innovators and adopters can quickly and easily relate to one another, contributing to collective learning and nurturing a willingness among innovators to connect.

In a nutshell, knowledge sharing stimulates economic development in four main ways:

- facilitates knowledge transfer;
- encourages further innovations;
- catalyzes for new technologies and businesses; and
- creates joint ventures, and other income generating activities.

The higher the number of adopters in this network, the larger the probability that the user will further innovate - a continuous and additive innovation effect. Where only few people bear highly productive knowledge among African indigenous producers (for example herbalists), working with these few to promote their knowledge can help a system achieve excellence by tapping the capacity of the best.

Allen (2001) also argued that in endogenous technological advances, imitations and innovations determine the long-run economic growth-path of a country. Growth of technological knowledge produces useful outputs, and technological advances define the values of resources and the rates of utilization, hence impacting sustainability in a sector such as African agriculture.

To complement the innovative achievements of African local agriculturists, a mechanism is needed to promote, with participatory public support, a sharing and additive system of innovation among the lowest-income producers of Africa. Incubating local agricultural innovations can help to

unlock the secrets of the economic and cultural transformation of these societies. The technological and secular approach to innovation systems is based on putting these innovations into the public domain to achieve a scale effect, and increasing the productivity of the poorest.

Conclusion

This study promotes the creation of local knowledge sharing networks to help innovators share their inventions with potential users and other innovators to both gain recognition for their work and to increase knowledge generation for further innovation. The study bases its observations on interviews with community based innovators. It calls for public support for creating or fostering local knowledge sharing networks. The policy objective of a local knowledge sharing network should be to find workable strategies to increase allocative efficiencies, increase their scale effects, and stabilize their growth in local economies. The policy would have to first stimulate a need to share knowledge among disparate innovators. Second, the policy would have to provide for knowledge "connections" to enable innovators, adopters and intermediaries to interact, for innovators to enhance the innovation process, for adopters to find solutions to their problems and for intermediaries to help connect and support interactions or improve the knowledge sharing environment.

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Footnotes:

¹ Estimated by the author using national statistics. Informal usually are those economic activities that are not registered, do not pay taxes. It is part of each sector in Africa and estimated to provide income for up to 600 million Africans (see also ECA 1992).

² The questions are: a.) are you willing to continue generating new knowledge/innovations if given assistance; b.) are you willing to record your new knowledge/innovations if given public assistance; and are you willing to teach to other agriculturists in your locality any new knowledge/innovations you may acquire if given assistance?