INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)

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Contribution of Uganda

to the CSTD 2018-19 priority theme on 'The role of science, technology and innovation in building resilient communities, including through the contribution of citizen science'

From:
Sent:
To: UNCTAD-stdev
Cc:
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1. Can you give examples of projects/policies in your country aimed at using science, technology and innovation (STI) to build resilient communities? What are the main challenges confronted while trying to implement these projects/policies in your country or region?

Some examples of projects/policies in Uganda aimed at using STI to build resilient communities?

i. Low Cost Irrigation Schemes Project

The Low Cost Irrigation Schemes Project started under College of Engineering, Design, Art and Technology (CEDAT), Makerere University in 2010. The project has a major objective of locally manufacturing low-cost water pumps to be used by small holder farmers to irrigate their crops and guarantee all year production and hence improve food security of the country.

The aim of the project is to design and manufacture low cost solar powered pumps for supplementary irrigation needs of small-scale farmers hence contributing to increased sustainable agricultural productivity and food security.

ii. Production and Application of Phytolacca Dodecandra to Control Vector Borne Diseases

The project set out in the 1990s to promote the production of Phytolacca dodecandra, a locally abundant unutilized wild plant, as a natural biodegradable and environmentally safe product to control fresh water snails and other vectors like mosquitoes. It was inspired by earlier work at the Institute of Pathobiology, Addis Ababa University, on use of phytolacca dodecandra to control bilharzia in Ethiopian communities. It built on the indigenous knowledge that Phytolacca dodecandra has successfully been used by communities in Ethiopia to control animal diseases as well as human disease like Bilharzia. Phytolacca dodecandra, Omuhoko/Luwooko, as locally known by some communities in Uganda is a perennial plant commonly found in Africa. It is used as traditional herbal medicine to treat various animal and human diseases. Some traditional birth attendants use it on women in difficult labour.

The project tested Phytolacca dodecandra for its effectiveness and subsequently developed Snailtox; a potent insecticide for the containment of snails that cause bilharzia in humans and liver flukes in livestock. It has scientifically been proven to be an effective molluscide against fresh water snails-the vectors for Liver fluke in cattle. It has also been used to control Biomphalaria snails vectors of bilharzia in man.

To process the molluscide from Phytolacca dodecandra, mature but unripe berries of the plant are harvested, dried and milled into a molluscide powder under the commercial name Snailtox. The powder is soaked in water for 12 hours. The extract is then used as a molluscide. It is applied in predetermined amounts to give a final concentration range of

15-20 parts per million in water dams and ponds infested with snails.
Repeated applications of this extract eliminates the snails. Snailtox is now commercially used to control liverflukes in cattle and is saving cattle farmers millions of shillings.
Besides being affordable, it easy to apply and environmentally safe.
It controls snails that transmit bilharzia, larvae of anopheles mosquitoes, which transmit malaria and vectors which transmit river blindness, in addition to other unexplored applications.
The project is now promoting the planting Phytolacca dodecandra against the common trend of planting eucalyptus and other exotic trees. The project has sought to engage the community through an outgrowers model where community members grow and sell phytolacca dodecandra to the project for processing into snailtox.

iii. Malaria Prevention as Household Level using Artemesia-annua-avacado powder-lemon grass blend beverage
This is one of the outstanding innovations contributing to sutainability in the area of healthcare. The innovation is based on the Artemisia annua anti-malarial beverage- Artavol where medicinal plants have been converted into an antimalarial product with pharmaceutical characteristics. Artavol was developed by a Ugandan pharmacist in collaboration with scientists at Natural Chemotherapeutics Research Institute Laboratory and Makerere University. This innovation was conceived to address the widespread devastating effects of malaria using a readily available and marketable beverage – tea to deliver the solution. The project explored the outcome of the use of powder-lemon grass blend herbal beverage for malaria prevention and eradication at household and community levels. In the research conducted by the team, it was found that after eight months of taking the beverage, the subjects did not develop any fevers associated with malaria. Among the study participants, hospital visits for fever related causes fell by 80 per cent as compared tothe control subjects who visited hospital more for fever related to malaria.
Artavol, the product of this innovation has been patented at ARIPO and is currently produced and widely distributed through pharmacies and drug shops in Uganda. In 2014 the Ministry of Health in Uganda recognized th innovation and awarded the principal investigator for outstanding achievement in research for herbal prevention of malaria. Artavol production currently stands at 6,000 one hundred-gramme tins per month. Distribution is mainly through pharmacies, exhibitions and during school visits to raise awareness about the product. Artavol is distributed by pharmacies in Fort Portal, Jinja, Kampala, Lira Mbale, Mbarara, Soroti, Tororo, and Wakiso districts in Uganda. At international Artavol has been sold to Ghana with order received from Niger, Mozambique, and Senegal. However, the freight costs are still prohibitive. Moreover, this large scale shipping would require licensing the product in those countries as a medicine for malaria control. In order to address the high costs of equipment, Artavol Programme has a collaborative arrangement with Makerere University College of Engineering Design Art and Technology alumni to fabricate production equipment.
Besides controlling malaria, a significant outcome of this innovative endeavor is the new discovery that regular consumption of Artemisia among HIV/AIDS patients increases their CD4 count.
In terms of sustainability the ARTAVOL concept has evolved into a Center for Science-driven Traditional Medicine and Drug Development at Mbarara University of Science & Technology (PHARMBIOTRAC-MUST). The centre sponsored by the Government of Uganda and World Bank under the auspices of the African Center of Excellence for Southern and Eastern Africa (ACE II). The objective of this initiative is to train and build a critical mass of graduate scientists specializing in traditional medicine and pharmaceutical biotechnology and to link traditional medicine research outputs to Industry in the region. It is envisaged that at the end of 5 years 30 PhDs from the various disciplines specializing in traditional medicine will be trained; new drugs will be discovered and developed; 60 Master students adding scientific and economic value to Traditional Medicine; 500 Herbal Medicine producers trained through short courses to improve quality, safety and efficacy of their herbal products and 5000 traditional medicine practitioners trained to improve primary healthcare service in the region. The innovation has therefore unveiled enormous opportunities for transdciplinary research that integrates indigenous traditional knowledge.

Major challenges
- Commercialization of the R&D outputs
- Poor involvement of the private sector
- Lack of venture capital

2. Can you provide examples of policies/projects/initiatives aimed at using/promoting citizen science to build resilient communities? Do these projects incorporate a gender approach? What are the main challenges confronted in implementing these projects?
- Uganda National Climate Change Policy

- National STI Policy 2009

3. What are the actions that the international community, including the CSTD, can take to leverage the potential of STI in building resilient societies, including through the contribution of citizen science? Can you give any success stories in this regard from your country or region?

- Supporting the alignment of relevant policies to make them responsive to building resilient societies,
- Building capacity of STI policy makers
- Advising on a workable model that leverages the participation of private sector in the innovation cycle

4. Could you suggest some contact persons of the nodal agency responsible for projects/policies, related to resilient communities, STI and the citizen science as well as any experts (from academia, private sector, civil society or government) dealing with projects in this area?

We might contact them directly for further inputs or invite some of them as speakers for the CSTD inter-sessional panel and annual session.

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ii. Prof John Baptist Kaddu - johnkaddu2012@gmail.com
iii. Professor George William Otim Nape, Africa Innovation institute - wonape@afrii.org

5. Do you have any documentation, references, or reports on the specific examples on the priority theme in your country or region?

- National science, technology and innovation plan 2012/2013
- Uganda's intended nationally determined contribution (INDC)
- Ministry of Science, Technology and Innovation | The Republic of Uganda