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The Foundations of Food Security

Ensuring support to small-scale farmers managing agricultural biodiversity

Susan H. Bragdon

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Food & Sustainability

The Food & Sustainability programme of the Quaker United Nations Office addresses the complex and intertwined issues of trade and innovation policy and how they relate to poverty, hunger and food insecurity. We look at these issues with a particular focus on small-scale farmers, including fisherfolk, forest dwellers and pastoralists, a critical yet largely unheard voice in trade and innovation policy-making. Our work is collaborative, providing the space where it is safe to think, share and explore creative alternatives to a food system that does not work for the majority of the world's population.

Half the world's food today is produced by 1.5 billion small-scale farmers. The figure is higher for food produced in the non-industrialized world—up to 80%. Small-scale farmers are stewards of biodiversity; they maintain, adapt, improve and distribute plant varieties. The agricultural biological diversity they enhance and develop provides a major contribution to health and nutrition. They find ways to deal with new pests and disease. They are also active players in critical ecosystem processes, developing and adapting ideas for nutrient cycling, effective water use and the maintenance of soil fertility, both traditional and from elsewhere. Who could be better placed to help the world cope with global environmental change and feed the world than over a billion small-scale farmers living, working and experimenting on the front lines of change?

Our work aims to ensure that trade and innovation policy are supportive of, and do not undermine, the critical role of small-scale farmers in providing local and global food security and the resilience we will need to facing ever-increasing environmental change.

For more information please contact:

Susan H. Bragdon, Representative for Food & Sustainability
shbragdon@quno.ch

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Abstract

Access and benefit-sharing (ABS) agreements, whether through a multilateral system established by the International Treaty on Plant Genetic Resources for Food and Agriculture (IT) or bilateral systems envisioned by the Convention on Biological Diversity (CBD) or a mixed system that may arise under the Nagoya Protocol (NP), are based on a transactional approach to facilitating the exchange of genetic resources and funding their conservation. This paper argues that ABS regimes are, and will continue to be, insufficient for generating the benefit necessary to support the innovative activities of small-scale farmers in conserving, managing and actively developing the majority of the world's plant genetic resources for food and agriculture (PGRFA). Access is critical, but linking it to benefit-sharing creates false hopes as to the monetary benefits that will be generated and shared.

Recognizing only increased awareness will overcome any political, economic and social barriers to action beyond ABS, the paper first investigates why small-scale farmers and PGRFA on-farm and in situ are critical to food and nutrition security and to the resilience and sustainability of agricultural systems. Because the transactional orientation of ABS inherently limits what can be achieved, the paper maintains that a rights-based approach supported by governments nationally and internationally opens broader possibilities of predictable, stable support. The paper also observes the opportunity presented by the globally adopted Sustainable Development Goals (SDGs) to provide a framework to consider not only how ABS can be made more effective, but other means to support farmers and the sustainable use of PGRFA as required by Articles 6 and 9 of the International Treaty. After briefly exploring possible means for more stable support, the paper concludes by noting that increased private sector (industry) interest in agriculture and food systems is reason for equally vibrant governments acting in the public interest. Small-scale farming depends on appropriate government interventions at the national and global level for its structure, its support and its development.

Acronyms

ABS	Access and benefit-sharing
CBD	Convention on Biological Diversity
FAO	Food and Agriculture Organization of the United Nations
IT	International Treaty on Plant Genetic Resources for Food and Agriculture
MLS	Multilateral system of access and benefit-sharing
NP	Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Use
PGRFA	Plant genetic resources for food and agriculture
PPP	Public-Private Partnership
SDGs	Sustainable Development Goals
SMTA	Standard Material Transfer Agreement
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UNEP	United Nations Environment Programme
UPOV	International Union for the Protection of New Plant Varieties
WIPO IGC	Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore under the World Intellectual Property Organization
WIPO CDIP	Committee on Development and Intellectual Property under the World Intellectual Property Organization
WTO	World Trade Organization

I. Introduction

The International Treaty on Plant Genetic Resources for Food and Agriculture[1] (IT) entered into force in 2004 with the objectives of conserving, sustainably using and sharing the benefits arising from the use of plant genetic resources for food and agriculture (PGRFA).[2]

The IT is part of an international legal architecture governing plant genetic resources that emerged in the 1980s in reaction to a particular historical context that shaped its orientation and approach.[3] The Treaty's current state of implementation is affected by its place in a disjointed system of governance characterized by multiple unrelated bodies and constituencies.

PGRFA are the raw material for evolution.[4] Hectares of genetically uniform crops may give a false sense of food security. But vulnerability underlies this uniformity. The best known historical example of the vulnerability is perhaps the Irish potato famine. A potato blight wiped out the genetically uniform potato called the "Irish Lumper," leading to mass starvation, disease and emigration from Ireland between 1845 and 1852.[5] Without novel genetic diversity to introduce and breed with, uniform domesticated crops will not withstand biotic and other stresses.

Genetic uniformity continues to present challenges today. A contemporary example is the race to save the Cavendish banana, an important cash-crop for millions of people, enabling them to send their children to school and support their families. A new strain of the Panama disease is destroying tens of

1 http://www.fao.org/3/a-i0510e.pdf (last accessed February 22, 2017).

2 PGRFA consist of diversity of seeds and planting material of traditional varieties and modern cultivars, crop wild relatives and other wild plant species. These resources are used as food, feed for domestic animals, fibre, clothing, shelter and energy. See http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/en/ (last accessed February 22, 2017).

3 See also paper in draft form at QUNO to be published April 2017 on the history of rights and responsibilities related to small-scale farmers and PGRFA.

4 PGRFA are living plants materials (e.g. seeds or stems, including genes that have potential value for humans. PGRFA include agricultural crops and their wild relatives and "are essential in adapting to unpredictable environmental changes and future human needs." See Preamble of the IT at http://fao.org/3/a-i0510e.pdf (last accessed February 22, 2017).

5 Great Famine potato makes a comeback after 170 years. (2013, March 3). Irish Central. Available from http://www.irishcentral.com/news/great-famine-potato-makes-a-comeback-after-170-years-194635321-237569191?q=Great%20Famine%20potato%20makes%20a%20comeback%20after%20170%20years (Last accessed February 22, 2017).

thousands of hectares of Cavendish banana plantations, threatening to cause widespread poverty around the world.[6] Greater genetic diversity among banana cultivars is needed to prevent the disastrous epidemics that threaten production.

Furthermore, it is important to note that all nations are interdependent on PGRFA for their food and nutrition security; so, access and exchange is essential. In the 15th Century—the Age of Exploration—maize from the New World was transferred to Africa, where it now constitutes 50

Access and benefit-sharing (ABS) refers to the way in which genetic resources may be accessed, and how the benefits that result from their use are shared between the people or countries using the resources (users) and the people or countries that provide them (providers) (Secretariat of the Convention on Biological Diversity, 2010).

Article 9 of the IT recognizes the contribution of local and indigenous communities and farmers to the conservation and development of plant genetic resources as a basis for food and agriculture production, and places the responsibility for realizing those rights on national governments. The provisions of Article 9 are neutral with respect to the issue of the rights of farmers to save, use, exchange and seed farm-saved seed (Farmers' Privilege) (Moore and Tymowski, 2005).

The Multilateral System (MLS) is a declaration that 64 crops—crops that together account for 80 percent of all human consumption—will comprise a pool of genetic resources that are accessible to everyone. On ratifying the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA), countries agree to make their genetic diversity and related information about the crops stored in their gene banks available to all through the Multilateral System (MLS) (International Treaty on Plant Genetic Resources for Food and Agriculture, 2017).

Article 6 of the IT requires the Contracting Parties of the IT to develop and maintain appropriate policy and legal measures that promote the sustainable use of PGRFA and gives a non-exhaustive list of the types of measure that may be included (Moore and Tymowski, 2005).

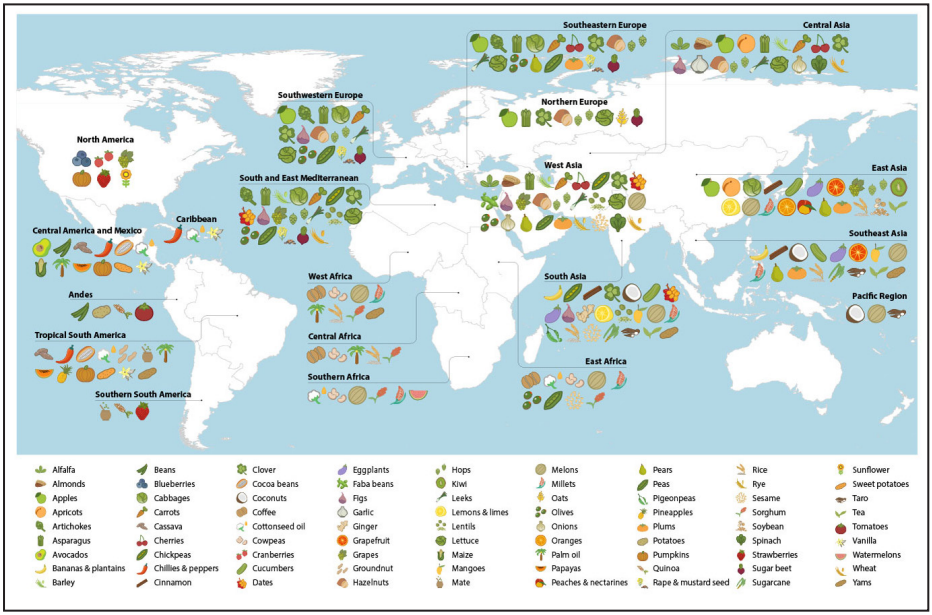
percent of the sub-Saharan African diet (Kloppenburg, 2004). It was also during this period, that the tomato was relocated to Italy, the potato to Ireland, and rice to North America. A recent study commissioned by the IT reports that the global community is inextricably interdependent with respect to PGRFA to an unprecedented degree (Khoury et al., 2015).

These examples and proof of interdependence help make the case that PGRFA are the most valuable natural resources on earth. Without them, humans cannot continue to exist. Biodiversity underpins the productivity, resilience and ultimately the security of our global food system. Farmers' varieties and wild species related to domesticated crops are the dynamic pool of genetic diversity that farmers and the global community will continue to rely on for their resistance, tolerance and immunity to stresses, even as advances are made in the field of synthetic biology.[7]

7 Synthetic biology is bringing together engineers and biologists to design and build novel biomolecular components, networks and pathways, and to use these constructs to rewire and reprogram organisms." See Khalil, A. S. and Collins, J. J. (2010). Synthetic biology: applications come of age. 11, 367-379. See ETC Group's call for a moratorium on Genetically-engineered Gene Drives at http://www.synbiowatch.org/gene-drives/gene-drives-moratorium/ (last accessed February 22, 2017).

PGRFA are arguably the most valuable natural resource on earth because without them, humans cannot continue to exist. But PGRFA do not exist in isolation, nor are they static. PGRFA depend on small-scale farmers who have been conserving, managing and developing them for almost 12,000 years.

However, it is not just PGRFA that are so important—it is this diversity combined with the role of small-scale farmers who have been conserving and developing them from the beginnings of agriculture almost 12,000 years ago that is critical (Smith, Elliott and Bragdon, 2015). Indeed, PGRFA are not static any more than small-scale farmers are static holders of unchanging knowledge, materials or management practices. Farmers' dynamic and collective systems of technology development and diffusion, experimentation, and knowledge and skill sharing with other farmers, and with public and private entities, are of immense value. They are also integral to the implementation of the IT's Article 6



Where our food crops come from: global interdependence on plant genetic resources. (CIAT)

on the sustainable use of PGRFA and Article 9 on Farmers' Rights.[8]

Small-scale farmers are being displaced by industrial agriculture, which is an intensive, high-input, linear system that tends to focus on increased production without regard to environmental, social or health costs. In fact, industrial agriculture pollutes land and water, produces 30% of global greenhouse gases, and is the biggest cause of biodiversity loss.[9] The focus on increased production and yields ignores the fact that scarcity is not the core challenge. The world already produces plenty—roughly a third more food for each of us than in the 1960s. Even after feeding to livestock a third of global grain production, 90 percent of all soy meal, and a third of the fish catch, there is still a global average of roughly 2,800 calories available per person per day. The real issues are 1)

8 Farmers' rights include the right to save, use, exchange and sell farm-saved seed; the right to share in the benefits arising from the utilization of PGRFA; and the right to participate in making decisions at the national level on issues related to the objectives of the IT. See http://www.fao.org/plant-treaty/areas-of-work/farmers-rights/en/?q=content/farmers-rights. (last accessed February 22, 2017).

9 See Foley et al. (2011). Solutions for a cultivated planet. *Nature* 478, 337-342. http://www.nature.com.proxy.lib.pdx.edu/nature/journal/v478/n7369/pdf/nature10452.pdf (last accessed February 22, 2017).

producing culturally desired food with nutritional variety essential for good health; 2) access and distribution, getting food to the people who lack it; and 3) producing without harming planetary health.[10]

All the above points to the need for a fundamental re-direction from the expansion and spread of industrial agriculture. As the IT calls for in Article 6 on sustainable use of PGRFA and in Article 9 on Farmers' Rights, there is a need to move towards support of small-scale farmers, agricultural biodiversity and agro-ecological practices to effectively address hunger, malnutrition, obesity and the rising demand for food and feed in a way that keeps people and our planet healthy.[11] This requires more than a working ABS system.

This paper takes a critical look at the current global strategy in place for supporting small-scale farmers in their role as active conservers, managers and developers of the majority of the world's PGRFA: generating benefits through transactions between "users" and "providers" of PGRFA, and redistributing these benefits in the form of project funding. Access and benefit-sharing (ABS),[12] whether facilitated through bilateral contracts or a multilateral system with a standard material transfer agreement (SMTA), is premised on the theory that the use of PGRFA will generate sufficient benefits to fund conservation.

Looking objectively at current benefit flows and critically at the potential for future benefit flows, this paper suggests that this strategy is, and will continue to be, insufficient for safeguarding PGRFA. Access—and hence the multilateral system (MLS)—remains critical, but linking it to benefit-sharing creates false hopes as to what will be generated

10 Statement entitled "The Time is Ripe for Governments to Support Sustainable and Food-Secure Farming" currently in press to be published in March 2017. For more information visit QUNO website: http://www.quno.org/timeline/2016/11/expert-consultation-role-government-supporting-small-scale-farmers-and-agricultural (last accessed February 23, 2017).

11 Reflecting these interlinkages, FAO has recently created a new division and a new department: an FAO Departments on Agro-Ecology and Land and Water Division. http://fao.org/family-farming/themes/agroecology/en/ and http://www.fao.org/nr/aboutnr/nrl/en/ and a Department on Climate Change, Biological Diversity, Land and Water http://fao.org/fileadmin/user_upload/faoweb/images/organigramme/FAO-Organigramme-February_2017-en.pdf (last accessed February 22, 2017).

12 ABS "refers to the way in which genetic resources may be accessed, and how the benefits that result from their use are shared between the people or countries using the resources (users) and the people or countries that provide them (providers)" https://www.cbd.int/abs/infokit/revised/web/all- les-en.pdf (last accessed February 22, 2017).

An Indian women's group in a field of Finger Millettolerant rice in Vietnam. (Bioversity International)

and shared. As will be discussed in section II below, the multilateral system of ABS established by the IT is a vital piece of the international legal architecture contributing to food and nutrition security. But the benefit-sharing component will need to be complemented by other non-ABS measures to ensure sufficient, predictable and stable support for small-scale farmers and the PGRFA they maintain and develop.

Section II of this paper describes the international legal architecture related to ABS, small-scale farmers and PGRFA. Section III examines how ABS regimes have been functioning thus far and if they are living up to expectations. In light of this examination, Section IV discusses the future of ABS regimes concluding that the benefits that can be generated by ABS regimes are inherently limited by their transactional nature. Section V looks at what the limitations of ABS regimes mean for the private and public sector in terms of what is needed to support small-scale farmers and PGRFA. Section VI explores what is needed to move beyond a transactional approach to support of small-scale farmers. Section VII concludes by reiterating the need for a fundamental re-direction of current trends and notes

with the political, economic and social will we can do this in the public interest and in the interest of small-scale farmers and the PGRFA they maintain and develop.

II. The International Legal Architecture

The international legal architecture governing PGRFA and small-scale farmers is made up of a number of international bodies with overlapping mandates. In addition to the IT, these include the Convention on Biological Diversity (CBD) and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (NP); the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore and the Committee on Development and Intellectual Property under the World Intellectual Property Organization (WIPO IGC and WIPO CDIP); the World Trade Organization (WTO) and its Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement; and the International Union for the Protection of New Plant Varieties (UPOV).

This paper focuses on the CBD, the NP and the IT because these are the

> Access remains critical, but linking it to benefit-sharing creates false hopes as to what will be generated and shared.

treaties that establish the concept and mechanisms for ABS. ABS was conceived under the CBD and the IT as a reaction to the inequity that arose with respect to PGRFA within this broader context.[13]

The CBD was adopted at the First Earth Summit in Rio de Janeiro in 1992. It shares the objectives of the IT but applies to *all* types of genetic resources (except human), not just PGRFA. Although the CBD was originally proposed to the Executive Director of the United Nations Environment Programme (UNEP) by the government of the United States as a treaty with a conservation focus,[14] the CBD negotiators almost immediately expanded the focus to include sustainable development

13 See paper to be published by QUNO in April 2017 on the evaluation of the larger legal institutional architecture including the WTO and WIPO entitled Rights and Responsibilities: The Evaluation of the International Legal Architecture related to Small-Scale Farmers and Agricultural Biodiversity.

14 Personal communication of author with the late Dr. Mostafa Tolba, then Executive Director of UNEP, the UN programme that oversaw the CBD negotiations.

and equity considerations. This was spurred by a growing sense of imbalance between technology-rich countries with the ability to capture economic value from biodiversity and biodiversity-rich countries with no parallel mechanisms to reward the long-term custodians and active developers of these resources.

Technological advances in the 1970s, particularly involving molecular biology and genetic engineering, led to an expansion of the scope, breadth and international cooperation in the recognition of plant-related intellectual property rights. [15] [16]

The CBD responded by creating a new corresponding tool: ABS contracts. This tool was designed to allow "provider" countries – in particular, the custodians and developers of those resources – to capture the economic value of their diversity. Article 15, the ABS provision of the CBD, asserts a country's national sovereignty over its natural resources and hence its ability to regulate access to genetic resources under its jurisdiction. The treaty article uses terms such as "prior informed consent" and "mutually agreed terms" that imply a bilateral negotiation between a user and a provider, whereby contractual arrangements are made for access and benefit-sharing.[17]

The CBD was negotiated by representatives from national Ministries of Environment who had little understanding of PGRFA. This lack of understanding was noted in a resolution (when the CBD was adopted) asking the Food and Agriculture Organization (FAO) to consider outstanding issues like the status of *ex situ* collections of PGRFA and Farmers' Rights.[18]

15 In addition, conceived as being a tool to balance incentives for innovation with the desirability of getting new innovations out to the public, intellectual property rights over the past 40 years have been characterized by the expansion of the rights part of intellectual property policy and a contraction of interest in societal good. See Chapter 3 of report entitled Integrating Intellectual Property Rights and Development Policy (2002) by the Commission on Intellectual Property Rights http://www.iprcommission.org/papers/pdfs/final_report/ciprfullfinal.pdf (last accessed February 23, 2017).

16 Exemptions to intellectual property rights also shrunk. Most notably, the International Union for the Protection of New Plant Varieties Convention has incrementally narrowed and further qualified provisions allowing farmers to save, re-sow, exchange and sell planting material that is protected by Plant Variety Protection, and allowing plant breeders to use protected varieties in their work without prior consent from the rights holder. See Batur and Dedeurwaerdere (2014). The TRIPS Agreement was being negotiated simultaneously with the CBD. Adopted in 1994, the TRIPS Agreement obliges State Members to initiate policy and legal processes to adapt their intellectual property rights legislation to TRIPS standards, including developing legislation to protect new plant varieties. See https://www.wto.org/english/tratop_e/trips_e/intel2_e.htm (last accessed February 22, 2017).

17 See www.cbd.int/convention/text/ (last accessed February 22, 2017).

18 See https://www.cbd.int/doc/handbook/

The IT was negotiated in response, under the auspices of the FAO and by delegates from Ministries of Agriculture. One of the IT's goals was to establish MLS, with the understanding that PGRFA have been moving around the world throughout the history of agriculture and the heritage of new varieties is often unclear. Determining a resource's country of origin as defined in the CBD is problematic.[19] Another key concern was that bilateral arrangements might inhibit the exchange of PGRFA when all countries, developed and developing alike, are highly interdependent for food security.

The IT therefore established a MLS with rules for access and benefit-sharing for PGRFA listed in Annex I of the treaty. Access is provided by SMTA adopted by the Parties. While the CBD envisions a bilateral negotiation and the MLS sets the terms for ABS through its transfer agreement, the theory for both the IT and the CBD is that ABS provides a means for "providers" of genetic resources to ultimately receive benefits from a granting of access. The IT established a benefit-sharing fund to capture these benefits and distribute them in the form of project funding to eligible organizations engaged in conservation and sustainable use of PGRFA.[20]

cbd-hb-09-en.pdf (last accessed February 22, 2017).

19 Article 15 of the CBD calls for benefit-sharing with the "country of origin" of the genetic resources. Article 2 on use of terms defines the country of origin of genetic resources to be the country which posseses those genetic resources in *in-situ* conditions. Article 2 goes on to define *in-situ* conditions in the case of domesticated or cultivated species to mean where the PGRFA developed their distinctive properties. Determining where a particular PGRFA developed its distinctive properties is not straightforward given how long they have been exchanged around the world. Arguably, it could mean that the country of origina for a PGRFA accessed from one country, taken to another where it was genetically modified and cultivated, would be the second country. This was definitely not the intention of the negotiators.

20 Organizations eligible to apply for project funds include governmental, non-governmental, regional and international organizations; farmers and farmer organizations; gene banks; and re- search institutions. Pre-proposals are submitted through national authorities of a country that is a Contracting Party to the IT, and selected organizations are subsequently invited to submit full proposals by an Independent Panel of Experts. Selection criteria include geographical representation, relevance to the IT's objectives and technical merit. The list of projects invited to submit full proposals for the 2014 third Call for Funding is available at http://www.fao.org/3/a-bb151e.pdf (last accessed February 22, 2017). The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity is a supplementary agreement to the CBD. It provides a legal framework for the implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources. The Nagoya Protocol on ABS was adopted on 29 October 2010 in Nagoya, Japan and entered into force on 12 October 2014. For the full text see https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf (Last accessed February 23, 2017).

First session of the Governing Body of the International Treaty. (IISD)

The NP entered into force in 2014. It is a supplemental agreement to the CBD aimed at providing more clarity on ABS. All PGRFA not listed under Annex 1 of the IT fall under the ABS regimes of the CBD and NP which continue with a bilateral orientation between a user and provider. Article 10 of the NP does call for Parties to consider the need for modalities of a global multilateral benefit-sharing mechanism in transboundary situations or for which it is not possible to grant or obtain prior informed consent.

The benefits generated from access are to be used to support the conservation of biological diversity and the sustainable use of its components globally. It is not clear if or how this article will be used and interpreted. It addresses issues that could not be resolved during the negotiations and for which further discussion was required. This discussion is happening via online conversations mediated by the Secretariat. Nevertheless, the basis for the generation of benefits remains ABS.[21]

21 See https://www.cbd.int/abs/about/ (last accessed February 21, 2017).

III. Reality check: The Functioning of ABS Frameworks

While the CBD, NP and IT were being negotiated, there were expectations among many that bilateral and multilateral ABS systems would generate significant monetary benefits.

However, at the international level, ABS has not functioned as anticipated. Since its establishment over a decade ago, the IT's Benefit-sharing Fund has accumulated only US$22 million in the form of voluntary contributions from Norway, Australia, Spain, Italy, Switzerland and the United Nations Development Programme.[22] This compares to the annual fund-raising target of US$23 million established by the Governing Body of the Benefit-sharing Fund.

In 2013, Moeller and Stannard projected that, given favourable assumptions regarding voluntary payments and members immediately making all materials available, it would take 15 years before this annual fund-raising target could be reached.[23] However, in light of the current list of State Parties to the IT, they suggested that it take a minimum of 38 years.[24] Other studies that have since been commissioned by the IT to conduct economic projections under different options for a revised SMTA have been even less optimistic. During the first meeting of the Ad Hoc Open-Ended Working Group to Enhance the Functioning of the Multilateral System in Geneva in December 2014, consultants reported a "mismatch" between the projections and expectations for the IT Benefit-sharing Fund.[25]

At the national level, progress has been made towards implementation of ABS legislation with the NP entering into force. Several ABS capacity-building initiatives have been started, including regional projects in Latin America and South East Asia, financed by the Global Environmental Facility,[26] and in the African, Caribbean, and Pacific

22 See *The Benefit-sharing Fund of the Funding Strategy* at http://www.planttreaty.org/sites/default/files/edm3_l2.pdf (last accessed February 22, 2017).

23 See http://www.fao.org/docrep/019/i3439e/i3439e.pdf (last accessed February 23, 2017).

24 See http://www.fao.org/docrep/019/i3439e/i3439e.pdf (last accessed February 23, 2017).

25 http://www.fao.org/3/a-be663e.pdf (last accessed February 22, 2017).

26 See for example, https://www.thegef.org/topics/access-and-benefit-sharing (last accessed February 21, 2017).

At the international level, ABS has not functioned as anticipated.

Group of States, financed by a group of donors as part of the ABS Capacity Development Initiative.[27]

However, despite the adoption of national legislation, international transactions taking place under ABS agreements are relatively few in number, and the benefits shared have been quite modest. Prip and Rosendal (2015), in an international review of the functioning of ABS in practice, reported few bioprospecting initiatives with commercial intent and low amounts of monetary benefit accumulated.[28] There remain research gaps with respect to the actual and potential contributions of ABS to conservation and sustainable use of biodiversity, as well as the impacts of implementation of ABS at the national level.[29]

IV. The Future of ABS Regimes

The fact that ABS has not *yet* functioned in practice as well as hoped does not of course invalidate its future potential. The ongoing work of the Ad Hoc Open-Ended Working Group to Enhance the Functioning of the Multilateral System is discussing a subscription model/system that could be incorporated into a revised SMTA.[30] Rather than waiting for benefit to accrue in the fund once varieties have been commercialized, a subscription system would require users to pay up front for access to genetic resources under the MLS. Such a model may reduce the transaction costs associated with

27 See http://www.abs-initiative.info/ (last accessed February 21, 2017).

28 Bioprospecting is "the systematic search for and development of new sources of chemical compounds, genes, micro-organisms, macro-organisms, and other valuable products from nature. It entails the search for economically valuable genetic and biochemical resources from nature. . . . Lately, exploration and research on indigenous knowledge related to the utilization and management of biological resources has also been included into the concept of bioprospecting" k= apps.who.int/medicinedocs/en/d/Jh2996e/6.3.html#Jh2996e.6.3 (last accessed February 21, 2017).

29 Studies documenting the state of implementation of ABS at the national level include those conducted by the Fridtjof Nansen Institute of ABS (Cameroon by Rosendal, 2010; Ethiopia by Andersen and Winge, 2012; Ghana by Rosendal, Olesen and Tvedt, 2012; Australia by Prip et al., 2014); the GIZ ABS Capacity Development Initiative (Brazil, India and South Africa); and the Centre for International Sustainable Development Law (a general overview of national and regional measures on ABS by Medaglia, Perron-Welch and Phillips, 2014).

30 The report of the third meeting of the Ad Hoc Open-Ended Working Group to Enhance the Functioning of the Multilateral System of Access and Benefit-Sharing (held in Brasília, Brazil, 2-5 June 2015) is available at http://www.fao.org/3/a-be630e.pdf (last accessed February 22, 2017).

accessing material and precipitate an earlier flow of benefits into the fund.

Complementary measures to support ABS could also help increase the success of ABS. These measures include, for example: 1) legislation outlining biodiversity-related disclosure requirements and the use of national databases for registering all new and existing plant varieties;[31] and 2) judicial systems that facilitate administrative and civil actions against private entities that do not fulfill their benefit-sharing obligations.

At the national level, new momentum associated with the NP entering into force may have positive impacts yet unknown. The ABS Clearing-house is an online platform for sharing information about the exchange and utilization of genetic resources and traditional knowledge, established under Article 14 of the Protocol and Article 18, paragraph 3 of the CBD.[32]

ABS is an understandable response to very real inequity. The question is can such a transactional approach generate the benefits necessary to support the activities of farmers, particularly small-scale farmers, in their dynamic process of conserving and developing these resources, as well as their broader role in experimentation and adaptation on-farm? As discussed in the following sections, there is reason to believe the answer is, and will remain, no.

This platform may illustrate a more widespread generation of shared benefits from ABS agreements than is currently documented.

However, there remains cause for modest expectations because of four core challenges. The first challenge is the financial resources required to fund conservation exceed potential benefit flows. This is because it is expensive to conserve and develop biological resources *in situ* (Vivas-Eugui, 2012) and difficult for users to capture the economic value of individual PGRFA in breeding programs. The use value of individual PGRFA does not necessarily go hand-in-hand with a market value for a number of reasons:

31 Current and ongoing discussions relating to biodiversity-related disclosure requirements and databases are taking place within the World Intellectual Property Organization's subsidiary body, the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore. See Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge. See http://www.wipo.int/tk/en/igc/ (Last accessed February 23, 2017).

32 See https://absch.cbd.int/ (last accessed February 21, 2017).

Community leader with outstretched hands in Ethiopia. (Georgina Smith)

- It takes an average 8 to 10 years to develop a new plant variety using new genetic materials.

- With some crop species, it is difficult to track the contributions of individual parental lines over many generations (e.g. in the case of potato breeding).

- Only about 10 to 15 percent of biotechnology patents yield economic benefit, while the majority of research and development with genetic resources is not commercialized and thus there are no benefits to be shared. (Vivas-Eugui, 2012).

A subscription service to the MLS that would obligate companies to pay up front for access could ensure that at least some benefit is collected. However, companies may choose to opt out from using material under the MLS altogether rather than pay a subscription fee. This leads to a second challenge for ABS regimes: alternative sources of PGRFA.

On the part of private breeding companies, there is less interest in collecting genetic resources from the field with benefit-sharing obligations attached to them than getting them from other sources. Vivas-Eugui (2012) reported that transnational companies are either not using such

material or are afraid to disclose this information. However, of the 50 or more countries with ABS legislation requiring disclosure of the geographical origin of the genetic resources used to develop new varieties (i.e. biodiversity-related disclosure requirements), there have so far been no reports of legal cases being brought for lack of disclosure. What seems more relevant is that companies perceive ABS regimes to be cumbersome and bureaucratic, and thus a deterrent to bio- prospecting (Robinson, 2015, p. 16). They are able to avoid ABS regimes because of the extensive *ex situ* collections that have been developed over a long period of time without strict access regulations (Prip and Rosendal, 2015). Users also have less incentive to access *ex situ* collections under the MLS because duplicates are available from other sources. The U.S. Department of Agriculture gene bank collections, in particular, house genetic material collected for decades through bioprospecting are open to users without the same "strings attached" as when accessing collections under the auspices of the IT.[33]

On their own, neither widespread implementation of national ABS legislation nor a restructuring of the MLS is likely to right the imbalance that led to the creation of these systems in the first place.

Related to users' avoidance of genetic materials with benefit-sharing obligations attached to them is the trend in agricultural research towards public breeding centres and universities focusing on preliminary research and breeding (often called "pre-breeding"), while private companies use the outputs of this work to develop and release commercial varieties. Private breeding companies thereby leave the risks and costs of bioprospecting to the public sector and only engage in licensing when something of commercial interest is discovered (Prip and Rosendal, 2015; Robinson, 2015).

The advent of genomics and "promise" of synthetic biology have raised the question as to whether or

33 Moeller and Stannard emphasized in their 2013 report on the functioning of the MLS that levels of benefit -sharing would be substantially enhanced if countries with large gene bank collections, particularly the United States and China, became Contracting Parties to the IT. ftp://ftp.fao.org/ag/agp/planttreaty/publi/2013/libro_MLS.pdf (last accessed February 22, 2017).

Gene bank accessions. (Neil Palmer, CIAT)

not user companies will even need tangible genetic resources to do their research and variety development.[34] It may be possible for breeders to synthesize material they need, thus negating the need for facilitated access. Laird and Wynberg (2012) explained how changes in science and technology and declining interest in field-based bioprospecting for "raw" or "natural" genetic resources on the part of pharmaceutical companies has resulted in less substantial benefit-sharing than expected.[35]

It remains to be seen how this will play out in the context of food and agriculture. What is discernible so far is the increasingly important role of micro-organisms in agricultural biotechnology. Genomes for micro-organisms are more easily sequenced than those for crop species, and micro-organisms around the world share considerable genetic material. This may open the door for advances in genetic engineering not yet anticipated.

34 See note 6 supra

35 Conniff (2012) and Prip and Rosendal (2015) documented the case of an ABS agreement signed in 1991 between the U.S. multinational company Merck & Co. Pharmaceutical and the Costa Rican National Institute of Biodiversity. The highly-anticipated blockbuster drug was never found, and thus there were no benefits to be shared. Merck moved its investment to synthetic rather than natural compounds. This case is part of a trend towards less investment in bioprospecting on the part of pharmaceutical companies.

Third, there is the challenge of compliance. As opposed to the TRIPS Agreement, there are no compliance mechanisms in place for the IT MLS.[36] Instead the system relies on the good faith of users. Vivas-Eugui (2012) explained that national intellectual property offices can verify that prior informed consent based on mutually agreed terms has been received but do not have the authority or ability to ensure that benefit-sharing has occurred.[37] ABS regimes will not function so long as national capacity to monitor and enforce contractual agreements or the IT SMTA is lacking.

A fourth challenge pertains to the lack of coordination among ministries involved. National focal points for ABS under the IT and the CBD are rarely in contact with one another. This may improve as more national governments enact legislation in accordance with the NP. More broadly, however, Ministries of Environment, Agriculture and Rural Development need to be communicating with one another about the potential impacts of benefit-sharing on conservation, food security and rural livelihoods. At the moment, there are important outstanding questions that can only be answered in concert: What criteria are there for deciding how benefits are distributed? Who benefits, and who does not, and for how long? What happens when payments cease? How is project funding monitored, and how are agreements enforced?[38]

Answering these questions will require coordination among relevant

36 This illustrates one reason for the strong feelings in the negotiations at the World Intellectual Property Organization for an instrument to protect genetic resources. However, one major issue remains whether to require disclosure of the source of a genetic resource in patent applications to prevent biopiracy and to enforce ABS agreements.

37 Andersen and Winge (2012) document the case of a 10-year ABS agreement on genetic material in Ethiopia, signed in 2005, which was at the time heralded as the most advanced to date. The Dutch company Health and Performance Food International declared bankruptcy in 2009 and the relevant patent on processing was transferred to a new company with the same owners. No benefits were accrued on the part of Ethiopian Institute of Biodiversity Conservation. Implementation of the agreement failed because of a lack of enforcement and legal oversight.

38 Prip and Rosendal (2015) document the case of the Hoodia ABS Agreement signed between the San people of Southern Africa and South Africa's Council of Scientific and Industrial Research. Much debate ensued over whether the San people had been consulted with and adequately recognized for their traditional knowledge, but without resources and organizational capacity, they had difficulty asserting these legitimate claims. This case demonstrates the complexities associated with implementing benefit-sharing among marginalized communities and highlights the need to include perspectives from rural development in ABS discussions.

ministries within countries and focal points to each of the international treaties discussed earlier — a level of coordination that is well beyond current practice.

V. The Role of the Private and Public Sector and a Rights-based Approach

The conclusion drawn from the above analysis is that ABS as a transactional approach is, on its own, insufficient to support the conservation, management and development of PGRFA by small-scale farmers. Clearly, if the private sector does not have adequate incentive to pay for access, little benefit will be accrued to any fund to be shared.

Furthermore, as the CBD, the NP and the IT were being developed, negotiated and implemented, private sector interest in PGRFA continued to grow. The private sector –industry – is understandably interested in profit-making and therefore looks for an ability to pay and market demand. It does not focus on human need or the public interest generally. That is the role of government; whether promulgating policy and regulations or as a provider of goods and services. Unfortunately, the growth of private sector interest in developed countries (where two-thirds of global agricultural research takes place) was met with an unfortunate decline of public sector investment that has only recently seen an inconsistent increase.[39]

It is not that the private sector is not or cannot be part of the equation in providing support to small-scale farmers and PGRFA; it may provide some tools to achieve these objectives. However, it will not by itself provide sufficient, predictable and stable support for small-scale farmers because they are largely poor, often marginalized and within and across countries are a highly diverse group occupying highly diverse agro-ecosystems. In addition, despite producing at least 70 percent

39 According to the International Food Policy Research Institute (2012), there have been significant increases in agricultural research and development spending during 1981-2009, with China, India and Brazil leading the way, Sub-Saharan Africa showing stagnant investment growth and South-East Asia seeing a decline in investment after years of progressive growth. Hence, most of the increase in global public spending is a result of large investments in a small group of middle income countries. High income countries on the other hand, have demonstrated considerable slowdown in public spending. See http://www.ifpri.org/news-release/agricultural-rd-spending-rise-low-income-countries-continue-lag-behind (last accessed February 23, 2017). Global private spending has increased by 26 percent between 2000-2008. See Trends in Public Sector Spending (2016). QUNO: Geneva. http://quno.org/resource/2016/11/trends-public-sector-spending-agriculture (last accessed February 22, 2017).

of the food the world consumes, small-scale farmers are amongst the hungriest populations of people.[40] Furthermore, because the products the private sector produces will be geared toward the bigger and more profitable markets, they are not able to reflect an appreciation for the complexity and diversity of small-scale farmers' physical and social environments.

A strong private sector requires a robust public sector to keep options available and to focus on support of small-scale farmers and PGRFA, particularly in marginal areas. This is particularly true where there is an increasing demand for public-private-partnerships (PPP) to achieve public objectives.[41] To engage with the private sector through PPPs requires a government able to ensure the public interest is protected and promoted through the partnership.

It is worth reiterating that while farming is mainly a private activity implemented locally in most parts of the world by small-scale farmers, their innovative activities, including the ongoing development of PGRFA, is in the public interest. Small-scale farming and PGRFA are negatively affected by global forces and it is therefore in the public interest to increase government support.[42] If

40 See report produced by International Fund for Agricultural Development (IFAD) and the United Nations Environment Programme (UNEP) (2013) http://www.unep.org/pdf/SmallholderReport_WEB.pdf (last accessed February 23, 2017).

41 The Addis Ababa Agenda for Action (AAAA) (2015) presents a policy framework that realigns financial flows with public goals. It states that the financing needs to achieve the 2030 Agenda for Sustainable Development are "on the order to trillions of dollars annually." Meeting these needs requires a "comprehensive approach, which mobilizes public finance, sets appropriate public policies and regulatory frameworks, unlocks the transformative potential of people and the private sector, and incentivizes changes in consumption, production and investment patterns in support of sustainable development." See UN DESA Briefing Note on The Addis Ababa Action Agenda (2015) http://www.un.org/esa/ffd/ffd3/wp-content/uploads/sites/2/2015/07/DESA-Briefing-Note-Addis-Action-Agenda.pdf (last accessed February 23, 2017). See also Addis Ababa Action Agenda of the Third International Conference on Financing for Development (2015) http://undocs.org/A/RES/69/313 (last accessed February 23, 2017). The AAAA (2015) also states that infrastructure financing, including "through […] public private partnerships" are necessary. However, the AAAA "also highlights the needs to "build capacity to enter into PPPs […]." See also KS, J., Chowdhury, A., Sharma, K., Platz, D. (2016). Public-Private Partnerships and the 2030 Agenda for Sustainable Development: Fit for purpose? UN DESA Working Paper No. 148. ST/ESA/2016/DWP/148. https://sustainabledevelopment.un.org/content/documents/2288desaworkingpaper148.pdf (last accessed February 23, 2017).

42 See Susan H. Bragdon Colloquium Paper entitled Reinvigorating the Public Sector: The Case of Food Security, Small-Scale Farmers, Trade, and Intellectual Property Rules at https://www.iss.nl/fileadmin/ASSETS/iss/Research_and_projects/Research_networks/ICAS/64-ICAS_CP_Bragdon.pdf (last accessed February 22, 2017). Timothy A. Wise. Two Roads Diverged in the Food Crisis: Global policy takes the one more traveled. *Canadian Food Studies*, Vol. 2, No. 2 (2015). Available at http://ase.tufts.edu/gdae/Pubs/rp/WiseCanadianFoodStudies-

government does not play a role, the displacement of small-scale farmer and on-farm PGRFA will continue.

VI. Moving beyond a transactional approach

A rights-based orientation is more likely to yield the types of institutions, policies and actions needed to fully support small-scale farmers and PGRFA than the transactional system that characterizes bilateral and multilateral ABS agreements. A rights-based approach requires the existence of legal and administrative capacities to ensure sufficient, predictable and stable support and more widespread participation and policy discussions relating to the conservation and sustainable use of PGRFA. This also supports implementation of the IT's Article 6 on sustainable use as well as Article 9 on Farmers' Rights.

The 17 Sustainable Development Goals and Agenda 2030 adopted by the global community in September 2015, could also be used to provide a framework to support a rights-based approach.[43] The SDGs were created as a package, indivisible from one another. Through the lens of small-scale farmers and PGRFA, the IT Secretariat and Member States can illuminate the links between SDGs such a No Poverty (SDG 1), Zero Hunger (SDG 2), Health and Wellbeing (SDG 3), Climate Action (SDG 13) and Life on Land (SDG 15). Small-scale farmers and PGRFA are a common link in all these SDGs and more.[44] It provides a solid framework to advocate for more systemic approaches to supporting small-scale farmers and PGRFA that can be provided solely through ABS mechanisms. It can also help promote the understanding that there is an urgent need for a more rigorous and comprehensive exploration of ways and means to support small-scale farmers and PGRFA because of the importance of both to achieving multiple SDGs.

Measures to support small-scale farmers and PGRFA that are not linked to access have been discussed, including:

Sept15.pdf (last accessed February 24, 2017).

43 https://sustainabledevelopment.un.org/post2015/transformingourworld (last accessed February 22, 2017)

44 For example, SDG 8 Decent Work and Economic Growth. In most developing countries, economic growth will begin through agricultural development. It is also a major source of employment though work needs to be done to achieve the International Labor Office's definition of "decent".

- A biodiversity tax levied on commercial seed sales;
- A guaranteed minimum income for small-scale farmers working in agro-biodiverse situations;
- An endowment similar to the Global Crop Diversity Trust;
- Implementation of farmers' rights legislation (see Andersen and Winge, 2013);
- Conservation programs funded by the public sector and non-governmental organizations (see, e.g., Jarvis et al., 2015, p. 16).

The second meeting of the Ad Hoc Open-ended Working Group to Enhance the Functioning of the Multilateral System discussed a proposal for a levy- or tax-based system to get a fee from the sale of every seed.[45] This would be a very simple and straightforward system, entirely eliminating not only the need to track but also all disincentives to acquiring PGRFA under the MLS rather than from other sources. However, some concerns were raised about the feasibility of implementing such a system among sovereign states. The range of feedback on this option included:

- Consider framing this as a levy rather than a tax. The distinction being that a tax assumes a sovereign state gets money from its citizens, whereas a levy would be paid by states and then states would determine how best to recoup that domestically, presumably though Ministries of Agriculture.

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45 See page 8 of the Report of the Second Meeting of the Ad Hoc Working Group on the Enhancement of the Multilateral System. Available at http://www.fao.org/3/a-be648e.pdf (Last accessed February 23, 2017).

- In order to make this an attractive option for contracting parties and users, the payment amount should be set at a lower rate than alternative options (6.7, 6.8 and 6.11).

- For companies that do not regularly utilize the MLS given the nature of the crops they work on, or for multinational companies subject to multiple state levy systems, they may choose to opt-out of the levy and pay according to 6.7, 6.8 or 6.11.

- A potential downside of the levy-based system is that it could create an uneven playing field if some countries choose to recoup the levy from companies and some do not.

- Some participants explored a scenario for a levy- or tax- based system which would shift the upfront payment based upon expected seed sales from .5% to .023% under Article 6.11, thereby incentivizing users to support a levy-based system.

- Some participants suggested that a levy- or tax-based system might create an inequality since only member states would be obliged to implement the system. Companies (or sales of companies) operating in non-member states could still have access to the MLS via member states and not pay a levy on sales in the non-member states.

Norway decided to make a permanent annual contribution to the IT's Benefit-sharing Fund that amounts to 0.1 percent of the value of all seeds that are sold in the country. The value of this annual contribution was $101,368 and was received on 15 June 2010. The Norwegian Minister of Agriculture and Food at the time, Riis Johansen, emphasized that the envisaged mechanism "is not conventional development funding [but] a situation in which the agricultural sector of Norway [is] contributing to the farmers of countries in the developing world." Nevertheless, the reference to 0.1 percent of seed sales refers only to the method that is used to calculate the amount of donations to the Benefit-sharing Fund, while ultimately such a contribution is paid with government money and not directly by the private seed sector. See Chiarolla and Jungcurt (2011).

The idea of providing low-income people with a universal basic income

has been regarded with skepticism in development circles, but that has been changing rapidly. In India, the World Bank and others have conducted three unconditional income schemes in India.[46] The main conclusion was the unconditional basic income can be transformative in four ways, it has: 1) strong welfare or capability effects; 2) strong equity effects; 3) growth effects; and 4) emancipatory effects.[47] Even more relevant to small-scale farmers and PGRFA (though not targeted at farmers or agricultural biodiversity) is a recent call by Ashley Dawson (2016) to install a universal guaranteed income in biodiversity hotspots to stop a mass extinction. Dawson argues that the income could come from some sort of tax. While the political feasibility of the proposal may be questioned, this is another area that deserves more thorough analysis and experimentation.

An endowment approach has been taken by The Crop Trust which was established in 2004 with a stated goal of "safeguarding crop diversity, forever."[48] The Crop Trust is funding the world's most important gene banks, *ex situ* collections of PGRFA. *Ex situ* collections provide an important insurance policy and complement the *in situ* and on-farm conservation and development by small-scale farmers. Humanity is at risk, however, if having seeds in a gene bank leads to the belief that the planet is food secure. Seeds are part of dynamic systems and for 1.5 billion farmers they are being developed and evolving in response to varying soil, water and energy challenges, with ever evolving pests and diseases and in response to climate change. Small-scale farmers are responsible for the development of 2.1 million varieties of 7,000 species and have access to 50,000 to 60,000 species of crops' wild relatives. The sheer amount and dynamism of this diversity is critical, and gene banks must be seen as complementary and essential in cases of emergency. They are a critical back-up system, but they are an inappropriate and insufficient "plan A" for ensuring that the genetic diversity needed in the future will be available.

While both are an essential part of the IT's funding strategy, the funding for the Crop Trust dwarfs that of the IT's Benefit-sharing Fund, which has collected only US$22 million thus far. The interest alone earned on the

46 https://theguardian.com/business/economics-blog/2014/dec/18/incomes-scheme-transforms-lives-poor (last accessed February 22, 2017).

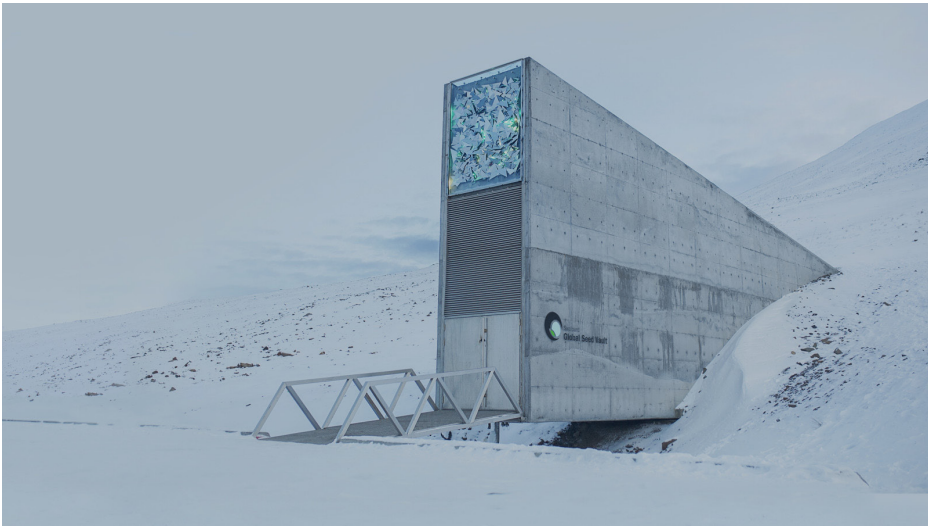
47 E.g. buying out of debt bondage or paying down exorbitant interest rates.

48 See www.croptrust.org (last accessed February 22, 2017).

Crop Diversity Endowment Fund supports the work of the Crop Trust while the endowment stays intact. Prior to the April 2016 pledging conference, the endowment stood at US$300 million (Crop Trust, 2016). Of this US$300 million, 63.8 percent came from countries, 10.4 percent from foundations, 2.2 percent from corporations and 23.6 percent classified as "other." It is more than 14 times the amount of the IT's Benefit-sharing Fund. Nevertheless, endowments are not well understood by the international community and the Crop Trust is finding it hard to achieve its endowment targets. One would have to anticipate at least an equal challenge to establishing an endowment for small-scale farmers and the PGRFA they manage on-farm and *in-situ.*

The previous discussion of possible measures is not meant to be comprehensive. Our hope is to stimulate discussion about additional measures to ensure adequate support for small-scale farmers to conserve and develop PGRFA at the frontlines of global environmental change. With each measure, consideration must be given to the roles of the private and public sectors in providing the support and incentives needed. What are the obstacles to increased support, and how can they be overcome? The SDGs and Agenda 2030 may provide a framework that allows a more systematic analysis that includes the

Svalbard Global Seed Vault. (Crop Trust)



major treaty bodies and institutions with an interest or mandate related to food and nutrition security and sustainable food systems.

At the core is the need for the political, social and economic will to make the changes necessary to support small-scale farmers and PGRFA on-farm and *in situ*. Raising awareness of the importance of small-scale farmers and PGRFA to addressing poverty, climate change, hunger, obesity, health and nutrition is a start. Countering narratives that focus solely on productivity or increasing yields and not the larger forces at play will also be critical. Small-scale farmers and agricultural biodiversity vividly demonstrate how the SDGs are interconnected and cannot be viewed in isolation.

VII. Conclusion

The public interest in feeding and nourishing people without harming the planet is urgent and small-scale farmers and PGRFA are a necessary component of making this happen. Nationally and globally, governments need to reverse the current trend towards the spread of industrial agriculture and a weakening of the public sector. We need to raise awareness nationally and globally of the necessity of supporting small-scale farmers and agrobiodiversity to ensure global food security. Supporting small-scale farmers in conserving and developing PGRFA *in situ* may be expensive, but it will be far costlier to humanity if a way is not found to do so.

Funding the dynamic, *in situ* and on-farm conservation and development efforts of small-scale farmers is more complex than funding an *ex-situ* physical structure, together with the information and personnel to maintain it. But if farmers, their innovative management practices and the PGRFA they conserve and develop are necessary for the security of the global food system, then funding their efforts is essential.

With the will, the cost of externalities of industrial agriculture on the health of people and the planet can be internalized. This could, in turn, help fund things like a minimum income for small-scale farmers. With the will, the positive externalities of small-scale farmers, the PGRFA of agro-ecological systems and other innovative practices can be recognized. With the will, taxes can be imposed on seed sales or other parts of the farm to fork food chain and used to support small-scale

farmers. With the will, sufficient, predictable and stable support for small-scale farmers and PGRFA is possible.

In sum, what is needed is a more broad-based approach to achieving the shared objectives of our international legal architecture governing PGRFA, the SDGs and Agenda 2030; one that places small-scale farmers at the centre and includes their voices in discussions. It is a critical point in time to reflect together on the roles of the private and public sector in facilitating the exchange of genetic resources. We must look beyond ABS mechanisms to consider means to generate incentives and benefits for farmers so they can continue to develop and maintain PGRFA as part of broader agro-ecological practices. The health of the planet and its people depend upon it.

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QUNO
Quaker United Nations Office

QUNO offices:

In Geneva:
13 Avenue du Mervelet
1209 Geneva
Switzerland

Tel: +41 22 748 4800
Fax: +41 22 748 4819
quno@quno.ch

In New York:
777 UN Plaza
New York, NY 10017
United States

Tel: +1 212 682 2745
Fax: +1 212 983 0034
qunony@afsc.org

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