MALAYSIAN SEED RESERVES VOL 2

Agroecology and Farmers' Seed Systems

Lim Li Ching, Third World Network, 15 January 2024

Introduction: Why agroecology?

The current crises in agriculture, including the contribution of the sector to climate change, are primarily caused by industrial agriculture and its practices that are fossil fuel dependent and monoculture focused. A hallmark of the industrial food system is a tremendous loss of genetic diversity, with the replacement of genetically diverse farmers' varieties or traditional varieties, with modern varieties.[i]

Modern varieties are products of formal plant breeding systems and are high-yielding when cultivated with inputs such as chemical fertilizers and pesticides, as exemplified by practices of the Green Revolution. But that system came at a tremendous cost to the environment and social equity, while doing little to address the root causes of hunger, which still persists.[ii]

No less than a transformation of our agricultural and food systems is thus needed. There is increasing agreement that this would entail a paradigm shift from specialized industrial agriculture[iii] to biologically diverse systems such as agroecology.[iv] Agroecology applies scientific ecological principles to the design and management of agroecosystems, while taking into account local contexts in its implementation. It is premised on agricultural biodiversity.

Agroecology has consistently proven capable of sustainably increasing productivity,[v] ensuring adequate nutrition through diverse diets and has far greater potential for fighting hunger and poverty, particularly during economic and climatically uncertain times.[vi] Evidence is particularly strong on the ability of agroecology to deliver strong and stable yields by building environmental and climate resilience.

Farmers' seed systems are the basis of agroecology

At the basis of diversified agroecological systems are farmers' seed systems that maintain the diversity of local seed.[vii] Farmers' varieties are the products of careful and extensive selection by farmers, and a system of saving, reusing and exchanging seeds with other farmers. This strategy relies on the knowledge and skills of farmers in utilizing, conserving and enhancing crop diversity.[viii]

Seed selection, saving and reuse by farmers and indigenous peoples, particularly women, are based on their families' and communities' needs. There are numerous productivity, nutrition, pest resistance, resilience, taste or cultural reasons that determine why certain seeds are selected, used and kept. As a result, the seeds are tailored to local conditions. As the basis for agroecological practices, these farmers' seeds systems then provide food and nutrition, pest control, resilient varieties, etc., at places where they are needed most.[ix]

The diversity of seed kept by indigenous peoples and farming communities has its roots in diverse cultures.[x] The world's most biodiverse areas overlap significantly with the territories of indigenous peoples and there is a correlation between biological richness and cultural diversity. Farmers' seeds systems and agroecology are therefore rooted in the knowledge, cultures and experiences of farmers.

Research has shown that as much as 75 percent of global seed diversity in staple food crops is held and actively used by a wide range of small farmers.[xi] This is three times as much as the diversity held in *ex situ* collections in gene banks. Data from 11 countries in Africa, Asia and Latin America show that small farmers, in many cases women, are pivotal in preserving landraces[xii] or farmers' varieties of food crops. Depending on the crop, the study found that farmers may plant between one to 15 different varieties.

Farmers' seed systems can supply as much as 80 per cent of seeds to farmers in developing countries. Crucially, women are the custodians at the centre of seed saving and exchange, with significant importance in ensuring food security and genetic diversity.[xiii,xiv]

The multifunctional benefits of agroecology and farmers' seed systems

There are multifunctional benefits associated with resilient and diverse seed systems.

In the first place, the observation, selection, nurturing, breeding and saving of seed by generations of farmers increases agricultural biodiversity.[xv] Farmers have cultivated a huge diversity of crop varieties to deal with the various challenges they face in the environment around them. This agricultural biodiversity allows farmers to spread their risk and guarantee a harvest, even if they face extreme weather events and changing pests and diseases, which are all associated with the vagaries of climate change.

Additionally, by ensuring genetic diversity – rather than uniformity – within a variety, farmers also increase the likelihood that a portion of their seeds will germinate under difficult conditions. Their in-depth knowledge and understanding of crops, seed, selection and local conditions allows them to develop a wide range of germplasm that they can draw on to further breed and adapt new resilient and nutritious varieties.[xvi]

Together with the biodiversity in the surrounding landscape, the synergies generated help support vital ecosystem functions such as air and water purification, fixing and recycling of nutrients, regulation of local hydrological processes, etc. This regulating and regenerating function of agricultural biodiversity is a key component of resilience and therefore an important element in helping farmers to adapt to climate change.[xvii]

The diversity of seeds and crops cultivated by farmers also provides important on-farm resources and better economic returns. Various components can be eaten, as well as sold to earn income. There are lower production costs; for example, there is no use of expensive external inputs such as chemical fertilisers and pesticides.

At the same time, the diversity cultivated by farmers' seed systems is crucial to ensure dietary diversity and nutrition[xviii]. Indeed, small-scale farmers continue to feed the world, with smallholders providing up to 80 percent of the food supply in Asian and Sub-Saharan Africa.[xix]

Conclusion: The need to support and protect farmers' seed systems

Seed saving and exchange – practices intrinsic to farmers' seeds systems – are not only the mechanisms for the access and exchange of materials needed by farmers,[xx] they are

also necessary for increasing agricultural biodiversity, which is the basis of agroecology. For agroecology to be upscaled, we therefore also need strategies that support farmers' seed systems and the corresponding knowledge and skills. This means recognizing, supporting and rewarding smallholder farmers and indigenous peoples as stewards of seed systems.[xxi]

Farmers' seed systems depend on the rights of farmers to freely, save, use, exchange and sell farm-saved seeds. These rights, along with farmers' rights to participate equitably in benefit-sharing and in decision-making regarding laws, policies and practices related to seeds, have their basis in international law, particularly the International Treaty on Plant Genetic Resources for Food and Agriculture[xxii] (ITPGRFA) and the UN Declaration on the Rights of Peasants and Other People Working in Rural Areas[xxiii] (UNDROP).

The joint implementation of these two instruments is essential for the realization of Farmers' Rights. [xxiv] National laws are also needed to recognize and establish Farmers' Rights as fundamental aspects of national seed systems[xxv].

States are also tasked to "support peasant seed systems, and promote the use of peasant seeds and agrobiodiversity" (Article 19.6, UNDROP). The implementation of UNDROP is an opportunity to redress the general lack of support for farmers' seed systems and the privileging of industrial or commercial seed systems[xxvi,xxvii], the latter including through the application of intellectual property rights or plant variety protection over seeds[xxviii].

It would also be critical to work with farmers and households, particularly women, to support practical efforts such as seed exchanges, community seed banks and participatory plant breeding.

Community seed banks are collections of seeds that are maintained and administered by the communities themselves. While *ex situ* in nature, community seed banks can function as a seed reserve, providing easy access and are easy to link to on-farm conservation efforts while still giving farmers control over their seed [xxix].

In situ or on-farm conservation where farmers actively maintain diversity in their fields is even more crucial to continue the dynamic evolutionary process of local genetic diversity and its associated knowledge and cultures. Linked with farmer-centered, participatory plant breeding approaches, this could help farmers improve and increase the diversity of farmers' varieties.[xxx]

Protecting farmers' seed systems and Farmers' Rights, both in policy and practice, will therefore allow agricultural biodiversity to take root and agroecology to thrive. All are necessary ingredients for the change we need in agriculture.

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[i] FAO (2010). The Second Report of the State of the World's Plant Genetic Resources for Food and Agriculture. Commission on Genetic Resources for Food and Agriculture, Food and Agriculture Organization of the United Nations, Rome.

[ii] IAASTD (2009). Agriculture at a Crossroads. International Assessment of Agricultural Knowledge, Science and Technology for Development. Island Press, Washington, DC. http://www.agassessment.org

[iii] Specialized industrial agriculture is a model characterised by monocultures, genetically uniform varieties, intensive

use of external inputs, maximization of yield from a single or limited number of products, and production of large volumes of homogenous products typically within long value chains. See IPES-Food (2016). From uniformity to diversity: A paradigm shift from industrial agriculture to diversified agroecological systems. International Panel of Experts on Sustainable Food Systems, Brussels. www.ipes-food.org

[iv] IAASTD (2009). Ibid.; Report submitted by the Special Rapporteur on the right to food, Olivier De Schutter, A/HRC/16/49, 20 December 2010; UNCTAD (2013). Wake up before it is too late: Make agriculture truly sustainable now for food security in a changing climate. Trade and Environment Review 2013. United Nations Conference on Trade and Development, Geneva; IPES-Food (2016). Ibid.

[v] The UN Special Rapporteur on the right to food demonstrated in his report to the UN Human Rights Council (20 December 2010, A/HRC/16/49) that agroecology, if sufficiently supported, can double agricultural productivity in entire regions within 10 years (See 'Eco-Farming Can Double Food Production in 10 Years, says new UN report', 8 March 2011, http://www.srfood.org/images/stories/pdf/press_releases/20110308_agroecology-report-pr_en.pdf)

[vi] Altieri, M.A, Nicholls, C.I., Henao, A. and Lana, M.A. (2015) Agroecology and the design of climate change-resilient farming systems, *Agronomy for Sustainable Development* 35(3): 869-890; FAO (2015). Agroecology for food security and nutrition. Proceedings of the FAO International Symposium, 18 and 19 September 2014, Rome; HLPE (2019). *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition*. High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome; UNCTAD (2013) Ibid.

[vii] Anderson, T. and Campeau, C. (2013). Seeds For Life: Scaling Up Agro-Biodiversity. Ecumenical Advocacy Alliance and The Gaia Foundation

[viii] The Development Fund/Utviklingsfondet (2009). Banking for the Future: Savings, security and seeds. A short study of community seed banks in Bangladesh, Costa Rica, Ethiopia, Honduras, India, Nepal, Thailand, Zambia and Zimbabwe.

[ix] GRAIN and Alliance for Food Sovereignty in Africa (AFSA) (2018). The real seeds producers: Small-scale farmers save, use, share and enhance the seed diversity of the crops that feed Africa.

[x] Toledo, V.M. (2013). Indigenous Peoples and Biodiversity. In *Reference Module in Life Sciences: Encyclopedia of Biodiversity (Second Edition)*, pp. 269–278.

[xi] 'World crop diversity survives in small farms from peri-urban to remote rural locations', https://www.sciencedaily.com/releases/2015/02/150213164846.htm

[xii] A landrace is a locally adapted, traditional variety of a domesticated species.

[xiii] Global Alliance for the Future of Food (GAFF) 2016. The Future of Food: Seeds of Resilience, A Compendium of Perspectives on Agricultural Biodiversity from Around the World.

[xiv] GRAIN and AFSA (2018). Ibid.

[xv] Anderson and Campeau (2013). Ibid.

[xvi] Anderson and Campeau (2013). Ibid.

[xvii] Ensor, J. (2009). Biodiverse Agriculture for a Changing Climate. Practical Action, Rugby.

[xviii] GRAIN and AFSA (2019). Ibid.

[xix] FAO (2012). Ibid.

[xx] GAFF (2016). Ibid

[xxi] Fakhri, M. (2022). Seeds, Right to Life and Farmers' Rights. Human Rights Council, Forty-ninth session, 28 February–1 April 2022. Report of the Special Rapporteur on the right to food, Michael Fakhri.

[xxii] Article 9.2: Each Contracting Party agrees to take measures to "protect and promote Farmers' Rights" including: (a) the right to the protection of traditional knowledge relevant to plant genetic resources for food and agriculture (PGRFA); (b) the right to equitably participate in sharing benefits arising from the utilization of PGRFA; (c) the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of PGRFA. Article 9.3 clarifies that nothing in Article 9 "shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/ propagating material". Importantly, the preamble reaffirms "that the rights recognized in this Treaty to save, use, exchange and sell farm-saved seed and other propagating material, and to participate in decision-making regarding, and in the fair and equitable sharing of the benefits arising from, the use of plant genetic resources for food and agriculture, are fundamental to the realization of Farmers' Rights, as well as the promotion of Farmers' Rights at national and international levels…" See NurFitri Amir Muhammad (2023). The Potential Impact of UPOV 1991 on the Malaysian Seed Sector, Farmers and Their Practices. TWN and APBREBES, Penang and Geneva.

[xxiii] UNDROP was adopted by the UN General Assembly on 19 November 2018, establishing the rights of peasants and other people working in rural areas in international human rights law, including the right to seeds. It explicitly recognizes the right to protection of traditional knowledge relevant to PGRFA; the right to equitably participate in sharing the benefits arising from the utilization of PGRFA; the right to participate in the making of decisions on matters relating to the conservation and sustainable use of PGRFA; and the right to save, use, exchange and sell farm-saved seed or propagating material as fundamental prerequisites of the right to seeds, for which States are required to take "measures to respect, protect and fulfill." See NurFitri Amir Muhammad (2023). Ibid.

[xxiv] Golay, C., Peschard, K., de Schutter, O., Elver, H., Esquinas, J. and Fakhri, M. (2022). Implementing the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in light of the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP). APBREBES and the Geneva Academy, Geneva.

[xxv] Fakhri (2022). Ibid.

[xxvi] Peschard, K., Golay, C. and Araya, L. (2023). The Right to Seeds in Africa. The United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas and the Right to Seeds in Africa, *Geneva Academy Briefing No. 22.*
[xxvii] Golay, C. (2020). The Right to Seed and Intellectual Property Rights. *Geneva Academy Research Brief*.
[xxviii] Fakhri (2022). Ibid.
[xxix] The Development Fund/Utviklingsfondet (2009). Ibid.
[xxx] GAFF (2016). Ibid.