



THE AGA KHAN UNIVERSITY

eCommons@AKU

Institute for Educational Development, Karachi

Institute for Educational Development


January 2017

Seed policy in Pakistan: The impact of new laws on food sovereignty and sustainable development

Nosheen Ali

Aga Khan University, nosheen.ali@aku.edu

Follow this and additional works at: https://ecommons.aku.edu/pakistan_ied_pdck

 Part of the [Environmental Studies Commons](#), [Food Security Commons](#), [Food Studies Commons](#), and the [Other Social and Behavioral Sciences Commons](#)

Recommended Citation

Yazdani, A. T., & Ali, N. (2017). Seed policy in Pakistan: The impact of new laws on food sovereignty and sustainable development. *Lahore Journal of Policy Studies*, 7(1), 77–106.

SEED POLICY IN PAKISTAN: THE IMPACT OF NEW LAWS ON FOOD SOVEREIGNTY AND SUSTAINABLE DEVELOPMENT

Abstract

This paper highlights the challenges that genetically modified (GM) seeds pose for farmers, citizens and the land itself in Pakistan. It explores the history of agricultural policy in Pakistan from the Green Revolution to what is now being dubbed the “Gene Revolution”, and analyzes how harmful effects of both are being amplified by two recently passed laws: the Seed (Amendment) Act 2015 and the Plant Breeders' Rights Act 2016. The analysis of these laws is done from a food sovereignty perspective on sustainable development, where food sovereignty represents “the right of peoples to healthy and culturally appropriate food produced through sustainable methods and their right to define their own food and agriculture systems.” Finally, the paper offers comparative perspectives on seed policy and activism from Ecuador, Bolivia, India and Europe to suggest ways in which GM seeds have been approached with caution or outright bans, in order to promote health safety, farmers' rights, resistance to corporate monopolies over seed, and preservation of indigenous biodiversity. Ultimately, the paper sheds light on the forms of control and corporatization that patented GM seeds embody, and asks: who owns the seed and what kind of food do we want to leave for our future generations?

Introduction

Pakistan is a country at the crossroads of agricultural change. A majority of the country's population depends on the agricultural sector directly or indirectly for their livelihood, making any change in agricultural policy extremely significant. The recently passed Seed (Amendment) Act 2015 and the Plant Breeders' Rights Act 2016 are unprecedented and under-analyzed policies, that will unleash the use of Genetically Modified (GM) seeds in the country and produce far-reaching consequences for the state of agriculture and farmers, sustainable development, citizen and consumer rights, as well as the land itself.

The technology of genetically modified crops is being advanced in Pakistan and elsewhere under the cause of solving the crisis of world hunger and food scarcity. However, this new technology comes with a hefty price tag – in addition to the expensive seeds that local farmers will be forced to buy every season due to the monopoly of the corporate seed companies, they will also have to pay for the increased inputs these seeds require, such as extensive irrigation and costly fertilizers

and pesticides, which are already known to have severe negative consequences for the quality and productive capacity of the land and soil.

Being a World Trade Organization (WTO) signatory, Pakistan is also party to the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement which gives exclusive rights of any novel commodity to the inventors of the novelty feature, leading to the patenting of Genetically Modified Organisms (GMOs). Accordingly, in 2000, Pakistan drafted a Plant Breeders' Rights Ordinance which would have threatened the food security of small farmers by disallowing them from saving, trading, sowing or selling their seeds and farm produce while simultaneously expanding the power of multinational seed companies on local agriculture (Suleri and Shah 2003). While the draft ordinance was halted due to criticism and advocacy from stakeholders, recent turn of events saw the Plant Breeders' Rights Bill again tabled in Parliament. The bill has now been passed into an Act, and provides seed companies with intellectual property rights for new varieties. However, without a proper system of checks and balances regarding which seeds are being introduced and at what price, these "breeders' rights" will be extremely exploitative and disenfranchising. Consequently, already marginalized stakeholders such as small and landless farmers and farmworkers, as well as the women amongst them, stand to suffer most. The Plant Breeders' Rights Act will thus exacerbate the negative impact of problematic legislation that has already been passed, such as the Seed (Amendment) Act 2015 which establishes fines and imprisonment for farmers for sharing and selling unregistered and unbranded seeds, and makes it mandatory for them to purchase seeds from licensed seed companies with registered varieties.

While more technologically advanced countries are showing reluctance in fully endorsing GM technology, and with worrying reports of GM crops causing farmers to be embroiled in financial ruin in India, critics are weary of Pakistan's rushed policymaking at the behest of powerful interests representing or seeking to benefit directly from this new phase of corporate agriculture.

This paper comes at a time when it is crucial to have a well-informed dialogue on agricultural policy, seed sovereignty, and sustainable development in Pakistan. By raising concerns on behalf of citizens, consumers and especially marginalized farmers and farmworkers who are most vulnerable to the enactment of these policies, and looking at comparative trends from other contexts, our purpose is to spread awareness and make policy recommendations that benefit the consumer, the farmer and the agriculture sector on the whole. The public in Pakistan has a right to know the contents and context of food, and needs to develop an informed voice in shaping policies that are radically altering our food-system.

Before moving ahead with the discussion, it is important to expand on the notion of food sovereignty which constitutes the key concern of the paper. The concept of "food sovereignty" was introduced by La Via Campesina, the International Peasant's Movement, at the World Food Summit in 1996. Since then, the concept has become

widely recognized and it has attracted a large number of advocates who see it as the main solution to the plight of poverty and hunger in the world.

Food sovereignty is defined as

“the right of peoples to healthy and culturally appropriate food produced through sustainable methods and their right to define their own food and agriculture systems. It develops a model of small scale sustainable production benefiting communities and their environment. It puts the aspirations, needs and livelihoods of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations. Food sovereignty prioritizes local food production and consumption. It gives a country the right to protect its local producers from cheap imports and to control production. It ensures that the rights to use and manage lands, territories, water, seeds, livestock and biodiversity are in the hands of those who produce food and not of the corporate sector. Therefore, the implementation of genuine agrarian reform is one of the top priorities of the farmer's movement” (La Via Campesina 2011).

The Nature of Seed: The “Green” and the “Gene” Revolutions

The debate on seed begins with how one perceives its nature. Are seeds an incorruptible cog in the circle of life, owned by none and accessible to all, naturally leading to continuity and self-preservation of food and flora? Or are they patentable industrial inputs resulting from genetic experimentation for the largest, most profitable yields?

The latter view deems corporatized and biotechnology-fuelled agriculture as the sole panacea for global food problems. However, an examination of the Green Revolution and its after-effects shows that instead of eliminating scarcities, corporate agriculture may in fact create new scarcities (Shiva 1991). Furthermore, those on the “seed as a common good” side of the debate are weary of a new agricultural revolution taking root, one that is set to repeat the past mistakes of the Green Revolution in undermining traditional farming knowledge and food sovereignty to purportedly address food security. This so-called Gene Revolution (Bhutani 2013) features the genetic modification of seeds to give rise to new plant varieties that are owned by individuals and corporations, and are therefore patentable.

The advent of the Green Revolution can be traced back to the funding of an international agricultural research program in the early 1960s by the Rockefeller and Ford Foundations, with Dr. Norman E. Borlaug, the so-called “father of the green revolution” at the helm of the project. The subsequent transfer and adaptation of scientific agricultural advances of the developed world to developing countries led to dramatic increases in rice and wheat crop yields in Asia and Latin America in the 1960s. These increases in yield were only made possible however with a substantially greater use of irrigation, fertilizers and other chemical inputs. From rice and wheat, the

“revolution” then expanded to include the development of high yielding varieties of several other major food crops of developing countries (Hazell 2009). These agricultural advancements were given the term “Green Revolution” in 1968 by the director of the United States Agency for International Development (USAID), with the hopes of pre-empting the spread of “red,” or socialist, revolutions (Schmalzer 2016).

According to a report describing the intensive input usage and resulting yields of the Green Revolution, “between 1970 and 1990, fertilizer applications in developing countries shot up by 360 percent while pesticide use increased by 7 to 8 percent per year. The amount of land under irrigation increased by one-third. The gains in production were dramatic: world cereal yields jumped from 1.4 tonnes per hectare in the early 1960s to 2.7 tonnes per hectare in 1989-91. Over the past 30 years, the volume of world agricultural production has doubled and world agricultural trade has increased threefold” (Food and Agricultural Organization of United Nations 2016).

The extent to which the Green Revolution addressed food shortages remains debatable, however, with new shortages being created in place of old ones (Shiva 1991). Moreover, the Green Revolution brought with it various lingering problems. These include expensive inputs leading to increased farmers’ debt and poor irrigation management leading to waterlogging and salinity, with the latter affecting more than 20 percent of the irrigated land in China and Pakistan thus causing land infertility (Food and Agricultural Organization of United Nations 2016).

The soil leaching from the overuse of fertilizers and pesticides also posed environmental and health concerns, while also causing pest resistance. The most dire consequence of the “Green Revolution,” however, was the alteration of the relationship of the small farmer with the seed as the seed was now a commodity that had to be bought instead of a gift of nature to be saved from year to year.

The Green Revolution also had a disciplinary element built into it. According to Shiva (1991):

Control over nature and control over people were essential elements of the centralised and centralising strategy of the Green Revolution. Ecological breakdown in nature and the political breakdown of society were essential implications of a policy based on tearing apart both nature and society. The Green Revolution was based on the assumption that technology is a superior substitute for nature, and hence a means for producing growth, unconstrained by nature’s limits...the assumption of nature as a source of scarcity, and technology as a source of abundance, leads to the creation of technologies which create new scarcities in nature through ecological destruction (p 15).

For these repercussions of the Green Revolution to subside, policies need to be in place that are pro-poor and farmer-friendly, and corroborate the view of seeds as common heritage. According to Hazell (2009: 21), “Green Revolutions need to be small farm led to be pro-poor, but this does not automatically happen without supportive government policies.... Meeting these requirements typically required

proactive efforts by governments in the form of land reforms, small farm development programs, and input and credit subsidies. Not all Asian countries were successful in meeting these conditions, particularly those that began with inequitable land distributions.”

Despite there being much to learn from the repercussions of the Green Revolution, the developing world is already at the cusp of the second major agricultural revolution of genetically modified and patentable seeds – the “Gene Revolution.” Opposition to GM crops stems from environmental and health concerns, especially due to the lack of reliable information regarding their long-term impacts. There are also concerns regarding the limiting of farmer and consumer choice, and the problems of widespread corporate agriculture especially in developing countries which lack political infrastructure, proper checks and balances for plant registration, equitable land distribution and farmer-friendly legislation.

Thus, while the GMO debate is gathering steam the world over, developing countries like Pakistan stand to lose most at the hands of the Gene Revolution and its accompanying policies and impacts.

These policies firstly include legislation related to plant breeders’ rights. Although plant breeders’ rights legislation is applicable to local companies and multinational corporations (MNCs) alike, and applies both to GM and non-GM seeds, clever corporate usage of this law can essentially allow MNCs to use indigenous gene pools to create new genetically modified plant varieties that they can declare as their “invention” and subsequently patent. Corporate control over crop varieties would thereby increase, moving rights away from the farmers to the MNCs as MNC-endorsed seeds would gather steam. The new policies further include corporatization of agricultural farmland, whereby states give away large tracts of land to other countries or corporates, instead of addressing inequitable land distributions. Due to these policies, the increased foreign presence in the agricultural sector of developing countries has been likened to a “recolonization.” Monopoly over market prices, influence over policy-making, undermining farmers’ rights, destruction of biodiversity and food sovereignty through mono-cropping and loss of traditional knowledge are all facets of the dilemma.

The way in which powerful corporations and MNCs can lay claim to traditional knowledge systems through intellectual property “rights” is highlighted through the landmark patents case on a bio-pesticide created from a derivate of India’s Neem plant. In 1995, a US company patented the bio-pesticide called Neemix for use on food crops although the process for which the patent had been granted had already been in use in India for many years. While the patent should have been overturned upon application on the basis of prior existing knowledge, and not after a ten-year struggle involving various petitions and legal efforts by India at the European Patent Office (EPO), the patent went through because “in the United States, ‘prior existing knowledge’ is only recognised if it is published in a journal – not if it has been passed

down through generations of oral and folk traditions” (‘India wins landmark patent battle,’ 2005).

Pakistan’s Seed Industry and Politics - Historical Context

A historical context of seed politics in Pakistan must start with a discussion on land. The inequality in land distribution post-partition and the inheritance of a feudal system shaped by British colonialism set the stage for the disparity between Pakistan’s small scale farmers and the large farm owners, as well as between farm tenants and landowners. Today, a mere 5% of large landholders in Pakistan are said to possess a massive 64% of the total farmland, while 65% of small scale farmers hold only 15% of the land (Nazeer 2015).

The current dependence of previously colonized countries on developed countries for agricultural expertise and technology can also be seen as a continuing form of colonial control. Sadeque (2014) writes that after the conquered countries regained independence, the former colonizers had to find other ways to continue acquiring resources and goods, which was then facilitated by the creation of institutions such as the World Bank and the International Monetary Fund (IMF). Under discourses of modernity and development, the rulers of countries in the South were led to believe that they were technologically backward and could only advance if they bought new technologies including agricultural ones from the West – a practice that maintained dependency, created debt, and worsened the environmental impact on Southern soils.

Pakistan’s seed landscape suffered a lack of biodiversity following the Green Revolution as high-input, semi-dwarf varieties of staple crops such as rice and wheat were introduced on farms. By the early 1990s, just five of the “super varieties” accounted for 90% of the rice growing area of both peninsular Malaysia and Pakistan (Kuyek 2001). According to Sadeque (2014), it was easy to persuade the big farmers and landlords in Pakistan to use hybrid seeds along with their expensive inputs of chemical fertilizer, pesticides, machinery and the hybrid seed itself, when huge subsidies were given.

Local seed varieties were displaced by these hybrids, eventually to disappear, and by the mid-seventies, Pakistan’s big farmers had gotten enough used to the technology to forget the traditional ways. The time was thus ripe to introduce a Seed Bill in 1976 that “would give preferential treatment to the commercial seed industry, local or foreign, discouraging farm-saved seed, and depriving women seed-savers of their traditional work” (Sadeque 2014).

A preferential treatment to corporate agribusiness was magnified when Pakistan became a member of the World Trade Organisation (WTO) in 1995 and subsequently, had to ratify the Trade Related Aspects of Intellectual Property (TRIPS) Agreement. This agreement essentially gave rights over a new seed variety or genetic material to the owner, disallowing any other entity from profiting from that variety’s commercial usage.

This intellectual property regime can cause much more violence than the Green Revolution, because it creates public-private partnerships that promote “the use of proprietary technologies that do not respect the very sanctity of life itself. With the genetic manipulation (GM) of living forms including seeds, planting material and animal breeds, the sites of innovation are fast shifting from the fields to the laboratories” (Bhutani 2013, viii). This essentially ensures that all agricultural advancements are corporate-led instead of farm-led.

Unlike manufactured products, biological material is considered to lie in the domain of nature, and hence any gene exploration can be perceived as a “discovery” at most, and not an invention. Additionally, GM crops go against both the cultural norms as well as rights of Asian farmers as patents on seeds and life forms are unthinkable due to the ethics of growing food, and the importance of having a basic right to food in Asian countries (Kuyek 2001).

According to Sadeque (2008: 59), “Farming knowledge has historically been shared and free, just as with seeds and their exchange. The first attempt by the west to monopolise seeds was the concept of Plant Breeders’ Rights. The title gives the impression that highly-trained professional farmers or agricultural scientists were alone capable of breeding new varieties of crops. Hardly so – peasants, especially women farmers of the southern hemisphere, have been the selectors and breeders of seeds and crops for over 10,000 years, a fact that governments with scant interest in citizens’ rights avoid acknowledging.”

Due to the Pakistani government’s increased role in seed and PBR regulation, a role that favours the influx and operation of private seed companies and corporate agriculture, Pakistan’s historical agricultural context thus primarily features a transfer from public to private involvement in its seed sector. Pakistan’s local seed is consequently rendered vulnerable and less protected than the foreign, GM varieties. Seed saving and development that once every farmer was allowed to do are now special privileges that the farmer cannot access. Instead, they are being forced to turn away from the cultivation and saving of their local varieties in favour of corporate seeds. Pakistan’s legislation concerning seed, PBR and land are being revised to meet the demands of a global, profit-driven seed industry at the expense of the rights of small-scale farmers. Thus legislation that allows land grabbing by foreign entities and that encourages commercial GM seed activity are already in progress, while farmer and ecologically friendly legislation that deals with biosafety and resource conservation exists in watered down, ineffective forms, as explained in the ensuing sections of the paper.

In a sense, these agricultural and land developments can be viewed as travelling in reverse, back to colonization times. Pakistan’s selling of six million acres of farmland to foreign entities and consequently giving them extensive power over its resources and economy, is akin to it inviting multi-national colonists back into the country (SCOPE 2016).

Seed Corporations, Companies and Informal Sector Players in Pakistan

Provincial Seed Corporations

According to Rana (2014), the 1970s saw the establishment of provincial seed corporations in Punjab and Sindh and an Agriculture Development Authority in NWFP (now Khyber-Pakhtunkhwa), while the Government of Balochistan was made responsible for seed provision in the province. The performance of these institutions did not have the desired impact in Sindh, Balochistan and NWFP. Although the Sindh Seed Corporation was revived in 2006, its role has remained ineffective in seed provision, rendering the Punjab Seed Corporation as the only public sector seed provider.

Multinational Seed Companies (Monsanto Pakistan Agritech (Pvt.) Ltd., ICI Pakistan Ltd., Pioneer Pakistan Seed Ltd., Bayer CropSciences and Syngenta Pakistan Ltd.)

Five main Seed MNCs function in Pakistan, playing a significant role in introducing hybrid seeds such as maize, sunflower, fodder, canola, alfalfa, and sorghum (Rana 2010). In the 1990s, Monsanto mainly produced cotton, rice and wheat for local sale as well as for Afghanistan through export. Arguably, seeds for these crops are not being produced by Monsanto in Pakistan since 2002-2003 – a claim that farmers and rights groups dispute due to the widespread availability of Monsanto seeds in the local market. On the other hand, Syngenta and Bayer have scaled down their involvement in the seed business to refocus on their agrochemical business. Both companies are however, carefully looking out for developments regarding commercialization of GM crops, as they wish to commercialize their GM seeds in Pakistan (Rana 2010).

Local Seed Companies

750 Pakistani seed companies were registered in 2013, with the majority of them concentrated in Punjab at 82 percent. Most of these companies function from Southern Punjab which is well-positioned for access to the Sindh and Balochistan seed markets (Rana 2014).

Informal Seed Sector Players

Pakistan's informal seed sector is large, with uncertified seeds accounting for about 80 percent of the total seed requirement annually (Rana 2014). The informal sector comprises of “(1) farmer-to-farmer seed exchange on a non-commercial basis, (2) small-scale farmer-to-farmer seed sale, (3) farmer-saved seed for planting in subsequent years, and (4) medium- to large-scale sale of seed in brown bags” with the last two categories making up the bulk of the informal seed sector (Rana 2014: 20). According to Rana (2014), the case of Bt cotton is instructive when looking at Pakistan's informal seed sector. Bt cotton seeds first reached Sindh in 2002–2003 from abroad through enterprising farmers who initially planted them on a small-scale

basis but with steadily growing popularity. Meanwhile, the crossing of local cotton varieties with Bt material resulted in further Bt varieties, so that by 2007, Bt varieties accounted for 80 percent of the cotton cultivation area in Sindh and 50 percent in Punjab (Ali et al. 2007, as cited by Rana 2014). Unapproved Bt cotton varieties have therefore been widely marketed in the informal sector, so much so that non-Bt cotton became limited to a small fraction of the total cotton cultivated land, one that continues to steadily decline. The role of Monsanto in promoting this proliferation of Bt seeds is acknowledged by farmers' rights groups.

Legal Regimes and their analysis

This section of the paper presents information pertaining to the trajectory, current status and salient features of key legislative regimes affecting seed politics, farmers' rights and land rights in Pakistan.

The Seed Act 1976 was the first Act of its kind in Pakistan to lay down a set of principles regarding seed quality regulation, certification and registration of crop varieties. The Act's preamble states that its objective is "controlling and regulating the quality of seeds of various varieties of crops." Although it left much to be desired in terms of establishing proper infrastructure as a pre-requisite for its clauses, the Act and the subsequent rules developed under it led to the formulation of regulatory and certification authorities, the provision of important definitions relevant to the seed sector and the penalties for commercial activity concerning misbranded or unregistered seed.

Amendments to the 1976 Act were in process in the form of an Amendment Bill in 2009, but it made real headway in October 2014, when the Seed (Amendment) Bill 2014 was cleared by the National Assembly's Standing Committee on National Food Security and Research, and consequently passed by the National Assembly in March 2015. The Senate then received the bill from the National Assembly, and after the Senate Standing Committee on National Food Security and Research approved the Seed (Amendment) Bill 2015 in June 2015, the Senate speedily passed it into law in July 2015. The president's assent for the Act was granted on the twenty-third of July 2015 and it was published in The Gazette of Pakistan shortly thereafter

While the 1976 Act does address private interests, the Seed (Amendment) Act 2015 takes it a lot further. The 'Statement of Objects and Reasons' section for the 2015 Bill, signed by the Minister of National Food Security and Research, observes that "the Seed Act 1976 does not fulfil the requirements of the modern seed industry." It goes on to say that the current Seed (Amendment) Bill keeps in mind the emerging reality of the impairment of the public sector and the strength of the private sector to offer a level playing field to both sectors. Additionally, it states that "new innovations in hybrid technology and Genetically Modified Crops (GMCs) have transformed the seed industry," thus the Bill clearly sets out to cater to these innovations, and build a more favourable environment for foreign companies to invest in Pakistan's seed sector.

Part 1 of the Seed (Amendment) Act 2015 also states that “the Provincial Assemblies of Balochistan, Khyber Pakhtunkhwa, Punjab and Sindh have passed resolutions under Article 144 of the Constitution of the Islamic Republic of Pakistan to the effect that Majlis-e-Shoora (Parliament) may suitably amend the aforesaid Act.” Article 144 of the Constitution of Pakistan empowers the Parliament to legislate on behalf of provinces on the basis of their consent, given that the provincial assemblies can still amend or repeal any act passed in this manner.

Crux of Seed Legislation and Successive Clauses

In this section, the salient features of the Seed (Amendment) Act 2015 are discussed, alongside notable variations in successive clauses from the initial 1976 Seed Act to the current legislation.

Firstly, since the Federal Seed Certification Agency (FSCA) & National Seed Registration Agency (NSRA) as described in the 1976 Act were merged together as the Federal Seed Certification & Registration Department (FSC&RD) in 1997 on the basis of an austerity measure, the corresponding changes have been made in the 2015 Amendment Act.

Second, there are many additions and variations in the definitions laid out in the 2015 Amendment Act. In the 1976 Act, “basic seed” was a seed produced by an organization set up by a Provincial Government, while the 2015 Amendment Act includes the private sector in its definition in article 2(4): “basic seed means progeny of the pre-basic seed produced by any public sector or private sector organization and certified by the FSC&RD.” The definition of “Hybrid” seeds has also been added in article 2(9): “(1) the first generation offspring of a cross between two individual plants differing in one or more genes: (2) the progeny of a cross between species of the same genus or of different genera.”

Authorization of Genetically Modified Organisms (GMOs) Registration

Definitions added in the 2015 Seed (Amendment) Act include “genetically modified variety” in article 2(8), which stands for “varieties which have been bred by genetic engineering involving molecular techniques that modify, recombine and transfer genes or segments of genetic material and includes recombinant deoxyribonucleic acid (DNA) techniques that transfer genes or segments of genetic material between genotype and also apply to plant varieties derived from a living modified organism.”

The term “terminator technology” is also introduced in relation to GMOs in article 2(17) as “genetic modification that includes gene or gene sequences which restrict germination of the seed produced by the plant variety or hybrid during the next subsequent year of planting.”

According to the addition of Section 22G in the 2015 Amendment Act’s article 11, the registration of GM plant varieties is subject to an undertaking by the applicant

that the variety does not contain any gene or gene sequence involving terminator technology. A certificate from the National Bio-safety Committee (NBC) would be a required for the approval of the plant variety to confirm that it will have no adverse effect on the environment, human, animal or plant life and health, relying on the data of two crop season trials, which would then “satisfy environmental concerns about GMC,” according to the “Statement of Objects and Reasons” accompanying the 2015 Seed Amendment Bill.

Under the 2015 Amendment Act, the private sector will be allowed not only to produce basic seeds for their multiplication and certification but also to establish accredited seed testing laboratories. Here, “accredited laboratory” means any seed testing laboratory established in the public sector or private sector and accredited by the appropriate organization.

Setting seed labelling standards

Unlike the 1976 Act, the 2015 Seed (Amendment) Act addresses seed labelling by introducing the definition of “truthfully labelled seed” in article 2(18) as a seed of a registered variety or hybrid produced locally or imported and which conforms to standards as prescribed under the rules of the Act. Moreover, a detailed delineation of “misbranded” seeds is provided in article 2(9), including the following descriptions: (i) a seed which is a substitute for, or resembles in a manner likely to deceive, another plant variety or hybrid of seed under the name of which it is sold, and is not plainly and conspicuously labelled so as to indicate its true nature; (ii) it is falsely stated to be the product of any place or country; (iii) it is sold by a name which belongs to another kind or plant variety or hybrid of seed; (iv) false claims are made for it upon the label or otherwise; (v) the contents are not conspicuously stated when the seed is in packaged form or that the packaging is deceptive; (vi) it does not include the necessary caution for the environment and plant and human life. Businesses engaging in misbranded seeds will be penalized according to the rules of the Act.

Enhancement of fines and penalties against the sale of substandard seeds in the market

In the “Statement of Objects and Reasons” of the 2015 Bill, the penalties laid out in the 1976 Act are said to be too meagre to effectively deter seed violations. The penalties are significantly upped, even from the 2014 bill to the 2015 Bill and Act. The 2014 bill sets the fine amount at Rs. 25,000 while the 2015 Amendment Act sets it at Rs. 200,000.

The penalties for punishable acts are listed in article 12 of the 2015 Amendment Act, as substitution for section 23 of the 1976 Act. These penalties apply to whoever acts in violation of the Act and imports, sells, holds in stocks or exhibits for sale or barter or otherwise supplies any seed of any kind or plant variety or hybrid which is misbranded, or not a registered or enlisted plant variety or hybrid. They fall on any person who obstructs the work of an official under this Act or prevents a Seed Certification Officer or a Seed Inspector from taking a sample or inspecting seed

under this Act. The penalties include, in the first offence, imprisonment for a term which may extend to three months or with fine not exceeding two hundred thousand rupees, and for every subsequent offence, the imprisonment for a term which may extend to six months or with fine not exceeding six hundred thousand rupees or both.

Clear definition of the role of registered seed companies, seed dealers, seed processing units and fruit plant nurseries established in the private sector

“Seed Business” is defined in the 2015 Amendment Act as any commercial operation of seed involving production, processing, conditioning, packaging, distribution, import and export of seeds. The 1976 Seed Act was silent on seed company registration. In 1979, an Inter-ministerial Working Group was created to register or deregister new seed companies. However, since the Working Group was not a statutory body, it could not create a new organization, and thus only registered again seed companies that were already established under other instruments such as the Companies Ordinance 1984 (Rana 2014). This led to a slowing down of seed business operations. The 2015 Seed Act effectively brings the registration of seed companies under its ambit, with a 5-year registration period granted to seed businesses with renewal of further five-year terms.

Additionally, a seed dealer may apply for a provisional dealership license after one year without the pre-condition of prescribed training. After training, the seed dealer may apply for a regular 3-year licence. All seed dealers must also clearly display at their place of business the sale prices of different crop seeds held, including the opening and closing stocks on a daily basis.

Moreover, Section 22A states that the FSC&RD (Federal Seed Certification & Registration Department) may register or enlist plant varieties or hybrids imported for general cultivation on the basis of the results of multi-location trials for at least two crop seasons within Pakistan.

The Act further facilitates the set-up of private horticulture nurseries as well as seed processing units that meet the requirement of infrastructure, equipment and qualified manpower as well as the filing of periodic returns.

Finally, an important omission from the 2015 Amendment Act that was part of the 1976 Act pertains to the compensation paid by the government to the person from whom a seed inspector takes a seed sample from for examination, calculated at the rate at which such a seed is usually sold for in the market.

Plant Breeders’ Rights Legislation in Pakistan

Plant Breeders’ Rights are essentially developed to give rights over a new variety to the owner, barring any other individual or entity from profiting from that variety’s commercial usage. The requisite ratification of the Trade Related Aspects of

Intellectual Property (TRIPS) Agreement by Pakistan as a member country of the World Trade Organisation (WTO) set the stage for intellectual property protection of plant varieties in the country. Setting minimum standards for intellectual property protection, Article 27 of the TRIPS Agreement, “Patentable Subject Matter,” declares that “patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application.” Article 27.3 (b) further elaborates that plant variety protection will be provided by member countries either by patents or an “effective sui generis system” or by any combination of the two.

While incumbent upon members, the Agreement does not specify the nature or regulations of the sui generis system. Consequently, member countries do possess a certain level of liberty to develop protection mechanisms that best serve the interests of their people and economy. Nevertheless, Pakistan’s Plant Breeders’ Rights (PBR) legislation seems to pander to the vested interests of plant breeders and multinational seed companies, while concerns of farmers’ rights, food sovereignty and protection of local varieties are not adequately addressed.

The Legislative Process of Plant Breeder’s Rights in Pakistan, Placed in Context

Pakistan acquired WTO membership in 1995 as a “developing country” member, therefore it was granted a five-year transitional period for TRIPS implementation which culminated in 2000 with Pakistan’s release of the Patents Ordinance 2000. Specifically, pursuant to the TRIPS Agreement Article 27.3 (b) for agricultural patents, the Plant Breeders’ Rights Act was additionally prepared as a draft bill in 1999 by the Nawaz Sharif government and then completed under General Musharraf’s regime in 2000 as an ordinance. However, its promulgation was halted after pressure was exerted on the government by certain advocacy groups and stakeholders (Suleri and Shah 2003).

The draft PBR Ordinance 2000 and its predecessor bill were grounded in the 1991 Treaty of International Union for the Protection of New Varieties of Plants (UPOV). The UPOV has served as the basis of forming a “sui generis” plant protection system that the TRIPS agreement specifies, by ensuring that the members subscribe to the minimum protection standards contained in the treaty. UPOV has a membership of 74 states or organizations, including the European Union, Australia, the United States and the United Kingdom. To conform to international standards of protection and create a favourable investment environment, Pakistan did entertain the possibility of joining UPOV, thereby developing PBR legislation that is still influenced by the treaty. However, it eventually opted not to join the convention.

Plans for the enactment of the PBR legislation that was developed in 2000 were never dropped, as corroborated by the Plant Breeders’ Rights Bill making the rounds in 2006 and intermittently since, right until its current status in 2016 as tabled for passage in parliament. Presented to the PPP government in 2008, the government sought

legislative approval from provinces as per Article 144 of the Constitution of Pakistan, and it was purportedly attained by 2015, after which the bill was relaunched in the National Assembly (NA) at the end of 2015 (Sial 2016).

Introduced in the National Assembly in November 2015, the Plant Breeders' Rights Bill 2015 was passed by the NA Standing Committee on Cabinet Secretariat on the 6th of January, 2016 with "slight amendments" according to an NA press release (National Assembly Secretariat Press Release 6th January 2016). Although the Chairman of the NA Standing Committee on Cabinet Secretariat, Rana Mohammad Hayat Khan, expressed an inclination towards a speedy approval of the bill in a prior meeting, other committee members insisted on having an additional meeting with relevant stakeholders in attendance, including farmers, private seed companies and provincial government officials. In that meeting, although stakeholders and members did express reservations regarding the precedence of breeders' rights over farmers' rights, the bill was hastily approved, with Rana Mohammad Hayat Khan and the Federal Minister of National Food Security and Research, Sikander Hayat Bosan, espousing the positive impact expected from the Act, including provision of high quality seeds for farmers and increase in foreign private sector investment (Bokhari 2016).

In a meeting of the National Assembly Standing Committee on Cabinet Secretariat, held on 9th March 2016, proposed amendments to the Plant Breeders' Rights Bill 2015 were submitted by stakeholders such as the MNFS&R, IPO-Pakistan and MNA Asad Umar. Deliberation on the proposed amendments featured a conflict over administrative control of Plant Breeders' Rights between the Ministry of National Food Security and Research (MNFS&R) and the Intellectual Property Organisation of Pakistan (IPO-Pakistan), which is an autonomous regulatory body for intellectual property rights in Pakistan, established in 2005 under the administrative control of the Cabinet Division (Sial 2016). The main difference of opinion was concerning the jurisdiction of the National Agriculture Registry (NAR) that will administer protection to agriculture inventions. According to precedents in most other major agriculture-producing countries, the agricultural registry falls under the ambit of the ministry of agriculture, such as in India; however, there are examples such as that of Singapore where the registry is handled by the country's IPR organization (Sial 2016). While the Cabinet Division wants the NAR to be handled by the Ministry, IPO-Pakistan is pushing for the registry to be maintained by a purportedly neutral organisation such as itself (Sial 2016). The IPO-Pakistan website clearly states that after enactment of the PBR Bill, "the PBR Registry will be set up under administrative control of IPO-Pakistan on modern and competitive lines to provide an effective intellectual property right system for granting protection to the development of new plant varieties and to establish a viable seed industry for the improvement of agriculture to ensure the availability of high quality seeds and planting material to the farmers" (Intellectual Property Organization of Pakistan 2016).

The Plant Breeders' Rights Act 2016 was passed by the Senate in November 2016, and formally passed into law as an act of parliament by receiving the President's assent in December 2016.

Crux of PBR Legislation and Successive Clauses

In this section, the salient features of the Plant Breeders' Rights legislation are discussed, alongside notable variations in successive clauses as well as proposed amendments, incorporating the latest developments at the time of writing, as the legislative process for PBR is ongoing.

In the preamble to the 2006 and 2016 Bill (but not in the draft PBR Ordinance of 2000), Article 144 of the Constitution of Pakistan concerning provincial involvement is mentioned in relation to parliamentary PBR legislation, with the PBR Bill 2016 stating: "WHEREAS the Provincial Assemblies of Balochistan, Khyber Pakhtun Khawa, Punjab, and Sindh have passed resolutions under Article 144 of the Constitution of the Islamic Republic of Pakistan to the effect that Majlis-e-Shoora (Parliament) may regulate and make law on Plant Breeders' Rights and matter connected therewith." Article 144 essentially states that if one or more provincial assemblies allow the Parliament to regulate a matter not specified in the Federal Legislative List, it will be lawful for Parliament to pass an Act in relation, keeping in mind that the act can be amended or repealed by the provincial assembly of the province to which it applies.

The PBR drafts throughout the years all specify the establishment of a Plant Breeders' Rights Office or Registry, however in the 2000 draft Ordinance and 2006 Bill, this is placed under the domain of the Agriculture Ministry (then Ministry of Food, Agriculture and Livestock) while in the 2015 Bill, the Registry is notably to be established under the "Organization," referring to IPO-Pakistan. In the 2016 PBR Bill however, there is to be a "Plant Breeders' Rights Registry" set up by the Federal Government under the MNFS&R. Headquartered in Islamabad, the Registry may with prior approval of the federal government set-up provincial and other such offices according to requirement. The functions of the Registry include registration and promotion of new plant varieties, issuance of certificates under the Act and protecting the rights of farmers and breeders as laid out in the Act.

The 2016 PBR bill also instructs the federal government on establishment of a Plant Variety Protection Advisory Committee consisting of public and private sector members who may advise the Ministry (in place of IPO - Pakistan in the 2015 Bill) or the Registrar of the Registry on certain scientific and technical issues which may be referred to it.

Significantly, the 2016 Bill sets the criteria for a new plant variety: it should conform to the features of novelty, distinctiveness, uniformity, stability and should be designated by an acceptable denomination. Novelty is specified as the plant variety not having been sold or marketed by or with the agreement of the applicant, for more than one year in Pakistan, for more than six years in the case of trees or vines and for more than four years in the case of all other plants in a foreign country before filing for a certificate under this Act. The particular aspect of the Bill remains unchanged from the 2000 draft.

In the 2015 Bill and 2016 Bill, requirements for registering GMO varieties for breeders' rights mirror the 2000 and 2006 draft, in that a certificate from the National Bio-safety Committee should be submitted by the applicant stating that the variety will have no adverse effect on the environment, human, animal or plant life, and health. Moreover, an affidavit sworn by the Applicant should also declare that the variety does not contain any gene or gene sequence involving "terminator technology."

An application for variety certification should include descriptions and drawings or photographs which disclose clearly the distinctive characteristics of the variety from other varieties of the same crop, and these characteristics may be tested on order of the Registrar as part of a distinctiveness, uniformity and stability (DUS) trial or any other specific test required by the Federal Seed Certification and Registration Department.

The 2016 Bill enjoins advertisement of the application which can be refuted within four months from the date of advertisement by any person opposing the granting of rights to the applicant through written notice and documentary evidence proving that the opposition is entitled to the rights for the new variety or that the variety is not protectable within the Act. Additional grounds for opposition include that the grant of a certificate may not be in the public interest or that the variety may be detrimental to the environment, human, animal or plant health.

The exclusive rights granted to plant breeders as identified in the bill's article 22 include "(a) Offering for sale or selling or marketing of the reproductive or vegetative propagating material of the protected variety in Pakistan; (b) importing the reproductive or vegetative propagating material of the protected variety into Pakistan or exporting it from Pakistan; (c) conditioning or multiplying the reproductive or vegetative propagating material of the protected variety; (d) carrying out any of the acts identified in clauses (a), (b), and (c) in relation to an essentially derived variety provided the protected variety is not itself an essentially derived variety; (e) instigating or promoting any of the acts identified in clauses (a), (b), (c) and (d); (f) authorizing any person to produce, sell, market or otherwise deal with a protected variety; (g) stocking for any of the purposes mentioned in clauses (a) to (d) and (h) Subject to any other provision of this Act no other person shall perform any of the acts mentioned."

A less expansive list of Farmer's rights in the form of exceptions is also provided, which entitles a farmer to save, use, sow, re-sow, exchange, share or sell his farm produce provided that he cannot sell the seed of a variety protected under the Act on a commercial basis without complying with the requirements of Seed Act, 1976 and Seed (Amendment) Act, 2016. It also allows for the exchange of "reasonable" amounts of propagating materials among farmers (amendment proposed in March 2016 to specify the amount in the regulations).

It is important to note the proposed deletion of article 25 (f) in the Bill after the March 2016 proposed amendments. The article allows as an exception, the sale of farm-saved seeds in situations where farmers cannot make use of the farm-saved seeds on their

own holdings due to circumstances beyond their control, such as natural disasters or other emergencies, given that the amount of seeds sold is not more than the amount required for the farmer's own holding. The amendment to exclude this provision was proposed by the MNFS&R with the justification that fair use of this allowance was very unlikely and that a precedent for this provision had not been set in the PBR law of any other country.

The Act also lists benefit sharing provisions, as claims for benefit sharing for a registered variety will be invited after publication of the certificate by the registrar within a prescribed period. Claims may only be submitted by an individual, group, firm, governmental or non-governmental organization, given that the person or group of persons hold Pakistani citizenship or that the firm or governmental or non-governmental organization is formed or established in or outside Pakistan. "Or outside" Pakistan was later added as a proposed amendment by the MNFS&R with the justification that protection of genetic material is supported both inside and outside of Pakistan. The Act also states that to determine the amount of benefit sharing due, the Registrar will take into consideration the extent and nature of the use of genetic material of the claimant in the development of the variety in question as well as the demand and commercial utility of that variety.

Infringement of the PBR Act is described as actions in violation of the rights granted to Plant Breeders' by the Act, including the illegal usage of a variety protected by the Act to produce an essentially derived variety or F1 hybrid for commercial utilization. An article of the Bill additionally states that a suit will not be instituted for the infringement of a protected variety or relating to any right provided by the Act in any court inferior to the Court of District Judge.

Nevertheless, it is interesting to note that an amendment to this has been proposed by IPO-Pakistan, stating that the Intellectual Property (IP) Tribunal should have exclusive jurisdiction to try the suit. IPO-Pakistan gave the justification that all IP infringement cases were now being transferred from District and Session Courts to these Tribunals, which were already operational in Islamabad, Lahore and Karachi with the appointment of presiding officers and the enforcement of relevant sections of the Intellectual Property Organization Act 2012. The Bill also stated that all fees collected under the Act through a prescribed schedule of charges be deposited in the Intellectual Property Organization fund. Since IPO-Pakistan was removed as the regulatory body associated with this Act, these proposals and amendments no longer apply.

Incentives for the promotion of research and development are additionally put forth by the Bill, with the instruction to establish a Research Incentive Board by the Federal Government and each of the Provincial Governments. The Board will create incentives for the promotion of research and development for scientists and their teams working on developing new plant varieties, such as the entitlement to a minimum of forty percent of the royalty or profits gained by the institute through any commercial deal.

The 2016 Bill also gives the registrar the power to grant compulsory license, based on factors such as public interest or reasonable public requirement for particular seeds or propagating material.

Analysis of Legal Regimes: Their Impact on Farmers' Rights and Citizens' Rights in Pakistan

In light of Pakistan's legal regimes concerning the seed sector and wider debates on seed politics, key points of discussion have been highlighted and explained in this section.

- 1. Much of the legislation discussed in the prior section presupposes infrastructure, monitoring and regulatory mechanisms, transparency and trained government personnel. These either do not exist or do not function at the level of sophistication that is required as a pre-requisite for the legislation to work without exploitation by the powerful to serve their interests at the expense of the rights of small-scale farmers and farm workers.**

According to Sadeque (2014), the Seed (Amendment) legislation is arbitrary, as it serves the vested interests of corporations and does not involve all stakeholders. She states that “safeguards claimed by the Bill don't even exist, because the infrastructure and personnel don't exist. It's just a paper claim to authorize corporate control” (Sadeque 2014).

These “paper claims” are evident when one considers, for instance, the mere requirement of a certificate from the National Bio-safety Committee (NBC) to get approval of a GMO variety – a certificate which would, in the words of the Minister for National Food Security and Research in the ‘Statement of Objects and Reasons’ section of the 2015 Seed Bill, “satisfy environmental concerns about GMOs.” It is hardly satisfactory that a certificate relying on the data of two crop season trials, the procedure and monitoring mechanism of which is unclear, can confirm that a particular GMO variety will have “no adverse effect on the environment, human, animal or plant life and health.”

Just as absurd is the provision in the National Bio-safety Guidelines 2005 that allows an IBC to ask the NBC for an exemption the required laboratory work and fieldwork of genetically modified organisms on the “sufficient” grounds that no risk is posed. Moreover, if the exempt status is granted, the commercial release of the variety on a priority basis can also be considered by the NBC, processed within a thirty-day period. Keeping in mind that an IBC membership also comprises of the head of the institute in which it is based, the potential for misuse of power is too great to justify the provision of the aforementioned privileges.

Pakistan's noncommittal responses in the 2nd Regular National Report from 2014 on the Implementation of Cartagena Protocol on Biosafety don't help much, where Pakistan admits that a domestic regulatory framework is “partially” in place to enforce the Biosafety Protocol, and that there is no allocations of funds or permanent staff relating

to the operation of its national biosafety framework. It also admits to its financial and HR issues, deeming its capacity inadequate in addressing biosafety requirements.

Infrastructure and monitoring mechanisms with regards to Plant Breeders Rights Legislation are additionally unclear, and make the farmer's position more vulnerable by not making provisions in case of the sowing of a protected variety unknowingly. This is not a farfetched scenario given the informal or unlabelled distribution of seed in Pakistan, as well as accidental contamination through neighbouring fields (as in the dispute of Monsanto Canada Inc. v Schmeiser, which Monsanto won). The way Pakistan's PBR system is being set up, it would be easy for a seed corporation to sue a farmer for patent infringement, given especially the weak position of the farmer in the existing agricultural and political system. The culture of fear and intimidation surrounding seed companies such as Monsanto, in the countries in which they openly and expansively operate, could be Pakistan's future if PBR passes into law.

The jurisdictions of the IPO – Pakistan and the Ministry of National Food Security and Research are unclear in terms of PBR implementation, adding to the infrastructural deficiencies that leave the PBR Registry open to exploitation and manipulation. Broadly, there is a dire need for infrastructural improvement and a checks and balances system to properly implement legislative provisions, handle infringement cases and control market seed price, among other vital regulatory functions.

Pakistan has been repeatedly allocated the “Priority Watch List Countries” status in the Special 301 Report by the Office of the United States Trade Representative (USTR) till as recently as 2015, meaning that it features “serious intellectual property rights deficiencies” due to IP violations and rampant piracy. These violations heighten the need for monitoring, and hinder the very foreign investment that the PBR legislation sacrifices farmers' rights for, rendering the exercise futile.

When the county is struggling with granting and regulating simpler IP rights pertaining to media, apparel and non-biological items, it is worrying to think that the same IP organization might bring the much more complex PBR implementation and monitoring under its ambit. In the 2015 Special 301 Report by the USTR, it particularly recognizes the inability of the IPO – Pakistan to fully establish the specialized intellectual property tribunals as per the IPO Act. These are the same tribunals that are proposed by IPO – Pakistan to try PBR infringement cases. This raises the question whether such a tribunal can adequately and justly address alleged infringement cases.

2. Pakistan prioritizes the enactment of some of its international agreements over others. It is not adequately mindful of the Cartagena Protocol and the Nagoya Protocol under the Convention on Biological Diversity (CBD) and the COP21 agreement of the Paris Climate Conference 2015 on forest conservation. On the other hand, the TRIPS agreement and the UPOV, to which Pakistan is not even a signatory but nevertheless influenced by, feature prominently in its legislation and are oriented towards corporate agriculture. The sets of pro-trade (TRIPS and UPOV) and pro-

conservation and biodiversity (CBD and COP21) agreements are inherently at conflict with each other, and if Pakistan pays excess homage to one set in its legislation, its legal and agriculture system cannot be balanced or equitable.

Pakistan is bound by both the Cartagena Protocol and the Nagoya Protocol under the CBD. The former deals with biosafety, seeking to protect biological diversity from the risks associated with GM technology. It promotes the exercise of caution with regards to new biotechnology, with public interest taking priority over economic gain, thereby allowing for precautionary bans of undetermined GM varieties. The Nagoya Protocol provides an implementation framework for the fair and equitable sharing of benefits arising out of the utilization of genetic resources to ensure conservation and sustainable use of biodiversity.

Instead of the heavy influence of TRIPS, a consideration of CBD protocols in Pakistan's Seed and PBR legislation would allow for a more balanced approach to food sovereignty and the rights of small farmers in particular. In the case of PBR, a balanced plan of action would ensure that plant breeders should receive their due rights while at the same time the rights of farmers should not be overlooked.

Pakistan is not a member of UPOV and while its adherence to the TRIPS agreement is mandatory, member countries do possess liberty to develop a sui generis system by adapting policies that best serve their public interest. That being said, the pressure from foreign entities and the private sector make this a very difficult task to accomplish. Here, it is interesting to note that the UPOV, which was first adopted in 1961, has been revised in 1972, 1978 and 1991. The successive versions increasingly limit the rights of the farmers and breeders, with the protections granted to breeders in the 1991 version mimicking those granted under the patent system (Kuyek 2001). While the UPOV's 74 member countries ascribe to different versions of the convention, interestingly Pakistan has modeled its PBR legislation according to the stricter 1991 version. Hence, even while some countries have tried to ensure farmers' rights in their Plant Variety Protection (PVP) legislation during their implementation of the TRIPS agreement – such as their rights over local varieties, biosafety clauses and compulsory profit sharing of PVP-protected seeds – the witnessed trend is towards “harmonization” with seemingly progressive PVP drafts having their farmer-friendly provisions removed or watered down to the extent that they read unmistakably like UPOV laws (Kuyek 2001).

With regards to the Seed (Amendment) Act 2015, while its regulation of GMOs requires an approval certificate from the NBC in accordance with the Biosafety Rules 2005 based on the Convention on Biological Diversity (CBD), the clause does not adequately adhere to the CBD's biosafety guidelines and is not corroborated by the requisite infrastructure and planning to ensure that risky GMOs are not cultivated or commercialized in Pakistan.

3. Under the 18th Amendment in the Constitution of Pakistan, both Agriculture and the Environment are provincial subjects, and hence

federal and parliamentary processes on Seed and PBR legislation without the involvement of the provincial assemblies render the legislation unconstitutional

Although it has been stated by parliamentarians that the provincial assemblies have approved of the PBR and Seed legislation, this is not manifestly clear and there is lack of documentary evidence or government notices to corroborate provincial discussion and approval of these controversial legal regimes.

A letter written to the Chairman of the Senate Raza Rabbani by a farmers' organization, the Pakistan Kissan Mazdoor Tehreek (PKMT), on the subject of the 2014 Seed (Amendment) Bill attests to it being unconstitutional (Roots for Equity 2015).

The letter challenged the Government's claim that a resolution had been passed from each provincial assembly through which provinces had granted the National Assembly the right to proceed with legislation in this subject matter, therefore rendering the legislation in line with the 18th Amendment as provincial approval had allegedly been sought. PKMT states that their own inquiry from the Sindh Assembly Secretariat negates the aforementioned claim, as no such resolution had been passed by the Sindh Assembly. PKMT further urged the Senate to act responsibly in this regard and pay attention to the many social, technical and scientific issues outlined in the letter that have led to so many opposing this Act, calling the issues "anti-farmer, anti-people and anti-Pakistan." In closing, the letter asked the Chairman to not allow a law on agriculture that lets MNCs capture Pakistan's food and agriculture system.

Unfortunately, the Senate went on to pass the bill into law soon after. Upon further investigation from appropriate sources in the Senate Secretariat on the letters sent by PKMT for the purpose of this paper, the receipt or knowledge of existence of those letters was not admitted.

4. The recent Seed and PBR legislation does not include specific or adequate provisions for women farmers and tenants, which is vital considering the economic and socio-cultural role of women in Agriculture as well as their labour and land rights.

Rural Pakistani women play a vital role in subsistence as well as commercial farming activities; however, due to societal and cultural norms, their role is often invisibilized and ignored even within discussions of food sovereignty and farmers' rights. Their self-sufficiency and decision-making powers are thus obstructed. Since women's position is already socially and economically marginalized, women will most likely be affected drastically by legislation that favours the corporatization of agriculture.

5. The inclination of the legislation discussed in this paper towards corporate-controlled agriculture coupled with Pakistan's lack of pro-farmer policies and seed market regulatory systems, will not only grossly undermine farmers' rights but also adversely affect national sovereignty,

land and environment, food security, and consumer health. A renewed neoliberal-imperial colonization is not implausible, if the stakes of MNCs in Pakistan's seed industry remain unchecked and the land-grabbing activities of foreign entities – as well as of the Pakistani government on their behalf – continues on Pakistani soil

By being disallowed the importing, selling, holding in stocks, exhibiting for sale, bartering, or any kind of supplying of any unregistered seed under the Seed (Amendment) Act 2015, and by only being allowed to purchase registered seed from licensed dealers, local farmers who deal in the business of farm-saved seed will suffer unsparingly. Their plight does not end here. With the regulation of GM seeds under both Seed and PBR laws, even the personal tradition of saving and re-using of seeds by local farmers will be severely impacted. Even if farm-saved seed that others have not patented (yet) can be reused restricting it to one's own land as mentioned in PBR legislation, GM influx will lead to widespread contamination which will eliminate seed choice by the annihilation of local farm-saved seed, just as it has happened in the case of cotton in Pakistan, with local cotton being all but replaced by BT cotton. Additionally, the patents regulated under PBR may allow bio-piracy to occur and restrict local seeds from being saved and re-used. Foreign companies may obtain patents for local plants or their derivatives, exemplified by the previously mentioned ten-year legal battle resulting from the European Patent Office (EPO) granting a Patent for a Neem derivative to the US Department of Agriculture and the multinational WR Grace in 1995, despite Neem being an indigenous Indian plant.

Due to such exploitative practices of multinationals in the name of “innovation,” the new legal regimes of seed policies in Pakistan have the potential to lead to the monopolization of Pakistan's seed market by multinational seed corporations, causing unchecked hikes in seed and input prices which will be severely debilitating for farmers. Moreover, by prescribing the payment of royalties by farmers to MNCs on usage of protected seeds, limits will be placed on the farmers' rights to choose and buy seeds. They will be forced to repeatedly buy expensive seeds and inputs, adversely impacting their quality of life and livelihoods, while their liberty to economize through seed-saving and trading will be taken away. Just like the virtual impossibility of growing non-GM canola in Canada because of a widespread contamination that has even reached Japan (Greenpeace Canola Report 2005), it is alleged that cotton farmers in Pakistan will also have no choice anymore but to grow BT cotton.

As corporate control over Pakistan's food system will increase, the right of its people to food sovereignty will decline, as will their ability to source food that is justly grown and culturally suitable. According to Najma Sadeque (2014), in the words of the Minister for National Food Security and Research, “It has been observed that the Seed Act 1976 does not fulfil the requirements of the modern seed industry”. On this statement of the minister Sadeque observes, “True, because it does not help Monsanto, Syngenta, or Du-Pont-Pioneer in its objectives to take over Pakistan's main agriculture through GM seeds. But it also does not fulfil the requirements of our

small farmers' indigenous seeds geared to the domestic market. On the contrary, it actively deprives the small farmer through ordinance or legislation.”

Furthermore, by giving precedence to the rights of corporate plant breeders and the protection of foreign or genetically modified varieties, and by failing to recognize the role of farmers in developing and conserving genetic material and contributing to valuable traditional farming knowledge, a detrimental power dynamic will be created in which the socio-economic and political status of farmers will be further weakened.

According to Kuyek (2001), PBR legislation threatens Asia's agricultural heritage, which has been built by centuries of free exchange of seeds and knowledge, leading to farmer-led, agricultural innovation. The legislation also goes against the tradition of there being no patents on life forms because of ethical frameworks regarding respect for nature, and because anything within nature should be regarded as a discovery rather than an invention. The heightened risk of bio-piracy from the new legislation cannot be ignored, whereby corporations can exploit the weak regulatory and registry systems by securing protection for seed varieties that already exist.

Dwindling biodiversity as a result of mono-cropping will also contribute towards numerous environmental and health issues. According to Azra Sayeed (2016), “The vast array of genetic resources is critical to the survival of ecological zones and systems. The myopic intervention in the agriculture system can result in widespread disease and disaster as seen in the Bt cotton harvest season in 2015.”

Moreover, the environmental hazards arising from untested GM seed imports as well as their accompanying herbicides cannot be overlooked.

Comparative Trends: Ecuador, Bolivia, and Europe

South American Countries like Ecuador and Bolivia constitute instructive examples of efforts made by governments towards more environmentally-friendly food policies. These policies rest on the concept of the Rights of Nature:

Rather than treating nature as property under the law, rights of nature acknowledges that nature in all its life forms has the right to exist, persist, maintain and regenerate its vital cycles. And we - the people - have the legal authority and responsibility to enforce these rights on behalf of ecosystems. The ecosystem itself can be named as the defendant. (The Rights of Nature 2016)

Accordingly, in December 2010, the National Congress of Bolivia voted to support the historic “Mother Earth” Law, which is thought to set the precedence for legislation that treats nature as a legal entity with legally enforceable rights. The principles under the law include that of collective good (prevailing interests of society), guarantee of regeneration, respecting and defending the rights of Mother Earth and anti-commercialism which means that neither living systems nor processes that sustain them may be commercialized, nor serve as anyone's private property (Neill 2014).

Subsequently, in 2011, the Bolivian President Evo Morales signed a new law which set out to ensure food security for his country by safeguarding biodiversity and protecting local varieties, as well as ending dependence on foreign seed companies. This legislation was a response to protests regarding food shortages and increased prices, leading many Bolivians to forgo their staple food in lieu of cheaper foreign products. Under the plan, state-owned seed and fertilizer companies would be set up, small farmers would be given credits, the improvement of local genetic stock through natural selection would be promoted and GM seeds would be restricted based on fears of contamination of local species and higher food prices ('Bolivia moves to end dependence on foreign seed firms' 2011).

Similarly, Ecuador also incorporated the Rights of Nature in its legislation and became the first country to recognize these rights in its Constitution in 2008 by including a chapter on Rights for Nature. Article 71 of the Constitution states:

Nature, or *Pacha Mama*, where life is reproduced and occurs, has the right to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes. All persons, communities, peoples and nations can call upon public authorities to enforce the rights of nature. (Constitution of the Republic of Ecuador)

Article 73 further goes on to state:

The State shall apply preventive and restrictive measures on activities that might lead to the extinction of species, the destruction of ecosystems and the permanent alteration of natural cycles. The introduction of organisms and organic and inorganic material that might definitively alter the nation's genetic assets is forbidden. (Constitution of the Republic of Ecuador)

These rights, if tampered with, have to be restored, with citizens having the right to advocate on the Earth's behalf.

The European Union provides strict guidelines and a legal framework for the responsible and safe authorization of GMOs, including high-standard safety assessments, risk assessment, clear labelling of GMOs to enable informed consumer choice and the traceability of GMOs placed on the market. Moreover, GM-free labels are not restricted, provided that they are accurate. Additionally, the EU allows member states to opt out of the cultivation or food and feed use of GMOs even if they have been authorised by the EU. Accordingly, 16 out of 28 EU member states were said to have opted out of GMO usage in 2015 (Sifferlin 2015).

Comparative Trends: The Case of India

Keeping in mind the shared past of the two countries, as well as their climatic and agricultural similarities, it is pertinent to study the case of India while discussing the matter of seed politics in Pakistan.

In comparison to Pakistan's proposed PBR legislation, the Indian Protection of Plant Varieties and Farmers' Rights Act 2001 is more farmer-friendly in a number of ways (Rana 2014). Not only is their Plant Registry governed by an Authority that includes agricultural academics, local seed company and provincial representatives, as well as members of women's organizations, farmers' organizations and tribal organizations, but the Registrar of the Registry is also selected by that Authority and not by the government. Its explicitly farmer-friendly policies include the protection of farmers against unintentional infringement as well as protection against crop failure by compensation for a variety that fails to deliver. Furthermore, the Act states that "the farmer who is engaged in the conservation of genetic resources of land races and wild relatives of economic plants and their improvement through selection and preservation shall be entitled in the prescribed manner for recognition and reward from the National Gene Fund; Provided that material so selected and preserved has been used as donors of genes in varieties registrable under this Act" (Indian Protection of Plant Varieties and Farmers' Rights Act 2001).

It also waives fee payment from farmers for proceedings before the Authority, in addition to expressing the indisputable right of the farmer to save and re-use seeds. It thereby states that farmers are entitled to save, use, sow, re-sow, exchange, share or sell their farm produce, including seeds of a registered variety, provided that the branded seed of a registered variety cannot be sold, where branded seed means "any seed put in a package or any other container and labelled in a manner indicating that such seed is of a variety protected under this Act" (Indian Protection of Plant Varieties and Farmers' Rights Act 2001).

With regards to Indian seed legislation, much has been made to amend the India Seed Act 1966 with a Seed Bill 2004, which has persisted through the years despite resistance stemming from its clauses dealing with GM seeds (GRAIN 2005). The Bill makes provisions for compensations to farmers when registered seeds fail to provide the expected performance promised by the sellers, as well as for cancellation of the registration of a seed that is commercially exploitative and endangers public interest, health of humans, animals, plant life as well as the environment.

This is not to say that India has successfully thwarted the designs of corporate agriculture giants to profit from the fertile lands of their part of the world, especially through GM technology. The growing dissent on India's cotton belt and the strong presence of companies like Monsanto presents clear evidence of that, as well as the Government of India's National Biotechnology Development Strategy (NBDS) 2015-2020 to establish the country as a world renowned biotechnology hub ('India launches new biotech strategy' 2015). However, in India, there is certainly greater awareness and organized resistance to corporate agriculture led by Indian civil society organizations, academics, farmers' associations and the wider Indian public.

Most pervasive of the resistance movements is perhaps the one spearheaded by the leading Indian environmental scholar and activist Vandana Shiva, who started the organization Navdanya in 1987 to combat the corporatization of seeds and to fight

for farmers' rights while promoting biodiversity and organic farming. It advocates for seeds as commons, and the right to freely save and share them, thereby conserving traditional knowledge, culture and biodiversity. A women-centred movement with a primary membership of more than 6,50,000 farmer families, Navdanya comprises of a network of seed keepers and organic producers spread over 18 Indian states, 122 Community Seed Banks (CSBs), a biodiversity conservation and organic farming learning centre with its own farm and seed bank which preserves several important varieties and landraces, and more than 5000 "Jaiv Panchayats" in different parts of India. These are essentially village councils that have Community Bank Registers (CBRs) wherein they register the diversity and knowledge that exist in their village. Additionally, by including women, children and minority communities instead of just individuals on the electoral rolls of the village, these councils empower the community as decision-maker on biological diversity conservation. In addition to creating awareness about the hazards of GMOs and biopiracy, Navdanya also lists as its achievements, training over 5,00,000 farmers on seed sovereignty and sustainable agriculture, transferring 2,00,000 farmers to organic farming practices and conserving 3,000 varieties of rice.

Apart from Navdanya, there are several other civil and voluntary organizations that operate successful Seed Banks in India. These include seed banks by Annadana Seed and Soil Savers, Centre for Indian Knowledge Systems (CIKS), Green Foundation, Deccan Development Society, Sahaja Samrudha and Debal Deb's seed bank, Vrihi, in India's Odisha state. Additionally, community or regional seed banks are also present through the government seed corporation in India, the National Seeds Corporation (NSC), under which a SAARC seed bank is also maintained. Moreover, useful farmer and seed online portals are provided by the Indian Government in the form of "seednet.gov.in" and "farmer.gov.in," where farmers can access information relating to quality seeds and other input availabilities, market prices, crop and risk management, and seed dealers relevant to specific states and districts.

In Pakistan's case on the other hand, while some organizations such as Roots for Equity and PKMT (Kissan Mazdoor Tehreek) do work for community seed-saving, the spread of seed banks and a broader movement for seed and food sovereignty remains limited. As the Guardian reports, "numerous aid agencies, such as Action Aid and Concern Worldwide, saw seed banks as a prompt and effective way to distribute seeds to normalise household conditions after the floods in 2010. However, despite protests and activism, seed banks are still not seen as a long-term solution in that part of the world – primarily due to tenancy farming or feudalism (particularly in the south)" (Jaffery 2014).

Concluding Recommendations

This paper has sought to raise key concerns regarding the contemporary policy landscape of seed, food, and agriculture in Pakistan. It has highlighted the continuities between the earlier "Green Revolution" and the current "Gene Revolution" in terms of its emphasis on a modern agriculture that claims to address food security, but in

effect, produces devastating consequences for the land and worker alike due to its prioritization of the interests of corporatized, high-cost, seed businesses at the expense of the needs of the land, the farmer, the consumer and the citizen in general.

The new legal regimes in Pakistan regarding seed and agriculture – as represented in particular by the Seed (Amendment) Act 2015 and the Plant Breeders' Rights Act 2016 – are deeply problematic as they not only display a glaring disregard for farmers' rights as well as for our national seed heritage, but openly trample on them in order to facilitate a hasty proliferation of commercial and especially GM seeds. The Seed (Amendment) Act bars the use of unbranded seeds, which means that the small, subsistence farmer will be forced to grow only seed that has been officially registered after a series of costly and complicated requirements have been fulfilled. This raises the cost of access and agriculture for small and subsistence farmers, potentially heightening their dependency on rich farmers who will be able to afford the newly protected and registered varieties. The Act further imposes excessive financial penalties and imprisonment for those growing “misbranded seeds,” where misbranded seeds are defined in a wide-ranging manner thus opening the path for victimizing the small farmer for growing her or his own seed.

More fundamentally, this kind of monopolization of “true” seed and normalization of “branded” seeds goes against millennia of agricultural practice, whereby farmers have sowed, saved, reused, exchanged and innovated on seeds using traditional knowledge. It also goes against the idea of nature and seed as the “commons” – a shared global heritage that cannot be reduced to the individual property of a seed company.

Farming communities not only ensure the food supply for the whole country – and indeed, for our exports – but have also historically served as stewards of nature, land and biological diversity. It is a duty and moral imperative for the government to represent and protect the needs of this critical, already vulnerable segment of the population, instead of pandering to corporate interests. It is important to highlight that protecting farmers' rights should be a higher priority of the government, and that this prioritization does not mean that the needs of private companies and intellectual property concerns are completely unattended. As the comparative cases of contexts such as India and Ecuador have shown, the rights of nature, seed, and small and marginalized farmers can be effectively balanced with those of private, seed-selling companies.

The Plant Breeders' Rights Act 2016, however, does not even aim for such a balance, and fails to recognize that plant breeders' rights should not supersede those of farming communities. The Act is of grave concern because it seeks to facilitate the entry of GMOs in the market without having set up the proper mechanisms for their safe examination and testing. There is no documentary evidence that the Plant Breeders' Rights Act 2016 as well as the Seed (Amendment) Act of 2015 have provincial approval – as agriculture is now a provincial subject under the 18th Amendment to the Constitution. As such, both these new federal laws not only infringe on farmers' rights, but are also effectively unconstitutional in terms of procedure and jurisdiction.

Finally, as citizens and dwellers of the land, it is important to challenge the very logic of allowing intellectual property rights on seed and crop varieties. Any variation on a plant can be seen at best as a modification, not an “invention” that can be patented, protected, and sold as if it was a mechanical device. This is because such an “invention” will always be based on the biological diversity of seed which is a common, global inheritance, and any attempt to patent amounts to appropriating and commodifying this shared heritage as an exclusive product of one company. Indeed, this biological diversity has been developed and preserved by the very farmers whom the new legal and property regimes of agri-tech companies combined with governments now seek to displace.

In light of the key discussion points and arguments presented in the paper, the following recommendations are suggested:

- I. A comprehensive national agriculture policy should be formulated which supports the rights of small farmers and women farmers, fair land reforms, and market price regulations. The policy should also counter exploitative practices in agriculture by old feudals and new agri-businesses alike, and enable provision of affordable and good quality inputs for farmers.
- II. The agriculture policy should address food sovereignty as well as the protection and documentation of traditional knowledge of agriculture. Seed banks – state, farmer-run, private, or NGO-led – should be supported.
- III. Farmers and farmer organizations should not only be represented and included at the policy and decision-making level provincially and federally, but also have a defining role in the making of any laws pertaining to agriculture and the environment.
- IV. The Seed (Amendment) Act as well as the PBR legislation should be withdrawn, and rethought with the active input and prioritization of the needs of small farmers including women farmers. Any future PBR legislation should protect farmers against unintentional infringement and contamination. To develop such legislation, an advisory board should be created that includes provincial officials, farmers and farmers’ associations, academics, local seed providers, agricultural experts, NGO representatives and civil society members.
- V. Media coverage – television, print, electronic or social – should be increased to highlight the plight of farmers, food sovereignty issues and legislative processes.
- VI. Complete transparency should be ensured by the state regarding agricultural legislation, deals and decision-making.

Acknowledgement

A minor part of this article is based on our own article previously published in the monthly Herald magazine.

References

- Bhutani, S. 2013. 'Seed'ing Change.' In: S. Bhutani (Ed.), *Women Reclaim Our Seeds*, vii – xii. Penang: Pesticide Action Network Asia and the Pacific (PANAP).
- Bokhari, A. 2016. 'Breeders bill rushed through NA panel.' *Dawn News*, January 11. Accessed March 26, 2016. <http://www.dawn.com/news/1232026>.
- 'Bolivia moves to end dependence on foreign seed firms.' *BBC News*, June 27, 2011. Accessed May 07, 2016. <http://www.bbc.com/news/world-latin-america-13923732>.
- Food and Agricultural Organization of the United Nations 1996. 'Towards a New Green Revolution.' Natural Resources Management and Environment Department, World Food Summit, Food and Agriculture Organization of the United Nations, Rome, November 13-17, 1996. Accessed March 01, 2016. <http://www.fao.org/docrep/x0262e/x0262e06.htm>
- Greenpeace International 2005. 'Genetically engineered canola contamination confirmed across Japan – Canadian GE canola the culprit.' *Canola Report*, May 24. Accessed April 10, 2016.
- Hazell, P.B.R. 2009. '*The Asian Green Revolution*.' IFPRI Discussion Paper 911. Washington D.C.: International Food Policy Research Institute.
- 'India wins landmark patent battle.' *BBC News*, March 9, 2005. Accessed April 15, 2016. <http://news.bbc.co.uk/2/hi/science/nature/4333627.stm>.
- Intellectual Property Organization of Pakistan 2016. 'Plant Breeders' Rights.' Intellectual Property Organization of Pakistan. Accessed April 20, 2016. <http://ipo.gov.pk/contents/PlantBreedersRightsHome.aspx>.
- Kuyek, D. 2001. 'Intellectual Property Rights: Ultimate control of agricultural R&D in Asia.' *GRAIN*, March 25. Accessed March 26 2016. <https://www.grain.org/article/entries/30-intellectual-property-rights-ultimate-control-of-agricultural-r-d-in-asia.pdf>
- La Via Campesina 2011. 'The international peasant's voice.' *Organization*, February 9. Accessed May 05, 2016. <https://viacampesina.org/en/international-peasants-voice/>
- National Assembly Secretariat 2016. 'National Standing Committee on Cabinet Secretariat, Islamabad'. *Press Release*, January 6. Accessed April 11, 2016. <http://www.na.gov.pk/en/pressrelease.php?content=103#1716>.
- Nazeer, A. 2015. '*Punjab Land Tenancy Act 1950. Review, Analysis and Proposed Measures for Land Reforms*.' Institute of Development Research and Corresponding Capabilities. Accessed April 8, 2016 http://www.idrac.org.pk/images/pubs/1_Land_Rights_&_Tenancy_Issues_Pakistan_2IN18696.pdf.
- Neill, P. 2014. 'Law of Mother Earth: A Vision From Bolivia.' *Huffington Post*, November 18. Accessed April 20, 2016. http://www.huffingtonpost.com/peter-neill/law-of-mother-earth-a-vis_b_6180446.html
- Pakistan Environmental Protection Agency (Pak EPA) 2014. 'Second Regular National Report on the Implementation of the Cartagena Protocol on Biosafety.' Accessed April 08, 2016. http://environment.gov.pk/wp-content/uploads/2015/03/Second_Regular_National_Report_on_the_Implementation_of_Cartagena_Protocol_on_Biosafety.pdf

- _____. 2015. "National Biosafety Centre (NBC) Directorate." Accessed April 10, 2016. <http://environment.gov.pk/national-biosafety-center-nbcs-directorate>.
- Rana, M.A. 2014. 'The Seed Industry in Pakistan: Regulation, Politics and Entrepreneurship.' *Pakistan Strategy Support Program Working Paper no. 19*. Washington DC: IFPRI
- Sadeque, N. 2008. *The Great Agricultural Hoax*. Karachi: Shirkat Gah.
- _____. 2014. "Seed Heritage for Sale." *The Nation*, November 19. Accessed March 15, 2016. <http://nation.com.pk/columns/19-Nov-2014/seed-heritage-for-sale>.
- Sayeed, A. T. 2016. 'Corporate hegemony over seed sector.' *Dawn News*, January 18. Accessed March 26, 2016. <http://www.dawn.com/news/1233611/corporate-hegemony-over-seed-sector>.
- Schmalzer, S. 2016. *Red Revolution, Green Revolution: Scientific Farming in Socialist China*. Chicago: University of Chicago Press.
- SCOPE 2016 'Corporate Agriculture Farming (CAF) in Pakistan. A Case Study in Perspective of Global Study on Commercial Pressure on Land (CPL) by International Land Coalition (ILC).' Study by SCOPE. Karachi: SCOPE.
- Shah, S. 2011. 'Pakistan offering six million acres for corporate farming.' *The News*, August 17th. <https://www.thenews.com.pk/archive/print/317088>
- Sher, F. 2016. 'National Assembly body approves 'Plant Breeders' Rights Bill, 2016'.' *Business Recorder*, August 10. Accessed September 18, 2016. <http://www.brecorder.com/pakistan/industries-a-sectors/agriculture-a-allied/183:pakistan/73722:national-assembly-body-approves-plant-breeders-rights-bill-2016/?date=2016-08-10>
- Shiva, V. 1991. *The Violence of the Green Revolution: Third World Agriculture, Ecology and Politics*. New Jersey: Zed Books Ltd.
- Sial, A. 2016. 'Fight over agricultural registry delaying PBRA.' *Pakistan Today*, 6 March. Accessed March 26, 2016. <http://www.pakistantoday.com.pk/2016/03/06/business/fight-over-agricultural-registry-delaying-pbra>.
- Sifferlin, A. 2015. 'Over Half of E.U. Countries Are Opting Out of GMOs.' *TIME*, October 3. Accessed August 15, 2016. <http://time.com/4060476/eu-gmo-crops-european-union-opt-out/>
- Suleri, A. Q. and Qasim Shah 2003. "Trade-Related Aspects of Intellectual Property Rights (TRIPs) Agreement: Impact on Food Security of the People Living in HKH." *SDPI Policy Brief Series # 17*. Accessed March 26, 2016. <https://www.sdpi.org/publications/files/PB17-Trade-Related Aspects of Intellectual Property Rights.pdf>
- The International Treaty on Plant Genetic Resources for Food and Agriculture 2016. "Farmers' Rights." Accessed May 06, 2016. <http://www.planttreaty.org/content/farmers-rights>
- The Rights of Nature 2016. "What is Rights of Nature?" Accessed April 25, 2016. <http://therightsofnature.org/what-is-rights-of-nature/>
- World Health Organization 2016. "Food Security." Accessed April 05, 2016. <http://www.who.int/trade/glossary/story028/en/>.