

Free Seeds: Connecting Freedom and Autonomy of Nature

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Abstract: This paper presents the results of a research on a campaign called Seed Freedom, developed on Navdanya's farm - Bija Vidyapeeth - in 2012. Our essay focuses on the question of seed appropriation and domination practiced by large agribusiness corporations, since the 1960s to the present day's transgenic crops as well as the social movements' fight to keep their way of life and production. We plan to discuss and to put into a context the socio-economic problems that led to the Seed Freedom movement and the relationship between the protection of seeds and food production with the use of sustainable agriculture, environmental campaigns for the protection of biological diversity, and food sovereignty and safety in stark contrast to the agriculture mechanisms used by the broad market and the political and economic agreements which only benefit agribusiness corporations. Our goal is to prove that alternative forms of traditional farming used along with sustainable technologies can ensure not only environmental protection but also food sovereignty.

Keywords: Seed Freedom Network, agribusiness, GM Crops, Navdanya food sovereignty.

I. INTRODUCTION: THOUGHTS ON SEEDS

Seeds have been a part of human life for 10 thousand years, accompanying us throughout civilization development, cultural evolution, history and myths in such a way that it is impossible to think of the civilization itself and the terms of trade without considering grain storage from the first silos on the Nile Delta. The trade and interaction that support the civilizational model has begun with the exchange of seeds between citizens. The act of conserving and protecting the harvested seeds suggests the idea of ensuring food for the unreliable future in the face of nature's unpredictability. The idea of conservation has likely begun during the agricultural revolution, when the domestication of seeds was born and which remains, to this day, in the constitution of seed reserves.

Biologically speaking, the seed is part of the reproduction and regeneration of a plant; "it is an egg developed after the fertilization, [and which] contains the embryo." (VIDAL and VIDAL, 2006, p. 67), the fusion of male and female gametes is responsible for its development. To be disseminated or scattered, the seeds need – most of the times – the help of an intermediary called dispersal syndrome. Once it is disseminated, the seed is ready to be germinated, accordingly to the environmental factors that surround it. There are two types of germination: the epigeal, where the seed comes out of the soil after germination; and the hypogeal, where the seed remains underground. Besides being a reproduction instrument to plants, the seeds feed living beings, are filled with nutrients and – as it is the case with corn, wheat, rice, beans, soybeans or lentils – have energy reserves.

Socially, the seed has become a symbol of freedom and food sovereignty for farmers who rely on it. However, this need is not restricted to natural factors. Nowadays, there is an ongoing increase in the financial dependence when it comes to purchasing or acquiring seeds and raw materials – part of the production process. As the seeds gain economic status, being cultivated for the market production, they lose biological and social strength and are named with different terminologies, each of them according to its function or purpose.

Economically, the seed becomes grain and/or certified seed after going through a genetic improvement as a way to certify its quality and productivity. In this case, its genetic material belongs to a corporation or a research institution. The native seed is named creole, traditional or even peasant seed since it belongs to the area where it was cultivated using the plant's self-adaptation and with the help of the farmer's work. This seed keeps its genetic and cultural material as parts of the heritage of humanity.

In a precautionary manner, to ensure autonomy and safety, the seeds are stored for the next crop. For this the best seeds are selected, taking into consideration the size, shape and color and, quite often, smell and flavor if they are to be consumed as food. As a result of this effort to preserve the food, the production and the trade of food, as well as the protection of biodiversity, banks like the Heirloom Seed Bank, Community Seed Banks and seed trade fairs act like reciprocity and protection movement. Each group, following their local and cultural particularities, selects and conserves the seeds in different ways, often prioritizing the seeds part of the cultural eating habits and can also be sold. The seed banks/houses also act as a protection and conservation mechanism for biodiversity-suppressed seeds.

The monoculture – agriculture focused on market mechanisms – led to the suppression of thousands of species that were part, directly or not, of the diet of many people, causing us to become even more dependent and prone to import other sources of food or processed food that are made basically from corn and soybeans (POLLAN, 2007).

[...] crop germplasm is eroding at 1-2 per cent per year in the field. More than 34,000 species of plants (12.5 per cent of the world's flora) are facing extinction. Every higher-order plant that disappears takes at least 30 other species (insects, fungi and bacteria) with it. (MOONEY, 2002, p.29).

II. GREEN REVOLUTION OR THE HUNGER TECHNOLOGY

Despite all the attempts at privatization, it turns out that there are some things that don't want to be owned. Music, water, seeds, electricity, ideas—they keep bursting out of the confines erected around them. They have a natural resistance to enclosure, a tendency to escape, to cross-pollinate, to flow through fences, and flee out open windows. (KLEIN, 2003, p.08-09).

In this essay, we describe our experience in the Navdanya organization (Bija Vidyapeeth, Dehradun, India). We plan to discuss and to put into a context the socio-economic problems that led to the Seed Freedom campaign and the relationship between the protection of seeds and food production with the use of sustainable agriculture, environmental campaigns for the protection of biological diversity, food sovereignty and safety in stark contrast to the agriculture mechanisms used by the broad market and the political and economic agreements that only benefit agribusiness corporations.

The experience in the Navdanya organization between March and June 2012 was motivated by the fact that both the organization and the movement are innovative and are leading activists in food production and biodiversity protection. Led by environmentalist Vandana Shiva, Navdanya is a renowned organization and a symbol throughout the world for its actions. They provide the basis for several other groups that exchange experiences and ideas on seed protection, biodiversity and sustainable agriculture practices.

What are the true concealed reasons for this silence conspiracy on hunger? Is it merely a coincidence that the theme hasn't properly attracted the interest of modern speculators and creators? We don't believe that. It is such a prominent phenomenon and so very stable that very unlike a coincidence, it seems to be conditioned to the same rules that control all other social manifestations of our culture. It is a deliberate silence that comes from the very essence of our culture: the interests and prejudice of moral, political and economic nature of our so called western civilization made hunger a taboo or at least an issue considered improper to be dealt with publicly. (CASTRO, 1965, p.30).

Hunger is humanity's old acquaintance and it has been following us since the beginning of times, but in the last centuries it has become a decisive factor in conflicts and wars between nations and may even be considered as a new war weapon. For Messer (1990), "the 'food war' is defined as the deliberate use of hunger as a weapon or hunger suffered as a consequence of armed conflict".

The mechanisms of international donations and the intensifying of food production emerged from the vulnerability and the needs of those affected by geopolitical conflicts. Because of that, the agroindustry rapidly developed to meet the demand of needy nations and profit from the war industry. Ortuzá (2013) quotes Mollison to reaffirm this model's purpose, saying that "modern agriculture is not a system for producing food but for producing money".

Mazoyer and Roudart find that the increase in food productivity has conditioned the demographic expansion as well as the industrial and urban development with the increased capacity to produce marketable surpluses. Agriculture began an intensive process and "for the first time, Western agriculture was capable of supplying a nonagricultural population more numerous than the agricultural population itself." (MAZOYER e ROUDART, 2010, p. 390).

With the development of agricultural sciences in the beginning of the 20th century came the first hybrid seeds (F1) or high-yielding varieties (HYVs), which act as propellers - as well as part of the strategy - to achieve the present agribusiness model. The discussion about world hunger boosted this model and the seeds were created with the fund and research from the Rockefeller Foundation (RF), while the machinery and agricultural pesticides were developed with technology originally designed for war. The strategies of the growing agribusiness and its chain of production seek efficiency and decisively contribute to the colonization and enforcement of eating habits in countries that are going through a process of social reorganization as well as in the distribution of technologies to countries suffering with deficits in food production and malnourished population.

Castro (2011) corroborate the above, demonstrating that "[...] hunger and malnourishment are not the result of natural factors, but the result of social and economic relations established by mankind"

In India's case, after its independence in 1949, there was a need for a socio-economic reorganization because the nation was "buried in years of political turmoil", in addition to having "a rapidly expanding population and recurrent droughts that left millions at risk of hunger" (Rockefeller Foundation, 2014). This was a highly favorable context for the introduction of technologies aimed at hybrid production. Thus, the Rockefeller Foundation (2014) claims India's interest in using this technology (variety of corn) at the end of World War II. And this interest arose when Indian Council of Agricultural Research (ICAR) launched a breeding program in the Punjab region. Hybrid corn had produced sensational results in the United States but India simply did not have a seed industry that could maintain the purity of the lines required to create hybrids. In 1954, RF corn specialists devised an all-India corn improvement program.

After World War II, several recovering European nations took part in the food supply program encouraged by the Marshall Plan in 1947 and by the Agricultural Development Act associated to the Food for Peace program from 1954 (McKEEBY, 2007). This same plan was implemented in Third World countries in order to sell agricultural surpluses using a subsidy on exports and donations (MALUF, 2011), which became a milestone in the globalization of food crops. These policies were conditions for the introduction of new eating habits, a market strategy that developed and altered food crops - resulting in dependence and discrepancy in domestic food production in those recipient nations.

[...] Routinely, reasons of State [...] joined the private interests, leading to the dependence on imported wheat to countries that self-supplied with local alternatives. Even Brazil, with all its corn and manioc production potential, had native crops substituted and became dependent on the consumption of white bread, as if it were European (ALMEIDA, 2012, p.141)

The development of actions and strategies for changes in food crops mostly affected the developing and dependent countries prone to food speculation and insecurity as a result of international trade practices. These countries' food crops suffered modifications because the international market considered them uninteresting and - through a colonial and marketing imposition - forced the adoption of a model that met the interests of the market. This measure was the starting point for the idea of food weapon.

This continuous process of agricultural industrialization led to the Green Revolution, a model developed in the postwar years as means to increase food production. To Norman Borlaug (2000, p. 04), the Green Revolution is the initiation "of a process of applying agricultural science to develop modern techniques for Third World food production conditions". In contrast, Smith (2007) draws on Shiva (1991) to show that the Green Revolution meant the destruction of natural systems and resources since it is a part of capital intensive that stresses the dominant paradigm of economic growth. This revolution "supplied, through selection, high-yielding plant varieties and animal breeds that were adapted to the new means of industrial production and were capable of making these profitable." (MAZOYER; ROUDART, 2010, p. 420). However, to achieve profitability, the old ways of vegetable and animal farming were abandoned in search of more favorable means of production to the new production system and country life.

Dufumier quotes Pingali (1997) to exemplify how the Green Revolution in Third World nations contributed to the rapid suppression of a considerable part of biodiversity. In addition, "the use of high-yielding varieties often means farmers with a greater dependence of seed and agrochemical transnational corporations" (DUFUMIER, 2011, p. 373).

Thrupp (2003) shows that many conflicts resulting from this way of profiting from biodiversity loss are direct results of the Green Revolution and the agribusiness model. Additionally, he shows that supporters of this kind of approach?

Generally emphasize maximizing yield per unit of land, uniform varieties, reduction of multiple cropping, standardized farming systems (particularly generation and promotion of high-yielding varieties), and the use of agrochemicals. Although the predominant patterns of agricultural development in the last several decades have increased yields, they have also significantly reduced the genetic diversity of crop and livestock varieties and agroecosystems, and have led to other kinds of biodiversity losses. (THRUPP, 2003).

Mahabal Ram (1980, p. 212) paints the Green Revolution as an industry with essential parts for its functioning: the plants are seen as the primary sector of the agribusiness process, the seeds are the machines, the fertilizers and the water are fuels, the herbicides and pesticides are the necessary equipment and the loans and technological knowledge propel the industry growth.

Now, the seeds have become the key point for changes in agricultural production, highlighting the attempt to dominate and manipulate them through biotechnology, making the seeds increasingly essential to the domination and manipulation of society and nature. The genetic enhancement of seeds is not a neutral economic process, it goes beyond a political project because it transforms and controls all biodiversity of a local population for transnational corporations (TNCs) (SHIVA, 2010).

The genetic engineering was limited to the production of insulin in the pharmaceutical industry for therapeutic purposes and to the production of enzymes used in the manufacture of cleaning products. However, Monsanto industry began to use this same resource in transgenic plants, using the excuse of fight against hunger as a way to gain support to achieve its real goal: a new revolution in food production, this time with insertion and modification of plants' genes.

Through the genetic modification of its organisms — known as transgenics or GMOs, the gene manipulation process prepares the plant to react against "invading organisms", making it tolerant to "pest" attacks and also increasing its productivity. These seeds are genetically engineered varieties called High Yield or even "miraculous" seeds, and "they can be assembled in just three categories: 1. Able to produce insecticidal protein in their cells (BT plants); 2. Tolerant to herbicides (HT plants); or 3. Both" (FERMENT, 2011, p. 97; 98).

Norman Borlaug believes GMOs are not dangerous: "there is no scientific evidence showing that they are dangerous" and that "for more than 20 years, GMOs have been used in pharmaceuticals and medicines" (BORLAUG, 2013). Thus, there should not be a reason for people to fear its use in food, since the same process is used in the production of medicines.

Following the same logic used during the Agricultural Revolution, the real problem — again — is not disclosed, the truth is while this technology may allow a high yield in food production, it leads to disastrous ecological, social and economic impacts. By replacing the genetic diversity of a natural environment for extensive monoculture farming, the intensification of food production can be associated to ecological diseases like "soil erosion, desertification, soil pollution and loss of biodiversity" (ALTIERI, 2004 apud REDCLIFT; GOODMAM, 1991, p.19).

The food production would justify the use of biotechnology with Malthusian arguments regarding the discrepancy between population growth and food production, surpassed only by the use of a technology that would ensure higher crop yields. At the same time, biotechnology supporters try to invalidate the option of organic agriculture, claiming that "it is the type of agriculture already practiced by the poor, primarily because they do not have the means to buy fertilizers, pesticides, and irrigation equipment" and the use of green manures is a luxury. (TONUKARI; OMOTOR, 2010).

The use of "hunger" is directly linked to all crises throughout human evolution to the present day. It also acted as the motivator for the development of technologies (BOULARG, 2000), thus becoming a marketing tool. From social problems to corporate solutions, hunger and its problems were used as solutions for the development of international economic policies that exclusively benefit corporations and trading agents at the expense of nature and affected populations.

First, there is a need to understand that high-yield seeds are private properties and as such they belong to laboratories and multinational corporations that maintain ownership since they were responsible for the research of germplasm - a genetic material - and acquired the right to produce, sell and use the seeds. Therefore, with regard to farmers, the new and

imperative production system strips them of the right to their farming sovereignty, rendering them dependent on market volatility and interests.

The manifest by The International Commission on the Future of Food and Agriculture states that the rules contained in the Trade Related Intellectual Property Rights Agreement (of the WTO), for example, have empowered global agricultural corporations to seize much of the world's seed supply, foods and agricultural lands. The globalization of corporate-friendly patent regimes has also directly undermined indigenous and traditional sui generis rights of farmers, for example, to save seeds and protect indigenous varieties they have developed over millennia. (ICFFA, 2006, p. 08)

The farmer, who was once a producer, now becomes a consumer to those who own the wheat germ, who biosprospected, despoiled and homogenized the natural genetic heritage developed by farmers for thousands of years and "the social construct of modern industrial biotechnology is based in the western cosmology of linear history and progress". (KNEEN, 2000, p.193).

Echoing the criticism already exposed, Shiva (2010, p. 66) states that "the destruction of diversity and the creation of uniformity simultaneously involves the destruction of stability and the creation of vulnerability", when it follows the economic model, modifying the interaction and the ancient relationship between humans and nature. Earth - terrestrial planet - much like the earth - the stratum where life and living beings develop - ceased to be a place where the life of thousands of connected beings unfolds, where traditional farming and populations exist, and becomes an industry regulated by the time and supplies needed to maintain a high economic productivity.

By the end of the 20th century, more specifically on March of 1998, the agribusiness - now shaped by biotechnology models - in their eagerness to achieve absolute control over the dependent population, develops and owns the Terminator seeds, also known as 'suicide' or sterile seeds, as they do not germinate in the second generation and the following planting. The Terminator technology was developed by Delta & Pine Land, a Monsanto company, along with the United States Department of Agriculture (USDA), and other multinationals that hold patents on this technology, such as Syngenta, BASF and Du Pont (INTRODUCTION TO TERMINATOR TECHNOLOGY, 2010). The Terminator seeds are also known as "Gene Use Restriction Technology" (GURT), and according to supporters of this technology, these seeds try to enter the market with their commitment to biosecurity as they don't contaminate the non-GMO plants if there is a cross pollination and they limit the use or the dissemination of a specific genetic material.

Mooney (2002, p. 82) warns on the danger of adopting GURT since it may aggravate the dependency cycle. He believes that the Terminator technology puts countries with food deficit in danger of having their domestic production completely dependent of foreign exports and essential chemical inducers. However, Monsanto defends itself and restates the commitment not to commercialize sterile seed for food production.

Their press-release called "Myth: Monsanto sells "Terminator" seeds, reads:

Monsanto has never commercialized a biotech trait that resulted in sterile – or "Terminator" – seeds. Sharing the concerns of small landholder farmers, Monsanto made a commitment in 1999 not to commercialize sterile seed technology in food crops. We stand firmly by this commitment, with no plans or research that would violate this commitment. (MONSANTO, 1999).

In addition to the Terminator seed, there is a technology called Traitor, developed by the University of Perdue (USA), which features a key aspect in relation to other non-germ seeds. A plant that originates from a Traitor seed will develop a second sterile generation but a chemical agent may induce its germination. Pat Mooney (2002) called the Traitor seeds, the "Lazarus-link seeds" because they can be brought back to life.

Mooney believes that governments, not the radical fringe, are the ones behind the "agro-terrorism". Technologies such as Terminator are a terrorist threat that could be "employed by agro-mercenaries on behalf of client states as economic (or eco) warfare," enabling corporations or governments to use this technology to impose their will. (MOONEY, 2002, p. 71).

Throughout history, the "hunger countries" were led to believe that the sources of their problems were climatic or natural issues, until Josué de Castro (1965) showed that the real cause of hunger lies in the social relations. Still, it took 40 years for food safety to be discussed in another light.

After Castro's theory, other authors faced the problem of hunger as a social issue to which the solution would be of political and economic nature and thus they expanded the concept of hunger beyond the mere lack of food, to a

micronutrient deficiency or the hidden hunger (CASTRO, 1965), which is caused by the new food production system. The International Union of Food Workers (IUF/UITA/IUL), shows that "[...] people are less able to feed themselves", and they have become dependent of "products and production methods of large transnational corporations (TNCs)" (IUF/UITA/IUL, 2002, p. 03).

In developing countries, the economic policies for trade liberalization worsen the situation with agribusiness production incentive programs to transport their production to foreign markets and ensure the entry of imported products at low prices, consequently destroying the domestic production of small producers.

The globalized system under corporate control is a guaranteed recipe for food disasters and food famines. The food and hunger crisis is rooted in how we produce food and how we distribute it. (JALEES; SHIVA 2009, p.10).

Among the outcomes of the agricultural biotechnologies are farmers and consumers deprived from the right to food, the removal of agrobiodiversity and the life of essential insects in the food production chain. The Silent Spring, from the 1960s, now has a new issue on the vanishing of bees and other environmental changes.

The seed is the biggest problem of food sovereignty, as it is the first link in the food chain and it was, strategically, despoiled by the corporate agribusiness and now has restrictions on the farming use of their genetic material. Silently, a common resource became a commercial product and a material of life's continuum became a "production" instrument under the control of the corporate sector, changing the seeds and nature's natural role.

For Bedi et al. (1997), the sovereignty of nation-State passed into the hands of large corporations of this globalized market system. The new constitution allows those corporations to influence the State and the people's choice seeing that the globalization and the free transaction of commodities facilitate this by prioritizing the replacement of food supply for raw material, as is the case of sugarcane, cotton, soybeans, and others.

The globalization brought the "erosion of state power"; however, this power was not distributed to the society. Instead, it is increasingly absorbed by the market, and the corporations. In this way, the system is becoming more one-sided in representing corporate interests and failing to represent citizen and community interests. Transnational corporations (TNCs) and international institutions like the World Bank benefit from, and thus promote, an erosion of the role of the state in protecting the people through the seduction of terms like "liberalization of the economy" and "free trade". (BEDI; HOLLA- BAR; JAFRI; SHIVA, 1997, p. 80).

III. IN INDIA - EXPERIENCING THE DISPARITY OF AN ENVIRONMENTAL REALITY

We understand that in order to develop a research on sensitive topics such as nature's manifestations and its many relations with living beings that are dependent and co-authors of biological reciprocity and social beings who transform the natural environment, it is required a detachment of any dogmatic thinking. It is imperative to find methods aligned to a minimum interference with the object of research since we are, in fact, interconnected beings, causing and experiencing the results of the interaction with the natural world.

Starting from this premise, we have decided to use ethnographic approach, unstructured and informal interviews, visual and audio recordings and field diaries to better understand the practices of the observed parties. For Geertz (2008, p.04), ethnography is not only "the establishing of relations and the selecting of informers", but also the search for a dense description, the "winks" left behind, by demonstrating that there are "three characteristics of ethnographic description: 1. It's interpretive 2. What it is interpretive of is the flow of social discourse 3. The interpreting involved consists in trying to rescue the 'said' of such discourse from its perishing occasions and fix it in perusable terms." (GEERTZ, 2008, p. 15).

To observe the practices, we established a more intense approach in which it is developed an interaction between the researcher and the researched. For this purpose, voluntary work was carried out during months of research as a way to join in their routine.

In order to understand India, one must first realize that everything that is advertised by the media and that is present in common sense is an act of ignorance and disrespect to a country rich in culture and different in everything, material and immaterial. In this way, we seek to contextualize its reality from experience and existing scientific references.

At times during the research process – when I was living in India – I recalled the reality described by Marvin Harris

(1978) about Mother Cow¹ and the cultural materialism. Despite almost 35 years having passed since those words were written, some things are still the same. The symbol created by Gandhi of the cow as a mother was a way to protect the country and its culture against colonialism and foreign changes.

India is a country with huge social and economic gaps that are incomprehensible to Western minds and their standard molds and materials. Nevertheless, they are not insuperable for the optimism of those involved in the economic *Samsara*², the India of the Maharajas, a country that – economically speaking – has a GDP of almost two trillion dollars (IMF, 2012). Nor it is for those who live in search of the *Moksha*³, a transcendence – not in spiritual levels – but towards a dignified and simple life with basic needs (SEN, 2000). For a country with more than 4000 years of multicultural history, the Western way of life in its 150 years of influence had the power to confuse and devalue the foundations of India's culture and society. In 2001, about 78 million people were homeless (ACTION AID, 2003), most of them were and still are workers who left small towns in the countryside to make a living in urban areas, providing *rickshaw services*⁴ during the day, but sleeping on the streets at night. These individuals are part of the daily life in the 10th biggest economy in the world (IMF, 2012). A reality that needs changing to achieve development.

Massive economic growth forced wildlife conservation to intersect other social aspects necessary for sustainable development. Nevertheless, India goes beyond social issues; it has one of the highest air pollution rate and its surface water pollution reaches 70% (MURTY; KUMAR, 2011). The 2011 census showed that India had a population decrease in rural areas, something that has not happened since the country's independence in 1947. Yet, the rural population is still 70% (CENSUS OF INDIA, 2011), of which 58% earn their living from agriculture (IBCC, 2011).

Along with Mexico, Philippines and Brazil, India was one of the countries that experienced an increase in food production with the so-called Green Revolution. The country was elected as prime representative due to its population growth in the 1960s, which was a source of concern considering the relationship between food supply and population demand. At that time, the Indian government implemented policies related to the Green Revolution model that resulted in the despoliation of small farmers who worked with traditional techniques for over 4000 years.

According to Shiva (2010), the Green Revolution was a strategy to increase production – “the material abundance” – and decrease the existing agrarian conflicts.

While treating nature and politics as dispensable elements in agricultural transformation, the Green Revolution created major changes in natural ecosystems and agrarian structures. New relationships between science and agriculture defined new links between the state and cultivators, between international interests and local communities, and within the agrarian society. (SHIVA, 2010, p.47).

The Green Revolution in India led to the suicide of 166,304 farmers over a ten-year period (1997-2000), as a result of farming problems. However, the environmental activists claim that the major cause was the use of pesticides and Genetically Modified Seeds, because farmers could not afford the costs and were indebted (JALEES; SHIVA, 2009). Regarding the farmers' suicide involving the use of Bt cotton, Shiva (2013) reports an excerpt from a newsletter by the India Ministry of Agriculture in January 2012: "Cotton farmers are in a deep crisis since shifting to Bt cotton. The spate of farmer suicides in 2011-12 has been particularly severe among Bt cotton farmers," i.e. those who provide seeds under Monsanto's patent.

Nevertheless, 60% of crops in the country are organic and the National Centre of Organic Farming divides the farming in the following way:

First category of organic farmers are those which are situated in no-input or low-input use zones, for them organic is a way of life and they are doing it as a tradition (may be under compulsion in the absence of resources needed for

1 It refers to the Indian religious symbolism, from religions like Hinduism and *Hare Krishna*. Marvin Harris sought information that could result in greater understanding of the protection of cow by Indian society that goes beyond its religious relevance. In their religion, the cow is a maternal symbol, a matriarchal figure that represents soil fertility and nurturing. For them, the cow is utilitarian.

2 Some religions in India see it as a life cycle, relating it to the moments of distraction and desires that constantly return, taking on new forms. Others, associate the transmigration of being/living breath/soul in material worlds, putting them in evidence. By ending this cycle, one achieves Moksha.

3 It is the end of the endless cycles of death and rebirth, the enlightenment, such as Nirvana, seen in some schools and other Indian religions.

4It is a mode of transport that uses human traction. In it, people are transported in a wagon or on a bicycle.

conventional high input intensive agriculture). Second category of farmers are those which have recently adopted the organic in the wake of ill effects of conventional agriculture, may be in the form of reduced soil fertility, food toxicity or increasing cost and diminishing returns. The third category comprised of farmers and enterprises which have systematically adopted the commercial organic agriculture to capture emerging market opportunities and premium prices. While majority of farmers in first category are traditional (or by default) organic they are not certified, second category farmers comprised of both certified and un-certified but majority of third category farmers are certified. (YADAV, 2010, p.07).

India stands out as the second biggest food producer in the world and is among the 15 biggest exporters (IBCC, 2011), occupying the 26th position in seed exporting countries (ISF, 2011).

Navdanya, the nine seeds in Indian food sovereignty:

Navdanya is a non-governmental organization (NGO) which has as its main purpose the protection of biodiversity, organic farming, farmers' rights and the fight for seed freedom. The name Navdanya comes from a traditional technique in which there is an intercropping of nine seeds from the Uttarakhand region but it is also an allusion to food security and the "new gift". Techniques and interspersed or intercropped systems like this one promote mutual benefit for species grown together, decreasing the amount of "external inputs in farming system" (GLIESSMAN, 1998).

The organization started as a program of the *Research Foundation for Science, Technology and Ecology* (RFSTE), active since 1987 and now known internationally thanks to physicist and eco-feminist activist Vandana Shiva, a member of the *Chipko Movement*⁵.

The organization's experimental farm, Bija Vidyapeeth, or the "secret seed learning center", sits on a 45 acres site in the rural town of Dehradun, Uttarakhand. There, they do conservation work, project implementation, technical training for organic farming educational courses for young people and farmers, as well as for the exchange of knowledge with people from all over the world⁶. Among the actions for the conservation of seeds, was the rescue of more than five thousand varieties of crops, including 3000 of rice, 150 of wheat, 150 of beans, 15 of mangoes and other legumes and medicinal plants (NAVDANYA, 2012). Besides the experimental crop space, the organization has three stores (in Mumbai, Delhi and Dehradun, respectively) to sell the farm's products as well as those of producers who are helped by the organization. It also has a traditional organic food⁷ restaurant and an office that manages the movement and organization's actions.

Anand, the responsible for the production and distribution explains about the beginning of the organization and the actions taken:

Navdanya is based in New Delhi. That's where it all has begun. Initially, Vandana rented a room with only 3 to 4 chairs and a table. They had no staff. It was just Vandana Shiva and Darband Singh Nagyeji.⁸ Together they created Navdanya. They realized they could not farm in New Delhi, so they rented a lot in Dehradun, Uttarakhand. They rented the land for about 3-4 years and began to plant some varieties together. When Vandana Shiva was a little more financially secure, she bought a land in Dehradun. The first thing they did was build a seed bank. Initially, they had 15 acres of land where they started planting and saving seeds. In the beginning, they had few seed varieties and in the first few years some seed collectors were added and they had 20 to 30 varieties more than they had before. (Anand's oral statement, May 2012, Dehradun).

The organization, as well as the Chipko movement, is based on Gandhi's philosophies and in the political resistance and civil disobedience symbolized by the *spinning wheel*⁹. Therefore, Navdanya follows the footsteps and relates the free seeds and sustainable agriculture with Gandhi's ideas, using the same actions against multinationals and the agricultural model created in India by the Green Revolution. Among those actions are the *Bija Satyagraha*, that defends farmers, the

5 *The Chipko Movement* was an environmental movement that began in the 1970s, based on the idea of *Satyagraha & Ahisa*, or non-violence, practiced by Gandhi in the fight for independence. Their practices became known around the world as the movement "to embrace trees".

6 *Earth University* is an ecological and holistic educational program in Bija Vidyapeeth and was developed by Satish Kumar and Vandana Shiva.

7 *Navdanya Organic Slow Food Restaurant and Shop* is an organic food restaurant/store that follows the ideas of *slow food*, in Delhi.

8 One of the coordinators responsible for the programs and projects implemented by Navdanya in India.

9 It is a spinning wheel to weave cotton used by Gandhi as the form and the symbol of boycott and non-violent action against England and its fabric industry.

freeing of seeds from the patents and the claims for the right to biodiversity, as well as a non-cooperation with the intellectual property rights system that criminalize the act of saving/preserving and exchanging seeds. (NAVDANYA, 2003). There is also the *Bija Swaraj* (Seed Sovereignty), which acts in the creation of a seed bank, in the rescue and conservation of creole/indigenous varieties and in the appreciation of indigenous knowledge.

Martinez-Alier (2002), talks about a new era of global environmentalism (of which Navdanya is a part) as something necessary not only in a local level, but a global one that needs to be disseminated.

[...] Navdanya is a large network of farmers, environmentalists, scientists, and concerned individuals which is working in different parts of the country to collect and store crop varieties, evaluate and select those with good performance, and encourage their re-use in the fields (Kothari 1998:60–61) [...] What other name but “ecological neo-Narodnism” to give to such initiatives? Who would have thought twenty years ago that praise for organic agriculture would be expressed not by professional ethnocologists or agroecologists or by Northern neo-rural environmentalists but by real agriculturalists from India in international trade meetings? This is not to be seen as a purely defensive attitude towards modernity and development; it is not idiosyncratic homespun oriental wisdom combating western agricultural technology. On the contrary, it must be interpreted as part of an international worldwide trend, with solid foundations in agroecology, towards an alternative modernity. (MARTINEZ-ALIER, 2002, p.06-07).

As part of its actions, the Navdanya organization fights against the agreements and sanctions made by the WTO¹⁰ and the GATT,¹¹ considered essential to the development of bioprospecting practices of traditional knowledge, agreements are ruled by the TRIPs¹² and create ecological impacts while taking from indigenous populations the ability to conserve biodiversity. (SHIVA, 2010, p.88).

To Vandana Shiva, this is a new colonialism:

The land, the forests, the rivers, the oceans and the atmosphere, have all been colonized, eroded and polluted. Capital now has to look for new colonies to invade and exploit for its further accumulation – the interior spaces of the bodies of women, plants and animals. (SHIVA, 2010, p.45).

Bija Vidyapeeth is a research and learning center for indigenous varieties found in India, a conservation farm that collects different kinds of seeds in remote communities, tests their quality, revalues the seed adaptability to the ecosystem in relation to climatic factors and supports the feeding habits of local groups.

The resistance from farmers and movements/organizations such as Navdanya clashes with government and economy impositions because it, allegedly, would be against the "development", working for the maintenance of life.

Small farmers in India continue to produce, record and exchange a range of indigenous, perennial and sustainable seed varieties that can reproduce indefinitely. These seeds were developed over many years, to fit their ecological space, taste, nutrition, medicine, fodder, fuel and other needs. These farmers' seeds are varied, open pollinated and free to all. These seeds are sometimes called local varieties or germplasm to devalue the contributions made by farmers to the seed evolution through selective breeding. These seeds are also depreciatively called primitive cultivars to differentiate them from the elite cultivars developed by scientists (MILLER, 2010, p.26).

Since the beginning of the organization, it was possible to see how the seed collection and conservation were done.

Besides the mother bank in Bija Vidyapeeth, the Navdanya organization has 54 seed banks in India, as well as receiving and distribution centers for seeds from associated farmers. Some banks store varieties regardless of their origin but others focus on the conservation of local biodiversity for surrounding communities. The seed bank became part of the everyday life for this group of farmers, as sowing and harvesting are related to conserving.

Regarding the creation of the seed bank:

[...] In the beginning, Vandana Shiva rented the land and started collecting seeds from different states, like Madhya

10 World Trade Organization regulates and supervises the rules of international trade and which uses free trade, fair trade (advocated by developing and farming countries) and agricultural subsidies as the deadlock.

11 *The General Agreement on Tariffs and Trade* was proposed in the post-war in 1947 to fight against trade protectionism and to develop economic liberalism, the basis for the creation of the WTO.

12 *Agreement on Trade-Related Aspects of Intellectual Property Right* was created in 1994 by the WTO to be an international and multilateral instrument to globalize laws of property rights.

Pradesh, Rajasthan, Kerala, etc., collected indigenous seeds. They started with 20 seed varieties and that is how the Seed Bank began (Anand's oral statement, May 2012, Dehradun).

The structure of the mother bank/house is of rustic style: a brick building, covered in plaster made of bovine manure because the Indian culture believes it is a thermal material, protecting during both winter and summer, keeping the temperature similar to the "soil seed banks"¹³. The seeds are stored in containers, large and medium zinc buckets, glass jars or a more rustic, handmade container made with bamboo, covered with manure, and sprayed with Neem to protect from fungi and pests.

The organizational model for the seeds banks developed in the country follows the following system:

The collectors gather indigenous seed varieties. After grown and harvested, those seeds are delivered to farmers in kilograms. If a farmer takes 1kg, he has to return to Navdanya 1 1/2 kg of seeds from their production. Farmers are encouraged to also distribute seeds to other farmers in need. That way, they are disseminating the seeds and growing of the network of farmers who practice organic farming and the saving of seeds. Farmers reduce dependence of hybrid varieties... The distribution is a must for a seed bank and the more varieties and amount of seeds there are, more successful the seed bank will be (Anand's oral statement, May 2012, Dehradun).

To conserve and maintain seeds, the farming methods used are varied but all of them are sustainable agriculture methods, ancestral and traditional techniques of Indian agriculture, natural farming, biodynamics¹⁴ and agroecology and all of them interact with needs of the area. On the farm, biofertilizers are extensively used. They are made from urine, manure, molasses and neem, among other plants, as well as natural pesticides against fungi and pests.

The alternatives are Vermiculture and Permaculture. Permaculture is a very good method due to the important role played by weeds. The weeds don't grow with the crops anymore, but their roots help with the nitrogen fixation and when the crop is harvested and the soil is plowed, the leaves that fall from weeds become soil fertilizers. Therefore, the soil is rich. (Anand's oral statement, May 2012, Dehradun).

Fukuoka¹⁵ adds to what Anand says.

Crops are more susceptible to such attack because they have been artificially improved, reducing their innate resistance, and the environment in which they are grown is unnatural. If varieties of fruit trees closer to their natural ancestors are selected and grown properly, pesticides become unnecessary. (FUKUOKA, 2009, p. 213).

Anand shows that using simple techniques and materials already available in nature, it is possible to have a higher yield and profitability for trade purposes and still become self-sufficient. Currently, 2/3 of India's working population depend on agriculture to survive (PARVAIZ, 2011) and are divided between marginal and large farmers. The marginal farmers (62%) have less than one hectare of land, the medium farmers have 4 to 10 hectares (6%) and the large farmers have more than 10 hectares and represent 1% of this population (SRIVASTAVA, 2012).

IV. CONCLUSION

As we tried to demonstrate, the means of production of conventional agriculture or agribusiness are destructive to the ecosystem. The production levels by area (hectare) and the energy used (like oil) for food production in "agro-industrial complexes" are part of an "inverted economy" model, without economic or environmental sustainability, the opposite of organic and traditional production (GEORGESCU-ROEGEN, 2012). Keeping the seed as another industrial and/or product input, controlling it with records, patents and trade mechanism developed for the benefit of corporations means developing more and more a social structure of hunger and dependency, as well as it weakens the environment by diminishing its resilience to natural events like droughts, floods, etc.

India and its preservation of environmental and cultural characteristics can serve as an example to Brazil where also

13 The concept of seed bank has been adopted to refer to a reservoir of viable seeds in the soil or in the surface (ROBERTS, 1981).

14 Sustainable agriculture method that relate to the spiritual and ethical search of a relationship with nature (soil, plants, animals) to conserve and liberate the idea of utilitarianist and materialist nature. The concept of biodynamic agriculture was proposed by Rudolf Steiner, founder of anthroposophy.

15 Masanobu Fukuoka was a Japanese microbiologist, farmer and philosopher, creator and responsible for the natural farming method or simply natural farming, also known as wild farming, which is a mix of different crops via direct seeding. He is also known for the planting method with the use of clay balls (seed bombs), created as a way to reforest areas going through a desertification process.

exists, although not as advanced, a political coordination of social movements because of land struggle and environmental movements against agribusiness. Public policies developed by the government suggest a combination of agribusiness, focused on export and investment in small-scale production to supply the domestic market. As in India, the environmental cost is solemnly ignored by public administrators, whether it is in the field of energy or in food production, who use as an argument the same ideological discourse of the Green Revolution.

The Food and Agriculture Organization of the United Nations (FAO) declared 2014 as The International Year of Family Farming (IYFF), recognizing that this kind of production is essential to maintain global food security, considering that it produces diversified food, sustainably uses natural resources and boots the local economy. In Brazil, family farming is responsible for 70% of the food consumed in the country and this scenario is not exclusively Brazilian.

In 2011, the report "The State of Food and Agriculture" by FAO found that if women had equal access to the means of production: land, education, access to credit and others, they could increase agricultural production and feed more than 150 million hungry people in the world.

To make this happen, they need to be valued and not just seen as mere helpers, but as individuals with significant role in the production process, since they have a kind of knowledge with the potential to increase production. During lasting droughts in the semi-arid, productive backyards are true oasis and they are the work of women. These experiences need to be valued and their work needs to be highlighted in family farming and not hidden in invisibility. This issue directly affects the productivity of small-scale production, whether in Brazil or in India.

Even without autonomy over land use, with little to no access to credit or technical advice, they revitalize family production, generate income and preserve agrobiodiversity. However, when these tasks are an addition to domestic work, they became an excessive burden.

The fight for Seed Freedom is not just the struggle of farmers for access to the genetic material of open-pollination and free reproduction, it is an act of resistance against the market imposition that oppresses their way of life and natural processes. In this scenario, many actions, movements, groups, organizations are rescuing, saving and cultivating seeds in different parts of the world. "It is in the nature of seeds to carry the expression of hope. They bring to mind a cornucopia of harvest." (ICFFA, 2006).

Faced with the need to feed the hungry and provide food and nutritional security to other social groups, the seed becomes, besides a necessary element to sustain life, a symbol of food sovereignty. Fighting for food security – with food that is more nutritious, production and access of organic foods – and for political reform in rural and urban areas will only be possible when we break the dependence of an agribusiness that keeps us malnourished, without the right of choice.

Perpetuating the free seed dispersion may not be the way to solve social problems but it is truly the only way to maintain the right to life. To Bija Devi, a seed guardian and the "expert" in seeds responsible for their selection in Bija Vidyapeeth: "Without seed there is no food. Without food, there is no life. Saving seeds is saving life in all its diversity." (BIJA DEVI, 2010, p.75).

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