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Pakistan in the Global Seed Politics

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Acronyms

ADA	Agricultural Development Authority (NWFP)
ANZFA	Australia New Zealand Food Authority
Bt	Bacillus thuringiensis
CBD	(UN) Convention on Biological Diversity
CGIAR	Consultative Group on International Agricultural Research
DA	Department of Agriculture (Balochistan)
DCs	Developed Countries
EC	European Community
FAO	Food and Agriculture Organization
FSC&RD	Federal Seed Certification and Registration Department (Government of Pakistan).
GATT	General Agreement on Tariff and Trade (Now replaced by WTO)
GDP	Gross Domestic Product
GEOs	Genetically Engineered Organisms
GEST	Genetically Engineered Seed Technology
GEF	Global Environmental Facility
GMO	Genetically Modified Organism
HPYs	High Potential Varieties (synonym for HYVs)
HYVs	High Yielding Varieties
IARC	International Agricultural Research Center
ILO	International Labour Organization
ISO	The International Organization for Standardization
IPRs	Intellectual Property Rights
IMF	International Monetary Fund
IPC	Intellectual Property Committee
IRRI	International Rice Research Institute
LDCs	Least Developing countries
MNCs	Multi National Corporations
m.t	metric tons
NAFTA	North American Free Trade Agreement
NWFP	North West Frontier Province
OECD	Organization for Economic Co-operation and Development
PBR	Plant Breeders Rights
PGRI	Plant Genetic Resource Institute
PSC	Punjab Seed Corporation
PVP	Plant Varieties Protection
RAFI	Rural Advancement Foundation International
SAAG	Sustainable Agriculture Action Group
SAARC	South Asian Association for Regional Co-operation
SANFEC	South Asian Network on Food, Ecology and Cultlure
SSC	Sindh Seed Corporation
TRIMS	Trade Related investment measures
TRIPS	Trade -Related Aspects of Intellectual Property Rights
TNCs	Trans-national Corporations
UN	United Nations
UNCTAD	UN Conference on Trade and Development
UNICE	Union of Industrial and Employees Confederations

UPOV	Union for the Protection of New Varieties of Plant
WB	World Bank
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

Pakistan in the Global Seed Politics

Nusrat Sultana Chaudhry

Abstract

The multinational corporations (MNCs) are heavily investing in production of seeds, plant varieties and inputs like fertilizers, pesticides and herbicides to monopolize the market. The hybrid and transgenic seeds do not have regenerative abilities. Moreover, the intellectual property rights (IPRs) and plant breeders' rights (PBR) laws deprive the farming community of the right to share, store, reuse or sell its seed. This paper discusses the impacts of the IPRs and the proposed PBR law; and explains how modern technology has been increasing cost of production and resulting in biological uniformity and monocultures, which are hazardous for human health and environment.

The notion of trade liberalization is actually a mockery of free trade, which strengthens the monopoly powers of the MNCs at the cost of the economic development of the developing countries. The MNCs have monopoly over supply of sunflower seed (77.15%) and would create monopolies in supply of seeds of maize, fodder and forages in the short run.

The paper suggests that Pakistan's PBR Act must be made in accordance with the Convention on Biodiversity (CBD). It should be farmers' friendly and protective of their rights. Pakistan must not join UPOV, which is selling itself as a readymade sui generis system.

1. Introduction

Agriculture is the backbone[1] of Pakistan's economy and quality of seed plays fundamental role in high and sustained agricultural production. Though, seed is small, but it embodies diversity and freedom to stay alive. The high yielding variety (HYV) of seeds of Green Revolution[2] reached Pakistan's agriculture sector in 1960s. Heavy investments in tractors and tubewells were made in the same decade as well. The tradition of using fertilizers and pesticides was also set in the same era. The simultaneous arrival of all the modern inputs should not be surprising, since HYVs[3] bring desired results only when complemented with other modern inputs. Consequently, the HYVs have tremendously increased the cost of production (see box 1) and have proved to be vulnerable for farming community in general and small farmers in particular. The synthetic fertilizers have reduced intrinsic fertility of soil. Moreover the nitrogen base fertilizers release nitrogen oxide, one of the greenhouse gases causing global warming. Thus the chemical fertilizers have polluted the land, water and the atmosphere and threatened the food security. The pesticides and herbicides have put human health and environment in jeopardy. 'The Green Revolution is an example of the deliberate replacement of biological diversity with biological uniformity and monocultures (Biopiracy, The plunder of nature and knowledge 1998). Therefore, the *'Green Revolution'* is now referred to as the *'Yellow Revolution'*.

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1 Pakistan's agriculture accounts for about 26% of GDP, provides employment to about 52% of the labour force and contributes 45% of the export earnings. Therefore, agriculture is the backbone of our economy.

2 'Green Revolution' can be called 'grain revolution'. It refers to bumper agriculture production (particularly wheat and rice) during late 1960s and early 1970s after introduction of High Yielding Varieties (HYVs) or High Potential Varieties (HPVs). The new plants of wheat and rice were short on stalk and bore more edible grain than the traditional varieties. Wheat revolution originated in Mexico in 1943.

3 HYV is supposed to give 20% additional yield than the traditional variety.

Despite being addicted to the modern inputs, Pakistani farmers continued their seed sharing and exchanging practices. For instance, in case of "Wheat", more than 90 percent seed grown is farmers' own seed. The formal seed sector (public and private) contributes less than 10 percent. As Multi-National Companies (MNCs) dominate the formal seed sector they have been trying to mutate seed situation in Pakistan to make the farmers dependent on them. Hybrid seed (box 1) was introduced in this regard. This seed grows well but cannot be reproduced. In Pakistan, all fodder, forage, oil and vegetable seeds distributed are imported. The traditional crop[4] varieties have started vanishing and farmers seem to have lost their traditional seed sharing and exchanging system for these crops. MNCs are also trying to produce hybrid seeds of cotton, wheat and rice. Monsanto, one of the largest MNCs has developed genetically engineered terminator and traitor seed technologies (box 3) due to which farmers would be bound to purchase seed and other selective chemicals from Monsanto at each stage of crop.

Pakistan is a signatory to the World Trade Organization (WTO) and under the Trade Related Aspects of Intellectual Property Rights (TRIPS), is obliged to provide Intellectual Property Rights (IPRs) for protection of plant varieties. Plant Breeders' Right (PBR) act is a law, which grants right to the breeders of a new plant variety. The PBR can be compared with copyrights law and patents, trademarks and industrial designs law. The PBR Act, to be promulgated soon, supports the MNCs to create monopoly regarding their products. This law would damage the farmers' traditional seed saving, sharing and exchanging system. As a consequence, the seed will not remain a low cost input for the farming community.

Box 1: Hybrid Seed

Kloppenburg says hybridization has broken the unity of seed as food grain and as a mean of production. Therefore, hybridization of seed was an invasion into the seed itself. It stops seed from reproducing itself, because hybrid varieties do not produce true-to-type seed. Thus farmer is bound to return to breeder each year for new seed stock.

Hybridization results in monocultures, which are ecologically unstable and more vulnerable to disease and pests. The corn blight epidemic of U.S is one of the numerous examples, which can be cited in this respect. In 1970, 80% of the hybrid corn in the United States was obtained from a single, sterile male line and contained T.cytoplasm. This T.cytoplasm, was used because it raised quick and profitable production of high yielding, hybrid corn seed. This genetic uniformity made the plants vulnerable to the corn blight fungus, H.maydis and U.S experienced a corn blight epidemic in 1970-71, which destroyed 15% of the nation's crop. A pathologist of university of Iowa wrote after the epidemic: "Such an extensive, homogenous acreage is like a tender prairie waiting for a spark to ignite." According to a National Academy of Science study on the genetic vulnerability of major crops 1972: '……..until, in one sense, they (hybrid corn) had become as alike as identical twins. Whatever made one plant susceptible made them all susceptible.'

'Green Revolution was based on the assumption that technology is a superior substitute for nature and hence a means of producing growth unconstrained by nature's limits'. These miracle varieties are a threat to biodiversity, since due to the cross- pollination the number of traditional varieties falls significantly. Green Revolution washed away thousands of crops and crop varieties, substituting them with monocultures of rice, wheat and maize across the Third World. Green Revolution replaced thousands of local rice varieties with the uniform varieties of the International Rice Research Institutes (IRRI). In 1977, IR-36 was developed for resistance to eight major diseases, but as a monoculture it was vulnerable to attack by two new viruses "ragged stunt" and "willed stunt". It replaced internal inputs with capital and chemical-intensive inputs, creating debt for farmers and death for ecosystems.

4 Varieties prior to the Green Revolution are called '*traditional varieties*'.

The indigenous varieties are resistant to local pests and diseases, even if certain diseases occur, some of the strains may be susceptible, but others will have resistance to survive.

It is claimed that that per acre yields of hybrid variety is at least 20% higher than a traditional variety. But in 1992, cargill's sunflower seeds produced only 500 Kg per acre, instead of promised 1,500 Kg per acre, in Karnataka, India.

The hybrid varieties of seed require ample use of all the modern inputs and in this way, substantially increase in the cost of production. The Research Foundation of Science, Technology and Natural Resource Policy, conducted a survey in 1993 and found that in Karnataka, Indian farmer's cost of production, with Cargill's hybrid Sorghum was Rs 3,230 per acre and their income was Rs 3,600 per acre. Where as, the cost of production with indigenous seed was Rs 300 per acre and their income was Rs 370 per acre. Therefore, a farmer's profit from hybrid seed is Rs 370 per acre and from native seed is Rs 2,900 per acre.

Navdanya (nine seeds) or barnaja (twelve crops) are examples of high yielding systems of mixed farming or polycultures based on diversity. Their per acre yield is higher than any monoculture but still they are vanishing because their production does not depend on chemical inputs.

A South Asian campaign against Monsanto has been launched by SANFEC and has asked for free exchange of seeds among SAARC countries. "The use of traditional varieties should be used as a resistance against hybrid introduction", the campaigners emphasized. (Source: Cultivating Links Feb 1999).

To highlight details of all these realities, the current study was initiated to look into Pakistan's position in the world scenario. In this paper, some important seed issues will be discussed with some possible options.

2. Situation of Seed in Pakistan

Federal Seed Certification and Registration Department (FSC&RD) performs seed regulatory functions under Seed Act 1976, through its 16 seed testing laboratories/offices located in various ecological zones of the country. The public sector could not meet the total seed requirements, therefore privatization promotion policy was adopted by the Government in early 1980s. Total number of private seed companies now has risen to 213, out of which 4 are multinationals[5] [Economic Survey (1998-99)].

The government encouraged the private sector into the seed business by giving them the incentive of duty free import of seed-processing machinery and exemption from income tax. The first national private seed company, Pakistan Seed Corporation Lahore, was registered in 1981. Cargill (now owned by Monsanto)[6] is the first Multinational Company registered in Pakistan in 1985. The MNCs import hybrid seeds of fodder and oilseeds and are now planning to produce these hybrid seeds locally. These companies have also started producing seeds of local cotton, wheat and rice varieties. But active participation of private sector started in 1991 and the seed business was declared as an industry in 1994.

5 Cargill Monsanto Seeds, Lahore, ICI Seed Lahore, Novartis Seed Pak Ltd. Lahore and Pioneer Seed are the four MNCs (Source: FSC &RD, Government of Pakistan).

6 Monsanto bought Cargill on 29.5.98 (Source: FSC &RD, Government of Pakistan).

2.1 Agricultural Research

Mutation-breeding research is conducted in the laboratories of the agriculture research centers of Pakistan like National Agricultural Research Centre and Atomic Energy Commission, which have evolved a number of improved varieties. Pakistan keeps contacts with relevant International Agricultural Research Centers (IARCS), like CIAT, CIMMYT, ICARDA, IITA, IRRI and AVRDC for germplasm exchange and to strengthen the national breeding programs. Practically, all the improved varieties of fruits and vegetables released so far are based on selection from the imported elite germplasm. The FSC&RD has registered 261 varieties of different crops upto 1997 (these varieties have also been approved and released by the PSC), See the following table;

Table 2.1:

Crop	Number of varieties released by the FSC&RD
Wheat/Barley	60
Rice	23
Maize	15
Pulses	26
Oilseeds	34
Forages	15
Vegetables	30
Flowers	1
Cotton	42
Sugarcane	15

Source: Ahmed (1999).

2.2 Informal Seed Market

However, the informal private sector has been a major seed supplier in the country, About 90% of wheat seed flows from farmer to farmer (or from other sources like commission agents, retailers and shopkeepers). It means that only 10% seed is supplied by the formal sector i.e. public& private (national and multinational) companies. The estimated seed requirement by the informal seed sector in Pakistan is given in the table 2.2.

Table 2.2: Estimated seed supply by the informal Seed Sector in Pakistan

Sr. No.	Crop	Share
1.	Cotton	About 45%
2.	Wheat	85-90%
3.	Rice	85-90%
4.	Maize	Over 90%
5.	Pulses	Over 99%
6.	Vegetables	33%*

Note: * (67% from imports) Source: Aslam, A. R. (1996): Ahmad (1996)

According to the Food & Agricultural Ministry of Pakistan, about 85% of the seeds, mostly wheat seed, are prepared by the farmers themselves, [Itla, vol.76 (1999)].

2.3 Demand and Supply Situation of Seed in Pakistan

Pakistan is not self sufficient in seed production and imports substantial quantity of seeds. In particular, all fodder, forages and oil seeds are imported. Overall Pakistan meets only 12.23% (table

2.3.3) of the estimated seed requirement. Most of the companies, smaller in size based in Punjab. They only produce and sell cottonseed because of a high profit margin.

Empirical data analysis is required for deep insight into the current seed situation in Pakistan. The relevant data is given in the following tables.

Table 2.3.1: Estimated seed requirement, procurement and distribution of various crop seeds during 1996-97

Crop	Estimated seed requirement (mt.)	Quantity procured (mt.)	% age of the seed procured.	Quantity distributed (mt.)	% age
Cotton	66000	34292.00	51.95	26635.00	40.35
Wheat	739000	92218.00	12.47	77023.00	10.42
Paddy	43000	2534.00	5.90	1751.00	4.07
Gram	43000	73.00	0.17	73.00	0.17
Maize	35000	568.00	1.62	*2011.00	5.74
Potato	184000	1357.00	0.73	*5324.00	2.89
Fodder & Forages	13500	668.00	4.94	**668.00	4.94
Oilseeds	2535	1361.50	53.71	*1361.50	53.71
Vegetables	5000	4603.00	92.06	**4603.00	92.06
Total (Pakistan)	1130235	137674.50	12.18	119449.50	10.56

Source: Federal Seed Certification & Registration Department, Government of Pakistan.
Notes: * = Including imported seeds.
** = All fodder and forages and vegetable seeds distributed are imported.

Table 2.3.2: Estimated seed requirement, procurement and distribution of various crop seeds during 1997-98

Crop	Estimated Seed requirement	Quantity procured (m.t)	% age	Quantity distributed (m.t)	%age
Wheat	739000	85640	11.58	78544	10.63
Cotton	67000	27928	41.68	23128	34.52
Gram	43592	200	0.46	192	0.44
Paddy	60200	2301	3.82	1734	2.88
Maize	35000	1731	4.94	1674	4.78
Potato	197500	7023	3.55	6824	3.45
Pulses (Moong and Lentils)	4850	127	2.62	117	2.41
Fodder and Forages	14500	1163	8.02	873	6.02
Sunflower	1000	585	58.50	571	57.10
Canola	864	475	46.99	511	43.98
Vegetables	5000	3274	65.48	3181	63.62
Total:	1167606	130497	11.17	117349	10.05

Source: Source: Federal Seed Certification & Registration Department, Government of Pakistan.

Table 2.3.3: Estimated seed requirement, procurement & distribution of various crop seed during 1998-99 in Pakistan

Crop	Estimated seed require-ment (m.t.)	Quantity procured (m.t.)	%age	Quantity distributed (m.t.)	%age
Wheat	739000	110366.80	14.93	104193.20	14.09
Cotton	67000	34184.63	51.02	26276.44	39.22
Paddy	59570	2820.46	4.47	2280.54	3.83
Gram	39168	357.5	0.91	342.70	0.87
*Maize	35584	3419.28	9.61	3034.28	8.52
*Oilseed (canola, rapseed, sunflower & soybean)	2809	1797.69	63.99	1547.34	55.08
*Potato	269000	3500.95	1.30	3500.95	1.30

Continued…

Crop	Estimated seed require-ment (m.t.)	Quantity procured (m.t.)	%age	Quantity distributed (m.t.)	%age
*Pulses (Moong, Mash)	5256	203.09	3.86	203.09	3.86
*Fodder & Forages	14500	5185.52	35.76	4921.52	33.93
*Vegetables	5000	4647.71	92.95	4647.59	92.95
G. Total (Pakistan)	1233887	166483.41	13.49	1509447.65	12.23

Source: Source: Federal Seed Certification & Registration Department, Government of Pakistan
Note: * = Included imported seed.

Graph 2.3.1: Seed supply by formal sector in Pakistan 1998-99

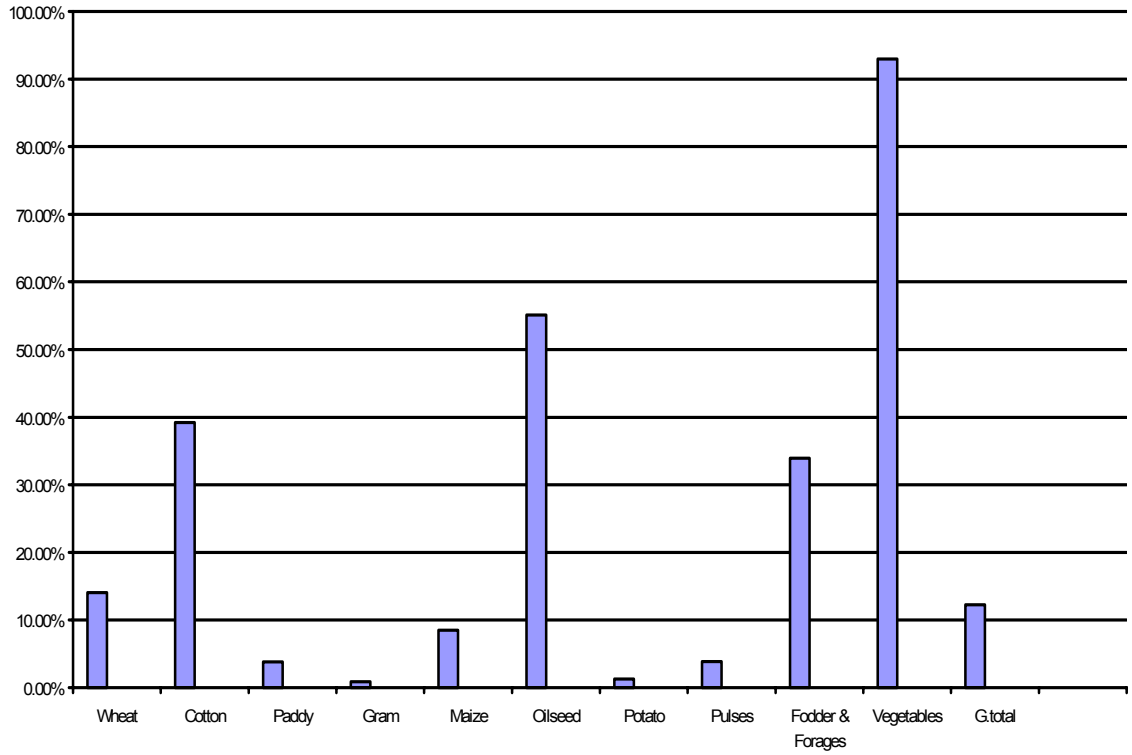


Table 2.3.4: Estimated requirement, procurement and distribution of various crop seeds in Pakistan for 1996-97, A province vise public, MNCs & private local sector analysis.

Crop	Province	Agency	Estimated seed requirement (m.t)	Quantity Procured (m.t)	% gap between estimated requirement & procured	Quantity distributed (m.t)	% gap between estimated requirement & distributed
Cotton	Punjab	Public (PSC)		8772.00	18.28	6272.00	13.07
		Cargill, Lahore (MNC)		826.00	1.72	662.00	1.38
		Private local (49 companies)		13430.80	27.98	9297	19.37
		Total Private		14256.80	29.70	9959.00	20.75
		Total (Punjab)	48000	23028.80	47.98	16231.00	33.81
	Sindh	Public (SSC)		1546.00	8.59	717.00	3.98
		MNCs		0.00	0.00	0.00	0.00
		Private local Bhanbhore seed		141.84	0.79	111.98	0.62

		Corp					
		PCGA		9575.00	53.19	9575.00	53.19
		Total Private		9716.84	53.98	9686.98	53.82
		Total (Sindh)	18000	11262.84	62.57	10403.98	57.80
	Total	**Pakistan**	**66000**	**34291.64**	**51.96**	**26634.98**	**40.36**
Wheat	Punjab	Public (PSC)		69081.00	13.00	54198.00	10.20
		Cargill, Lahore (MNC)		2550.00	0.48	2550	0.48
		Private local (37 companies)		11426.00	2.15	11418	2.15
		Total Private		13976.00	2.63	13968	2.63
		Total (Punjab)	531300	83057.00	15.63	68166	12.83
	Sindh	Public (SSC)		3609.00	3.63	3305.00	3.32
		MNCs		0.00	0.00	0.00	0.00
		Private local (2 companies)		100.17	0.10	100.17	0.10
		Total Private		100.17	0.10	100.17	0.10
		Total (Sindh)	99400	3709.17	3.73	3405.17	3.42
	NWFP	Public (ADA)		5076.00	6.59	5076.00	6.59
		MNCs		0.00		0.00	0.00
		Private local		0.00		0.00	0.00
		Total Private		0.00		0.00	0.00
		Total (NWFP)	77000	5076.00	6.59	5076.00	6.59
	Balochistan	Public (DA)		375.00	1.20	375.00	1.20
		MNCs		0.00	0.00	0.00	0.00
		Private local		0.00	0.00	0.00	0.00
		Total Private		0.00	0.00	0.00	0.00
		Total (Balochistan)	31300	375.00	1.20	375.00	1.20
	Total	**Pakistan**	**739000**	**92217.17**	**12.48**	**77022.17**	**10.42**
Paddy	Punjab	Public (PSC)		1240.0	4.51	1228.00	4.47
		Cargill, Lahore (MNC)		180.00	0.65	40.00	0.14
		Private local (7 companies)		213.00	0.77	91.00	0.33
		Total Private		393.00	1.43	131.00	0.48
		Total (Punjab)	27500	1633.00	5.94	1359.00	4.94
	Sindh	Public (SSC)		862.00	6.07	353.00	2.48
		MNCs		0.00	0.00	0.00	0.00
		Private local					
		Bhanbhore Seed Corp		15.60	0.11	15.60	0.11
		Total Private		15.60	0.11	15.60	0.11
		Total (Sindh)	14200	877.6	6.18	368.60	2.60
	NWFP						
		Public (ADA)		19.00	1.46	19.00	1.46
		MNCs		0.00	0.00	0.00	0.00
		Private local					
		Swat Seed		4.00	0.31	4.00	0.31
		Total Private		4.00	0.31	4.00	0.31
		Total (NWFP)	1300	23.00	1.77	23.00	1.77
	Total	**Pakistan**	**43000**	**2533.60**	**5.89**	**1750.6**	**4.07**

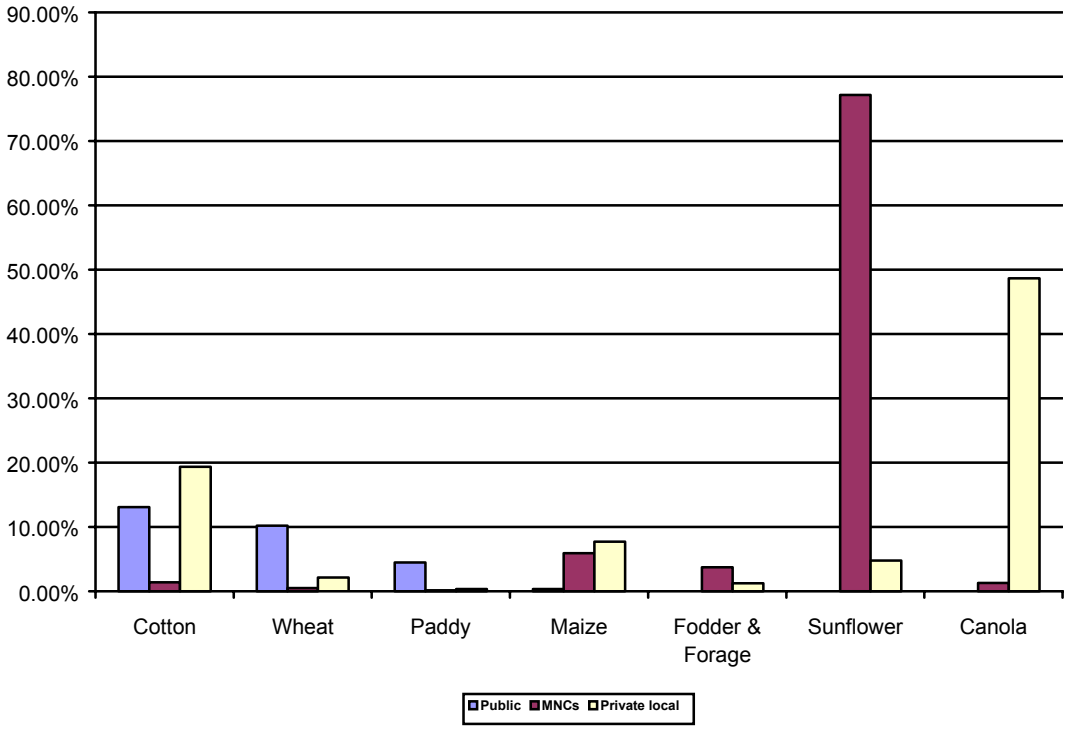
Gram	NWFP	Public (ADA)		73.00	1.82	73.00	1.82
		MNCs		0.00	0.00	0.00	0.00
		Private local		0.00	0.00	0.00	0.00
		Total Private		0.00	0.00	0.00	0.00
		Total (NWFP)	4000	73.00	1.82	73.00	1.82
	Total	**Pakistan**	**4000**	**73.00**	**1.82**	**73.00**	**1.82**
Maize	Punjab	Public (PSC)		50.09	0.36	50.09	0.36
		ICI (MNC)		280.00	2.00	*280.00	2.00
		Pioneer (MNC)		548.00	3.91	*548.00	3.91
		Total MNCs		828.00	5.91	*828.00	5.91
		Private local (6 companies)		1081.05	7.72	*1081.05	7.72
		Total Private		1909.05	13.64	*1909.05	13.64
		Total (Punjab)	14000	1959.14	13.99	*1959.14	13.99
	NWFP	Public (ADA)		51.60	0.24	51.60	0.24
		MNCs		0.00	0.00	0.00	0.00
		Private local		0.00	0.00	0.00	0.00
		Total Private		0.00	0.00	0.00	0.00
		Total (NWFP)	21000	51.60	0.24	51.60	0.24
	Total	**Pakistan**	**35000**	**2010.74**	**5.74**	**2010.74**	**5.74**
Potato	Punjab	Public (PSC)	NA	NA	NA	NA	NA
		MNCs	NA	NA	NA	NA	NA
		Private local	NA	NA	NA	NA	NA
		(1company)	NA	NA	NA	NA	NA
		Total Private	NA	NA	NA	NA	NA
		Total (Punjab)	NA	NA	NA	NA	NA
		Pakistan	NA				
	Total			NA	NA	NA	NA
Fodder & Forages	Pakistan	Public Sector		0.00	0.00	0.00	0.00
		Cargill (MNC)		231.00	1.71	**231.00	1.71
		ICI (MNC)		270.00	2.00	**270.00	2.00
		Total MNCs		501.00		**	
		Private local (7 companies)		167.00	1.24	**167.00	1.24
		Total Private		668.00	4.95	**668.00	4.95
	Total	**Pakistan**	**13500**	**668.00**	**4.95**	****668.00**	**4.95**
Sunflower	Pakistan	Public Sector		0.00	0.00	0.00	0.00
		Cargill (MNC)		297	31.13	**297.00	31.13
		ICI (MNC)		324	33.96	**324.00	33.96
		Pioneer (MNC)		115	12.05	**115.00	12.05
		Total MNCs		736	77.15	**736	77.15
		Private local (4 companies)		45.5	4.77	**45.50	4.77
		Total Private		781.5	81.92	**781.50	81.92
	Total	**Pakistan**	**954**	**781.5**	**81.92**	****781.50**	**81.92**
Canola	Pakistan	Public Sector		0.00	0.00	0.00	0.00
		ICI (MNC)		10.00	1.28	**10.00	1.28
		Private local (more than two companies)		380.00	48.66	**380.00	48.66
		Total Private		390.00	49.94	**390.00	49.94
	Total	**Pakistan**	781	390.00	49.94	**390.00	49.94

Soybean	Pakistan	Public Sector	NA	NA	NA	NA	NA
		MNCs	NA	NA	NA	NA	NA
		Private local	NA	NA	NA	NA	NA
		Total Private	NA	NA	NA	NA	NA
	Total	**Pakistan**	NA	NA	NA	NA	NA
Vegetables	Pakistan	Private	5000	4603.00	92.06	**4603.00	92.06

Source: Government of Pakistan, Federal Seed Certification and Registration Department.
Notes: * = All Maize seed distributed by the private sector is imported.
** = All fodder & forages, oil and vegetable seed distributed are imported.
*** = For abbreviations see acronyms.

Table 2.34 & Graph 2.32 clearly illustrate that the MNCs have monopoly on supply of sunflower seed (77.15%). The MNCs will create monopoly on maize, fodder & forages seed supply, in near future. The wheat and paddy seed supply is still in the hands of the public Sector. In Punjab, Cargill and public sector supply only 1.38 % and 13.07% of cotton seed respectively. Whereas, 49 local companies supply 19.37% of cotton -seed. Therefore, the formal cotton- seed market seems (for the time being) quite competitive and protected from vulnerabilities of the biotechnologies of the MNCs.

Graph 2.3.2: Public, MNCs & Private Local sector seed supply analysis 1996-97



Note: The cotton, Wheat, Paddy, and Maize figures are taken for Punjab and for Fodder & Forages, Sunflower, Canola for whole of Pakistan

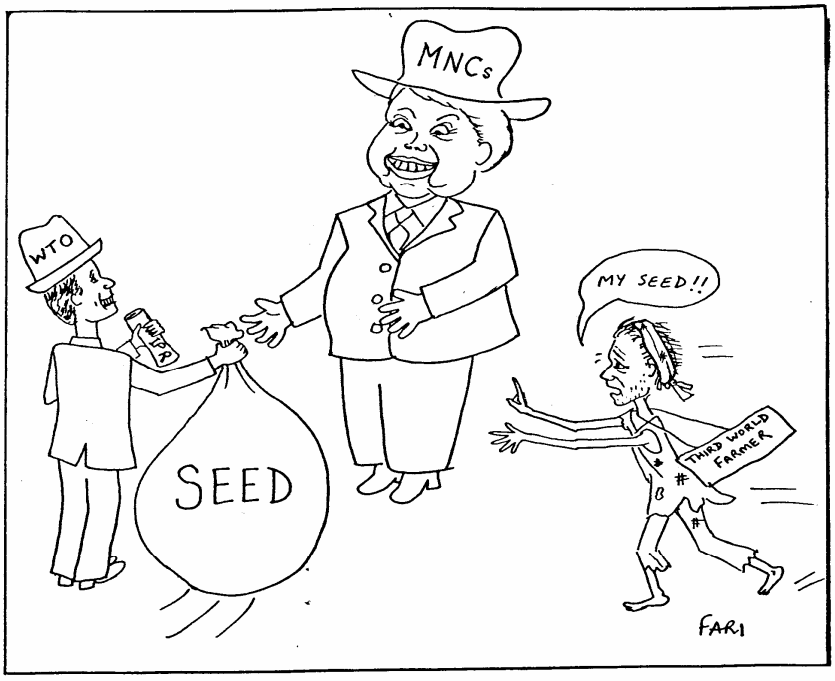
3. International Seed Politics

The Secretary General of the International Association of Plant Breeders for the Protection of Plant Varieties Hans Leenders says:

> *"Even though it has been a tradition in most of the countries that a farmer can save seed from his own crop, under the changing circumstances it is not equitable that farmers can use this seed to grow a commercial crop without paying a royalty. The seed industry will have to fight hard for a better kind of protection."*

The "hard fight" of the seed industry has, indeed been rewarded with the IPR obligation of TRIPS, in the Uruguay Round of the GATT. Since the establishment of GATT in 1948, the agriculture sector was, for the first time, brought on its' forum in 1986, why? Has, this sector been too insignificant (prior to the Uruguay Rounnd) to play any role in the 'global trade liberalization'? (Which has been the motto of the GATT since its establishment). The legitimate piracy of seed by multinational companies of agro chemical and seeds, which played a vital role in formulating the framework of the TRIPS agreement, was the actual motive of bringing the agriculture sector under purview of the GATT. This very idea of extending patents to biodiversity was strongly opposed by developing countries in the GATT negotiations. Industrialized countries hold just over 97% of all existing patents; and top ten seed companies currently control 30% of the world's US $ 23 billion commercial seed market (source: Grain issue #2).

The first patent on life form was granted in U.S in 1971 to Anand Mohan Charkravarty of General Electric, on a genetically engineered pseudomonas bacteria.[7] He said, "I simply shuffled genes, changing the bacteria that already existed". He was given this patent on the grounds that the micro-organism was his invention and not a product of nature. Similarly, the Consultation Group on International Agricultural Research made a policy statement on May 22, 1992 allowing for privatization and patenting of genetic resources held in international gene banks.[8]



THE LEGITIMATE PIRACY OF SEED

Seed is considered to be a relatively low cost input, because farmers usually sow their own saved seed and

7 Chakravarty took plasmids from three kinds of bacteria and transplanted them into a fourth.

8 Gene banks/Seed banks are refrigerated warehouses, maintained by most countries for long-term storage of a wide selection of seed varieties. 'PGRI is the largest seed bank of Pakistan' (source: Consultation with Syed Irfan Ahmed, ex DG of FSC&RD).

purchase seed once in three to five years. The PBR act will give monopoly powers to the breeders of national and multinational companies. So, after implementation of the PBR act, cost of seed is likely to rise to such an extent that poor farmers won't be able to purchase seeds, let alone the purchase of other inputs. Thus, the coming years would bring about devastating changes in agricultural sector in the world in general and in the third world countries in particular.

The public Institutions and the farming community have been making innovations for decades, without rights or patents. One of the studies in United States shows that implementation of the IPR has resulted in: little impact in terms of stimulating plant breeding; reduced information and germplasm flows from private to public sector; a decreased role for the plant breeding; and increased seed prices for farmers. There is literally no evidence that patents actually stimulate invention. The patents are the tools to block entry of other firms in the market and thus create sustainable monopolies. Also the implementation of the IPR in agriculture sector will not only threaten food security, but also terminate 'the *trickle down effect*' of knowledge, technology and, hence, economic development and impede the pace of further development in all walks of life.

Since, the times of Adam and Eve, the cultivars all over the world, have been putting their blood and sweat to evolve indigenous varieties, without patents, to feed the world. The traditional agricultural practices like mixed cropping, allow such genetic variability of the crop varieties, which give protection against pests, disease and environmental stress. These varieties, unlike the hybrid and transgenic varieties, do not depend on the modern inputs; and are environment-friendly and a necessity for sustainable agriculture. There is a close relationship between weeds and crops, particularly in tropics, where weedy and cultivated varieties have genetically interacted for centuries and hybridize freely to produce new varieties. *According to the national conservation strategy of Ethiopia, agricultural biodiversity has been conserved only when farmers have total control over their seeds. Therefore denial of farmers' rights is one of the reasons of biodiversity erosion*. Earlier, biodiversity was a live support for poor communities, but now it is becoming a source of raw material for powerful corporations.

The contribution of farming community cannot, indeed, be evaluated in monetary terms and is instead undermined by calling these varieties primitive. The modern breeders of the transnational corporations first snatch the so-called 'primitive germplasm' from the original custodians, then tamper with it to create their 'advanced elite germplasm' in laboratory. According to one of the biggest breeding industry associations, less than 7% of the germplasm used by professional breeders is 'exotic'. Two-thirds of it is tapped from genebanks and one-third is collected directly from farmers' field. They would have been the inventors and owners only if they had created the elite germplasm from space, instead of the primitive germplasm.

> *"The issue of the patentability of life is not merely a trade-related issue. It is primarily an ethical and ecological issue intimately related to the social injustice of biopiracy. We need a transition to an alternative economic paradigm that does not reduce all value to market prices and all human activity to commerce."*
>
> *(Biopiracy, The nature of plunder and knowledge 1998)*

But the world's number one seed company, Pioneer Hi-Bred denounces ethics as "*a barrier to free trade*". Cargill, the largest grain trader and the fourth largest seed- corporation has asked for IPRs to protect its investment, describing it as a social necessity, to benefit farmers. Whereas, private firms are profit motivated and are least concerned about welfare of society and sustainable agriculture.

SANFEC viewed with great alarm the increasing role of international agencies like FAO and GEF in becoming a conduit for transnational seed interests. FAO dumped hybrid seeds in Bangladesh in the aftermath of floods and accepted sponsorship Monsanto for the World Food Day celebrations. The GEF collaborated with Novartis to launch a Non-Pesticidal Plant Protection Program in India. This has been cited as example of co-operation between international public agencies and transnational corporations.

Despite the fact that 90% of the world's biological resources are located in the developing countries, majority of their citizens are deprived of food and environmental security and health care IPRs permit privatization of biodiversity and intellectual common. "Bioprospecting" is a word developed to express this new phenomenon of disclosure.

Dr. Vandana Shiva says:

> "*Bioprospecting leaves out societies poorer since we will have to buy what we produced freely for ourselves, and we will have to treat knowledge pirated from our farmers and our indigenous health traditions as an 'invention' of the western corporations, western scientists and western trained Indian scientists*."(Press Release April 28, 1998 India).

The United States blames the Third World for pirating worth $202 million per year for agricultural chemicals and $2.5 billion royalties annually for pharmaceuticals. Rural Advancement Foundation International (RAFI), in Canada shows if the contribution of the third world farmers and tribesmen are taken into account, the United States owes to the Third World countries $2.7 billion worth of royalties in agricultural chemicals and pharmaceuticals alone. And if the 'braindrain' from the Third World, is also accounted for, the royalty estimates would jump sky high.

The RAFI has cited 147 (in Sep 1998) examples of possible biopiracy involving the misappropriation of 124 farmers' varieties from 43 countries. (http://www.rafi.org)

Every one is aware of the Basmati rice controversy[9] and the patenting of "Neem". Thus contrary to the UPOV propaganda, the problem is other way around, farming and indigenous communities in the South are the ones that need protection from biopiracy.

3.1 International Agreements & Seed

The well- known international agreements, which are very soon to determine the destiny of seed and the farmers all over the world, are TRIPS, CBD and UPOV. The overview of each of the agreements is given below.

3.1.1 WTO AND TRIPS

After the World War II, the world was facing three major problems, namely establishment of peace, transaction and trade restrictions. For solving these problems, United Nations, International Monetary Fund (IMF) and General Agreement on Tariff and Trade (GATT) were established in 1945, 1944 and 1948 respectively. In the eighth round of talks of GATT 1986-94, called Uruguay Round of Talks], agriculture sector was brought under purview of the forum for the first time and on April 15th 1994 the GATT acquired the status of an organization named World Trade Organization (WTO). Three important agreements were made

9 On Setpember 2, 1997, the US patent office awarded a US patent Numeber '5,663,484, Basmati Rice and Grains', in favour of the company Rice Tech of Texas. But the U.S patent and Trade office has rejected main claims of this patent.

about the agriculture sector namely agreement on agriculture which is about the reduction and elimination of subsidies on the agricultural inputs, Trade Related Investment Measures (TRIMS) and Trade Related Aspects of Intellectual Property rights (TRIPS).

Basic Facts About the TRIPS Agreement

- Came into force on 1 January 1995 and mandatory for all WTO member states.
- Entails obligations for seven areas of intellectual property rights available for all fields of technology.
- Sets up first global system of the IPR on biological diversity, and specifically plant varieties.
- Requires application of either patents or an "effective" *sui generis*[10] (Latin word meaning unique or of its own kind) system, to "protect' (i.e. gain monopoly rights over) plant varieties at national level.
- Must be implemented in least developed countries by the year 2000.
- Must be implemented in least-developing countries by the year 2005.
- Review in 1999 (Article 27.3b see box 2) and 2000 (the entire Agreement).
- Is subject to the same dispute settlement procedures as other WTO agreements: failure to implement the terms of the agreement will result in trade retaliation against the offending country.

The framework for the TRIPS agreement was conceived and outlined by three organizations, namely the Intellectual Property Committee (IPC),[11] Keidanren[12] and the Union of industrial and Employees Confederations (UNICE).[13] Together these groups allied to introduce intellectual property protection into GATT. The TNCs have a vested benefit in the TRIPS agreement. The Pfizer, Bristol Meyers and Merck already have patents on Third World biomaterials, collected without payments of royalties.

The TRIPS agreement has allowed monopolistic control of life-form, spread of uniformity and destruction of diversity.

Box 2: 27.3b of TRIPS states

- Member may exclude from patentability

Plants and animals other than micro- organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, members shall provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof…..'

UNCTAD has estimated the cost of enforcing TRIPS through judicial and administrative systems for various countries. This cost could be US$1.8 million in Egypt, over US$1.4 million in Bangladesh and at least US$1-1.5 million in Tanzania (GRAIN issue 3 1998).

3.1.2 CBD

The basic principles of the 1993 UN Convention on Biological Diversity (CBD) are as follows:[14]

- Importance of the contribution of the peoples of developing countries towards biodiversity.
- Biodiversity is not a 'gift of nature', but a result of community activities where women, in particular play a vital role.

10 *Sui generis* system: Certain things like folklore, computer circuits and plant Varieties do not fit into the classic intellectual property rights category/system, So they come under the *Sui generis* rights category/system and are simply a deviation from conventional intellectual property rights.

11 IPC is an alliance of 12 largest U.S corporations: Bristol Myers, DuPont, and General Electric,General Motors, Hewlett Packard, IBM, Johnson & Johnson, Merck, Monsanto, Pfizer, Rockwell and Warner.

12 Keidanren is recognized as the economic organization in Japan.

13 UNICE is recognized as the official spokesperson for European business and industry.

14 From GRAIN issue 1 1998.

- Biological diversity is intrinsically co-dependent with diverse cultures, knowledge systems, and lifestyles, which generate and maintain it.
- Rights for local communities, as well as states, are necessary to protect biological resources and to encourage conservation.
- Programmes and policies must be implemented to promote conversation and sustainable use, as well as, the sharing of benefits arising from use of biological resources.

Over 130 countries are signatories of both the treaties, which have contradictory objectives.

3.1.3 UPOV

The international Union for the Protection of New Varieties of Plants (UPOV, derived from its French derivation) is an intergovernmental organization with headquarters in Geneva (Switzerland).[15] It is based on the 1961 International Convention for the Protection of the New Varieties of Plants, which provides exclusive and private ownership rights to biodiversity. Protection is given to plant breeders as incentive to the development of agriculture, horticulture and forestry and to safeguard the interests of the plant breeders. The convention has been revised in 1972, 1978 and 1991. It is currently selling itself as a ready-made and effective *sui generis* system, in order to comply with TRIPS, though TRIPS agreement makes no mention of UPOV. In the 1978 Act, the farmers are allowed to save seed for their own use and the breeders too are allowed to freely use PVP varieties to develop newer ones. But the 1991 Act snatches away these age-old rights of the farmers[16] and breeders and hence the protection offered to plant breeders has become more similar to patent rights to plants. Till July 1999, total number of member states of the UPOV has increased to 44.[17]

3.2 Trade Liberalization: A Mockery of Free Trade

> *It is ironic that while national (LDC) markets are being opened, global markets remain restricted. How can developing nations sell their products unless global markets are also freed of protectionist restraints?*
>
> William H. Draper III, United Nations
> Development program Administrator, 1992.

Liberalization of trade means substantial reduction of import/export duties (tariff) on agricultural commodities; input and export subsidies. The advocates of 'free trade' argue that liberalization results in improving the efficiency of the overall resource allocation and "getting the prices right". The IMF, WB and WTO are advocates of market economy and trade liberalization. The classical school of thought of the free market economy, with no government intervention failed to explain the Great Depression of 1930s. Then the Keynesian School of thought emerged arguing that the government intervention in the right time is must to prevent the economy from severe sufferings.

As mentioned earlier that trade liberalization has been the motto of GATT, (since its establishment after World War II, when world was facing many trade restrictions). Consensus during various rounds of talks of GATT has proved to be vulnerable for the LDCs and the eighth round 1986-1994 Uruguay Round of talks has given such powers to WTO that it will not only regulate international trade, but also determine domestic policy.

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15 For further detail see http:/www.upov.org

16 If a farmer will sow field to a PVP variety without paying royalty, then breeder can claim ownership of the output.

17 The UPOV member countries are:
Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Colombia, Czech Republic, Denmark, Ecuador, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Kenya, Mexico, Netherlands, New Zealand, Norway, Panama, Paraguay, Poland, Portugal, Republic of Moldova, Russian Federation, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Trinidad and Tobago, United Kingdom, United States of America, Ukraine and Uruguay.

Let's cite the devastating consequences of the implementation of 'The Laws of Free Trade', in Mexico. Corn, is Mexico's staple food and it is cultivated at 40% of her land. NAFTA (North American Free Trade Agreement) believed that Mexico had comparative advantage in importing corn from U.S.A. Therefore, the Mexican government dropped the consumption and production subsidies on corn. The production of corn and other basic grain fell by nearly half; 25 million acres went unplanted and by 1995 some 2 million peasants farmers migrated to saturated urban centers. In 1996, there were no corn surpluses in U.S.A. Consequently, the corn prices tripled in Mexico and per capita corn consumption dropped three times. In dry northern parts of the country, women and children reportedly hijacked trains, carrying U.S corn to Mexico.

The developed countries produce huge food surpluses and even get paid for leaving their fields fallow. In the developed countries (DCs) subsidy to agriculture is of very high order. For example, an Indian farmer gets the same subsidy on one ton of rice that a Japanese farmer gets on one kilo. Now that the developed world has become self sufficient in food by using the tools of subsidy and tariff, they are depriving the LDCs of their chance of protecting their infant agriculture and acquiring self-sufficiency in food by using the tools of subsidy and tariff. In developed countries, farming community is large and rich. It constitutes 2% to 7% of population. For DCs farmers, cost of seed does not determine whether or not they are able to plant their crop. Moreover these countries do not have large number of small and marginal farmers as in the developing countries. For example, in Pakistan about 96% of the landowners have less than 10 hectares and can be regarded as small farmers.[18] Therefore for the farmers of the developed countries, the cost of seed does not determine whether or not they are able to plant their crop. The miracle seeds of Green Revolution and the transgenic seeds (the trend of using them is being established) cannot bring the desired results, unless they are complemented with modern inputs like chemical fertilizers, tractors and tubewells. Thus in the absence of subsidies and imposition of PVP, cost of seed and other modern inputs would be beyond reach of the poor farmers of the third world and might even lead to high rates of structural unemployment.

Due to globalization

> *...Every policy decision translated into the politics of "we" and "they"- "we" have been unjustly treated, while "they" have gained privileges unfairly. The cold war era has ended, the era of trade wars has begun.*
>
> *(Biopiracy, The nature of plunder and knowledge 1998).*

Fernando Jaramillo, Chair of the Group of 77 and Colombia's permanent representative to the United Nations, said in a speech, "*The Uruguay Round is a proof against the developing world that continues to be sidelined and rejected when it comes to defining areas of vital importance to their survival.*"

In December 1993, at the last stage of GATT negotiation, Micky Kanton (U.S trade representative) and Leon Brittany (the negotiator for the European community) sat behind closed doors and then bestowed the world with a "free trade" treaty. In fact the free trade has actually strengthened the power and mobilized the freedom of TNCs to trade and invest in most countries of the world and simultaneously to reduce the power of national governments in order to resist their operations.

The TRIPS agreement of GATT is not the outcome of democratic negotiations between industrialized countries and the Third World, but it is actually the dictation of values and interests of transnational corporations. Prior to the Uruguay Round of GATT, each country had its own. IPR protection, harmonizing with its ethics and socioeconomic conditions. A major push for internationalizing IPR laws was given by the TNCs. The corporations, which obtain IPRs for plants or animals, try to maximize their global market share, in

18 Source: [Khan (1997): Chaudhry (1999)].

order to maximize the long run return on their investment. Thus, the same variety of crop or livestock is spread worldwide. *In this way, IPRs lead to spread of monoculture and destruction of diversity*. Monopoly control of seeds and plant varieties exacerbates pressures on small farmers of the Third World, who are the original breeders and custodians of plant genetic resources.

The U.S trade Act, particularly the Super and Special 301 clauses that allow the U.S to take unilateral action against any country that does not open up its market to its corporations. *Free trade is actually, an asymmetric arrangement that combines liberalization and protectionism for Western interests. A revolt leader of Mexico says, "**The free trade agreement is a death certificate for the Indian people of Mexico**".*

If the WTO, agreements are implemented, without any amends, then the flow of funds from poor to rich countries will worsen the third world crisis 10 times. (RAFI, 1991: Shiva 1998). The international Labour Organization (ILO) has suggested that the biotechnologies shall cause a 50% rise in the unemployment level of the Third World in the near future (Dawkins 1997).

Figure 2: Death Certificate

Monsanto bought Agracetus, for $150 million in May 1996, which had broad species patents for all transgenic cotton and soya. Thus both cotton and soya bean are now Monsanto monopolies. Monsanto "owns" the crops when it comes to intake millions of dollars in rent from farmers, but it disowns the costs and the responsibility for the jeopardy its transgenic crop creates. The technology fee alone reaped Monsanto a sum of $51 million in 1996. It has genetically engineered soya bean, called Round-Up, to increase its herbicide sale (since, it is resistant to the chemical herbicide glyphaosate). Five hundred organizations from 75 countries celebrated the World Food Day, October 16, 1996, by demanding an international boycott of the Round-Ups of Monsanto. Where as October16, 1999 had been celebrated as "Seed Day".

A 1975 joint WIPO/UNCTAD study found that 84% of patents registered in developing countries were held by Transnational Corporations (TNCs) housed in the North (http://www.cuts.org/mytrip.htm). Biodiversity, is becoming green gold and green oil of the TNCs at a swift pace. The already existing IPR treaties provide much of the backbone of the agreement on TRIPS. According to WIPO, citizens and corporations of industrial countries hold 95% of the patents in Africa, almost 85% of those in Latin America and 70% of those in Asia (GRAIN issue 1 1998). *PVP is a form of protectionism and hence a market distortion*. The UPOV has been made to establish worldwide monopolies of MNCs and to increase their profits. The MNCs, which have been given real power in the Uruguay Round, have gained new rights and given up old obligations to protect workers' rights and environmental rights. World top 10 seed companies control 40% of the market. The *UPOV*

is a transfer of power from farmers and states to corporations that want to appropriate the country's rich biodiversity.

The PVP, the ISO 9000 (quality management standards), ISO 14000 (International standards on environmental management), child Labour and the regional trading blocks[19] are the non-tariff barriers, benefiting the industrial countries and making the economies of LDCs more vulnerable.

Therefore, the prevailing global trade rules are a mockery of trade liberalization. They will simply strengthen the monopoly powers of the MNCs.

Box 3: Transgenic Seed

The world agriculture is moving from Green Revolution technologies to biotechnology, which is considered 'Second Green Revolution'.The making of transgenic species tampers with nature through crossing of species boundaries, which have been nature's way of maintaining distinctness and diversity. The precise ecological impact of crossing these boundaries has not been fully anticipated and assessed. Biotechnology enslaves and monitors seed, which is autonomous, free and self-generating, through technical means and through property rights. A seed produced through GEST is known as 'transgenic seed'.

It is claimed that without PVP, investment in the transgenic/genetically engineered varieties of seeds would seize and hence the Malthus theory that …….. population growth would eventually outstrip food supply, would prove to be right. Where as this is not true, because the world today produces more food per inhabitant than ever before. 'Enough is available to provide 4.3 pounds to every person every day' (Rosset 1999). Genetic engineering feeds the commodity market and not people. Though, food is available in the market, but is beyond the purchasing power of starving poor of the third world. Majority of the poor live in the third world. Therefore, hunger can be conquered by curbing of poverty, inequality and not by propagation of biotechnology. Why is a country poor? The answer is that it is trapped in a vicious circle of poverty and the new PVP will ensure that it never ever breaks that circle.

Some researches have shown that none of the genetically engineered seeds significantly increase the yield of crops. For example, DR. Charles Benbrook, the former director of the Board on Agriculture at the National Academy of Science, concluded that in more than 8,200 field trials, the Roundup Ready seeds produced fewer bushels of soybeans than similar natural varieties (Rosset 99).

The genes from Bacillus Thuringiesis [(Bt), a natural bacteria] are being widely used to genetically engineer corn, cotton and other basic crops. Though this apparently is an ideal non-toxic pest control, but in the long run insects would develop immunity to Bt gene.

In the United States, the Fish and Wildlife Service has found that Roundup, already threatens 74 endangered plant species.

The food obtained from genetically engineered seeds is known as GMO (genetically modified organism) food. GMO food has the potential of introducing new allergies.

The U.S authorities and officials have publicly protested recent decisions by Japan, Korea and Australia-New Zealand Food Authority (ANZFA) to introduce labelling laws for GMO food (Byrnes 1999). A Malaysian official said, " the level of awareness of GM food by consumers is not as (in) Europe". If there are no adverse impacts of GMO food, then why is USA reluctant to label them?

19 In Europe, a single EC market became a reality at the end of 1992, as all internal barriers were removed [Todaro Ch#14: Chaudhry (1999)]. On January 1, 1999, the Euro became the currency for 11 member states. [Timetable (New) What Will Happen and When].

The Ciba-Gegy, ICI, Monsanto and Hoechst are one of the 27 chemical multinationals, conducting most of the research and innovation in biotechnology. They are developing pesticide and herbicide (which kills weeds) tolerant varieties, in order to increase the sale and use of the pesticides and herbicides produced by their own companies. For example, Soya beans have been made resistant to Ciba-Geigy's Atrazine herbicide, thus increasing an annual sale by $120 million. It is cheaper to adapt the plant variety to the chemical than the chemical to the plant. The cost of developing, a new crop variety is mostly less than $2 million but the cost of a new herbicide surpasses $40million. The monopolistic powers of the MNCs, in the global agriculture are being strengthened by this integration of seeds and chemicals.

Small farmers in the third world use many non-crop plants as supplemental food sources and as animal feed. Wide spread use of chemical due to biotechnology is not only terminating this source **but also** increasing the debt, reducing the profit and hence diminishing the chances of the survival of the third world small farmers. All this, eventually threat the food security and the survival of mankind.

Half of the farmers of world depend on their own saved seed for each year's harvest.

Monsanto is attempting to acquire the rights to a genetic engineering technique that renders a crop's seeds sterile (terminator technology), insuring that farmers are dependent on Monsanto for new seed every year. 'Farming in the third world could be crippled if these genes contaminate other local crops that the poor depend on. And such genes could unintentionally sterile other plants, according to study by Martha Crouch, an associate professor of biology at Indian University' (Rosset 1999).

The genetically engineered, herbicide resistant crops can end up creating super weeds, via natural hybridization. The Ministry of Environment in Denmark, in its environmental risk assessment of herbicide-resistant agricultural crops states:

It is therefore, to be expected that the transfer of resistant genes to weeds will cause a gradual spreading of resistance to this agent and is thus likely to result in increased and wider use of herbicides.

To combat with these super weeds, the use of chemicals will further increase. Similarly the widespread use of the Pesticides and insecticides develops immunity in the pests and insects, respectively. Therefore weeds, insects and pests of today have a very high probability of turning into Frankensteins of Biotechnology. Mankind eventually has to pay the stakes of tampering with mother nature.

According to the US Academy of science guide, Field Testing Genetically Modified Organism, the probability of creation of the super weeds is highest in Asia and South America, thus the stakes of introducing transgenic varieties are highest in these regions.

'The genetically engineered seeds have a 'jumping gene', i.e. a gene may remain recessive for say fifteen years and may become dominant suddenly. Therefore the true impact of the bio tech seed can be seen after a very long time' (Consultation with Dr. Shahid Zia).

The transfer of engineered traits into related species takes place not only in plants but in all the organisms. For example, in late 1950s Nile Perch was introduced into Lake Victoria in East Africa to increase fish production. In the early 1980s Nile Perch took over, Lake Victoria. This example shows that the adverse and threatening impact of the biotechnology on biodiversity and genetic erosion are visible in the long run, though there may be GEOS, which may never threaten the ecosystem. But in the 1992 Rio conference on Environment and Development, the 'proposed precautionary' principle demands that if there is a threat of grave or immutable damage to the environment, measures should be taken even before they are fully proven by scientific evidence.

4. Pakistan and PBR

Since Pakistan is a member[20]of WTO, so it has to develop a Plant Patent Rights law or a Plant Breeder's Rights (PBR) Act. The Federal Seed Certification & Registration Department has the responsibility of developing a *sui generis* system for formulating and implementing PBR laws. Pakistan finds Plant Breeder's Rights more appropriate for protection. Where as in United States the plant varieties are given double protection. For a comparison[21] between the two kinds of rights is given as follows:

Comparison between protection by patent and protection by plant breeders, rights

Kind of protection	Patent Protection	Plant Breeders' protection
I. Object of protection	(Industrial protection)	Plant variety protection Act
II. Requirement for protection 1. Documentary examination 2. Field examination 3. Plant material for testing 4. Conditions for protection	 Required Not required Not required (may be deposited.) a) Novelty b) Industrial applicability c) Unobviousness (inventive step) d) an enabling discourse.	 Required Required Required a) commercial novelty b) distinctiveness22 c) uniformity23 d) stability24 e) an appropriate denomination.
III. Scope of protection 1. determination of scope of protection. 2. Use of a protected variety for breeding further varieties. 3. use of propagating material of the protected variety grown by a farmer for subsequent planting on the same farm.	Determined by the claims of the patent May require authorization of the patentee May require the authority of the patentee	Fixed by the national legislation (by the UPOV Convention in case of UPOV member States). Does not require authorization of the right holder (research exemption) Does not generally require authorization of the right holder
IV. Variety Denomination	Not required	Required
V. Term of protection	20 years from date of application.	18 years for trees and vines, 15 years for other species, from date of grant (increased respectively to 25 years and 20 years in the 1991 Act)

Moreover, Plant Breeders' Rights (PBRs), do not require ownership of germ plasm in the seeds, they only give monopoly rights over the selling and marketing of a specific variety. Patents on the other hand, permit multiple claims that may cover not merely entire plant but plant parts and processes as well. Thus, Patents are the hardest kind of IPR protection and they, as such protect neither the people nor local knowledge system. According to Anthony Diepenbrock

20 Pakistan became a member of GATT in 1948.
21 Source: Intellectual Property Rights (1998), Government of Pakistan, Federal Seed Certification & Registration Department.
22 Distinctness simply means that a variety, say of rice, is different from any other variety.
23 Uniformity means that all plants in question should display the same characteristics.
24 Stability means that the variety, say of rice, should display the same characteristics in each generation.

> *"You could file for protection of a few varieties of crops, their macro-parts (flowers, fruits, seeds and so on), their micro-parts (cells, genes, plasmids and the likes) and what novel process you develop to work these parts, all using one multiple claim".*

The CBD

- Requires signatories to protect and promote the rights of communities, farmers and indigenous peoples vis-à-vis their biological resources and knowledge systems (Art. 8j and 10).
- Asserts that intellectual property rights must not conflict with conservation and sustainable use of biodiversity (Art 16.5).

Strict laws should be made against bio piracy and adverse impact of transgenic varieties of seeds on human health and environment. The chapter 2.2C of the proposed PBR Act, states:

"A new plant variety, which is a genetically modified variety or transgenic plant, shall not be eligible for protection in other words commercial privileges, unless:,

iii) the owner of the genetically modified or new transgenic variety will provide in writing, along with application for plant breeders rights to pay compensation for hazards and damages shall be decided by the Bio-safety Committee."

Patent infringement litigation costs US$1 million in the US and $600,000 in Europe (GRAIN issue 3 1998). Pakistan hasn't yet decided about the infringement litigation costs.

At the global level, the most conspicuous platforms, where the issue of farmers' rights is heard, are the Food and Agriculture Organization (FAO)[25] and the Key Stone Dialogue.[26] At the local level, communities all over the world including Asia, Africa and Latin America are taking steps to save and regenerate their native seeds. For example, in India, Navdandya, a native seed conservation network, has been set up. In Pakistan, SAAG provides the platform for the protection of farmers' rights.

The Third World Network and African countries are against the patenting of seed, where as the SANFEC is asking for the elimination of PBR altogether, from TRIMS. Pakistan should join hands with these organizations at International forum to prevent its future from the dominance of the North. The developing countries are asking for an extension of the implementation of the PBR till 2004. The article 27.3b is being reviewed in November 2001, it should be revised in the light of the CBD, the Undertaking and national processes which are vocalizing the concept of "collective intellectual rights" of which farmers rights are the sub category, appropriate to agricultural biodiversity. By the end of the year we'll come to know if the LDCs will be able to turn the tables or it will result in stronger IPR obligations. In the North none of the farmers are marginal and can easily purchase high priced seeds.

Article 2 of TRIPS permits the exclusion of patents on life on ethical and ecological grounds. Therefore, WTO is obliged to listen to the views of the diverse groups before implementation of TRIPS.

25 Food and Agriculture Organization (FAO), International undertaking on Plant Resources, DOC C83/II REP/4 and 5 Rome, Italy,1983: Shiva (1998).

26 Keystone International Dialogue on Plant Genetic Resources, Final consensus Report of Third Plenary Session, Keystone Center, Colorado, May 31-June 4.: Shiva (1998)

An overview of some key provisions of the UPOV acts of 1978,1991 and Pakistan PBR Act, of 1999 is given in the following table.

Overview of some key provisions of the UPOV Acts of 1978, 1991 and Pakistan PBR, 1999.

Key provisions	UPOV 1978	UPOV 1991	Pak. PBR 1999
Breeder's exemption	Included	Included	Included
Principle of essential derivation	Not included	Included	Included
Scope of protection	Only traded material	All materials +harvested product +end product (optional)	Only traded material
Farmer's Privilege	Farm Saved Seed not under scope of PBR	Included	Farmers can save, exchange and share seed
Number of species to be protected	Minimal 24	All	No restrictions
Duration of project	15-18 years	20-25 years	20-25
Double protection (e.g. PBR and patent)	not possible	Possible	Not possible

5. Conclusion

Seed is considered to be a relatively low cost input, because farmers usually sow their own saved seed and purchase seed once in three to five years. Well over 130 countries are signatories to CBD and TRIPS, which have contradictory objectives. As seed and chemical companies have merged, investment in biotechnologies has widely increased. The hybrid and transgenic seeds do not have regenerative abilities. They have also increased the dependence of inputs, increased cost of production and hence sharply reduced profit margins of the farmers, 'who are the poorest of all the labor force' [Hafiz (1993): Chaudhry (1999)]. The notion of 'Trade Liberalization' is actually a mockery of 'Free Trade', which strengthens the monopoly powers of the MNCs and undermines economic development of LDCs.

The investment in mutation breeding research in Pakistan is not adequate to keep up with the pace of research in rest of the world.

The wheat and paddy seed supply concentrates in public sector. The profit margins in cotton are the highest, therefore cotton- seed market is competitive, and 49 local seed companies supply 19.37% of cotton-seed in Punjab. The public sector supplies 13.07% and Monsanto supplies 1.38% of cotton-seed in Punjab. The MNCs have monopoly in the supply of sunflower seed (77.15%) and shall create monopolies in the supply of the seeds of maize, fodder and forages in short run.

The PBR will give monopoly powers to the breeders of national and multinational companies and thus enhance the pace of bioprospecting. So, after implementation of the PBR Act, the cost of seeds is expected to rise to such an extent that poor farmers won't be able to purchase seeds, let alone the purchase of other inputs. Thus, the coming years would bring dramatically devastating changes in the global agricultural sector in general and the third world agriculture in particular. Since, most of the LDCs have agricultural economies, a depression in agriculture will be synchronized, first in the other sectors of LDCs and then all over the world.

6. Recommendations for Pakistan

1. In the National Seed Policy:
   - Importance of indigenous crop varieties should not be ignored and attempts be made to retreat and conserve them.
   - Importance should be given to research on strengthening fecundity of seed of local crop varieties.
2. District-wise community seed banks should be made possible to save local seed and encourage farmer's traditional saving, sharing and exchanging system.
3. The PBR Act should be;
   - Made in accordance with the Convention on Biological Diversity (CBD).
   - Farmers friendly and protective of their rights.
   - Close to our realities and limited IPRs may be given to breeders
   - Enacted after proper consultation with all the interest groups, especially the farmers.
   - Prepared carefully and pressure in this regard be avoided. More time may be secured from the WTO for consultation.
4. In our country, farmers' union, especially of small farmers, is lacking due to which they are loosing their inherited traditional knowledge and have become dependent on a few companies. Attempts should be made to get farmers organized and local knowledge based Agricultural Systems encouraged for sustainable agriculture in Pakistan.

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Reviewer's comments

No. F-2-1/D (FSC&RD)/ PA
GOVERNMENT OF PAKISTAN
FEDERAL SEED CERTIFICATION REGISTRATION DEPARTMENT
(MINISTRY OF FOOD, AGRICULTURE & LIVESTOCK)

Mauve Area, G-9/4,
Islamabad, the 18th November. 2000.

SUBJECT: *PAKISTAN IN THE GLOBAL SEED POLITICS*

It refers to the report on "Pakistan in the global seed politics" prepared by Ms. Nusrat Sultana Chaudhry, Sustainable Agricultural Programme, SDPI, Islamabad. The researcher has highlighted that high yielding varieties of seeds provided basis for green revolution, also there were heavy investments on tractors, tube wells, fertilizers and pesticides etc. According to the researcher, the high yielding varieties increased the cost of production and had been proved harmful for the farming community in general and small farmers in particular. These modern inputs, according to the report, are causing global warming, environmental pollution and putting human health and environment in jeopardy.

The undersigned is of the view that the researcher seems to be highly influenced by WTO activist, i.e. Dr. Vandna Shiva from India. It is practically impossible to feed the exploding population with conventional agriculture. High yielding varieties of cereals have been developed especially through the addition of triple dwarf gene. This breeding achievement has made modern varieties responsive to irrigation, fertilizers, which are expected to bring food prosperity to the modern world.

Regarding hybrid seed, it has broken the practice of using the seed as food grain rather it has brought revolution in maize production. Farmers are approaching the multinationals for hybrid maize for commercial cultivation due to its 3 to 4 times more production as compared to open-pollinated varieties.

Regarding monopolistic approach of multinational seed companies, it may clearly be demonstrated that multinationals, no doubt have established their programme for high marginal profits but simultaneously, are bringing in new technology, generating employment and creating competition between public and private sectors. The situation in Pakistan is totally changing and about 331 national seed companies have started functioning and are giving tough time to the multinational seed companies. If parental lines and technology from public research institutes are made available to the national seed companies, it will boost up hybrid seed production and will consequently diminish the monopoly of multinational companies.

Due to non-existence of major competition between public and private sectors, the commercial crop varieties and genetic resources were not given much importance but now in the new scenario of WTO and TRIPS agreement, all the innovations or existing genetic resources are becoming commercial entities.

It will lead to more dedicated efforts and commitments on the part of scientists, local communities and policy makers to encourage the innovators, creators or developers for better inventions and communities

will not be deprived of benefit due to scientific pursuits. Anyhow, the report has highlighted and pointed out that FSC&RD has developed a draft on the plant breeders' rights (PBRs), which is more flexible and appropriate for developing countries. It has provisions for using protected varieties for breeding purposes by the breeders and saving of seed of protected varieties by farmers for use in subsequent years without seeking the authorization of the owners. It will not only restrict the monopoly of multinational seed companies but will also help generate revenue by our public research institutes.

Regarding the Convention on Bio-Diversity (CBD), all proposals indicated by the author have been taken into consideration by the new draft of legislation on Access to Biological Resources and Community Rights. The recommendations of the author regarding indigenous crop varieties have been included in the draft PBRs law. Farmers rights have been given due share in the proposed draft law.

It can be concluded that the report is very critical and analytical in highlighting all relevant issues under the TRIPs and the CBD and may provide quite a sound basis for the policy makers in developing strategies dealing with issues under the scenario of WTO.

This issues with the approval of Director General.

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