DEVELOPING COUNTRIES AT THE INTERNATIONAL CROSSFIRE OF GMO REGULATION: THE CASE OF FORMER SOVIET COUNTRIES

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List of used abbreviations

AIA – Advance Informed Agreement

CIS – Commonwealth of Independent States

CBD – Convention on Biological Diversity

FFP – food, feed, and processing

GATT – General Agreement on Tariffs and Trade

GEF – Global Environmental Facility

GMOs – Genetically Modified Organisms

GURTs – Genetic Use Restriction Technologies

LMOs – Living Modified Organisms

MEA – multilateral environmental agreement

SDT – Special and Differential Treatment

SPS – Agreement on the Application of Sanitary and Phytosanitary Measures

TBT – Agreement on Technical Barriers to Trade

UNEP – United Nations Environment Program

WTO – World Trade Organization

Introduction

While biotechnological achievements in industry and medicine is widely accepted and deployed, GMOs as agricultural application of biotechnology have spawned high polarization and dichotomy of views among countries. The potential benefits and perceived threats pertaining to GMOs still need to be substantiated by conclusive scientific evidence. However, one discernible fact about GMOs is that the developing countries will be affected by both type of consequences the most; being either the "main beneficiaries" or the "main losers"[1].

Trapped between the developed countries favoring free trade and economic interests on one end and preferring precautionary attitude towards possible risks on the other end of the spectrum, the developing countries either embrace one of these approaches towards GMOs or adopt a "wait and see" attitude to be able to hedge their bets[2].

However, unlike developed countries that enjoy wide discretion when choosing the favorable GMO regulatory schemes and are capable of taking into consideration their national interests and concerns, the developing countries are often deprived of the options due to deficiency of scientific, technical, administrative and other resources. Moreover, bilateral pressures in the form of technical assistance and food aid are being misused by the industrialized countries to influence the adoption of desirable regulatory frameworks in developing countries. The resulting GMO policies, thus, fail to meet the unique needs and interests of these countries[3].

The ambivalence of the international rules regulating the trade in GMOs which provides further freedom for developed countries to advance their interests[4], adds complication to the vulnerable situation of the developing countries. The compromises achieved during the negotiations of the Biosafety Protocol[5] render it practically impotent to effectively regulate the trade in GMOs coupled with the lack of effective dispute resolution mechanism under its auspices[6]. The pertinent mechanism under the WTO, the organization with the major mission to facilitate free trade, fails to address the environmental concerns and accommodate the interests of developing countries[7], including those which emerged as the result of the Soviet Union's dissolution two decades ago.

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[1] S. Zarrilli, 'International Trade in GMOs and GM products, National and Multilateral Legal Frameworks', (2005), Policy issues in international trade and commodities study series No. 29, UNCTAD/ITCD/TAB/30, iii, 2

[2] R. B. Stewart, 'GMO Trade Regulation and Developing Countries, (2009) 2009 Acta Juridica 320 2009, 332, 364

[3] M. Akech, 'Developing Countries at Crossroads: Aid, Public Participation, and the Regulation of Trade in Genetically Modified Foods', (2005-2006), 29 Fordham Int'l L.J. 265 2005-2006, 271, 288-291

[4] Ibid. 284

[5] Cartagena Protocol on Biosafety (hereinafter "Biosafety Protocol"), 2226 U.N.T.S. 208; 39 ILM 1027 (2000); UN Doc. UNEP/CBD/ExCOP/1/3, at 42 (2000), < http://bch.cbd.int/protocol/> accessed 21 February 2013

[6] D. Smits and S. Zaboroski, 'GMOs: Chumps or Champs of International Trade?', (2001), 1 Asper Rev. Int'l Bus. & Trade L. 111 2001, 137

[7] See M. Akech, supra note 3, 265-266

The discussions about Russia's WTO membership after 19 years long negotiations in summer of 2012 were more fervent than ever as the environmentalist groups and public started to express concerns about the future status and regulation of GMOs in this country after joining the major trade organization of the world. It was feared that WTO membership would force Russia to open its markets to GM products[8]. Moreover, large multinational biotechnology corporations which see a great potential in post-Soviet country markets for their GM products have been actively launching and enhancing their businesses in the region[9].

In light of these events, it seems useful to analyze the existing biosafety schemes and regulatory frameworks of GMOs in Russia and other former Soviet countries, examine the mutual influence of these policies on the one hand and obligations under the main GMO international regulatory mechanisms on the other, ascertain the main characteristics pertaining to developing countries in this field and identify similarities, differences and unique features in the situation of former Soviet countries in relation to other developing countries.

Hence, the thesis attempts to answer the questions how GMOs are regulated in former Soviet countries, how obligations under main international regulatory mechanisms influence their GMO policies and which solutions exist for these countries to develop independent and favorable GMO regulatory mechanisms.

To answer these questions, this thesis will rely on desk research. Despite being relatively new topics, GMOs and their international regulation, as well as developing country GMO policies have been sufficiently researched in the last decade. Nevertheless, their regulation in former Soviet countries has not been touched upon in legal literature. While the analysis of international and developing countries GMO regulatory mechanisms in this thesis will mostly rely on early academic researches, the study of the GMO regulatory frameworks in post-Soviet countries will therefore mainly stem from news, articles, academic opinions and discussions in internet sources, to the extent that these have been deemed by the author to be sufficiently reliable sources.

The thesis is structured as follows. Chapter I of the thesis offers a brief historical overview of agricultural biotechnology and GMOs, potential benefits and perceived threats thereof, and the analysis of the underlying reasons of concerns in relation to them. Chapter II discusses the existing international trade regulatory mechanisms of GMOs, in particular the creation and evolution of the Biosafety Protocol and the WTO agreements which is substantial in appreciating the relationship and consistency between these two mechanisms. Chapter III examines the characteristics of GMO regulatory frameworks and policies, as well as the factors influencing their development in developing countries, focusing mainly on former Soviet countries before concluding with some recommendations on the challenges encountered by them in the process of development of GMO regulatory frameworks.

[8] "Russia needs to defend itself against WTO's GMO", 19 November 2012 <http://english.pravda.ru/russia/economics/19-11-2012/122848-russia_gmo_wto-0/> accessed 16 March 2013

[9] V. Vorotnikov 'People: Monsanto announce new head of business' (1 October 2012) <http://www.allaboutfeed.net/Process-Management/General/2012/10/People-Monsanto-announce-new-head-of-business-1076095W/> accessed 16 March 2013

Chapter I Brief overview of GMOs

1. Brief insight into the history of GMOs

The term "biotechnology" coined by Hungarian engineer Karl Ereky in 1919[10] is defined currently as "any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use"[11].As a direct outcome of these technologies GMOs result from horizontal or interspecies modification, which is significantly different from vertical or intraspecies modification used by conventional agriculture for millennia[12]. The Directive on Deliberate Release construes a GMO as "an organism, with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination"[13]. While biotechnological accomplishments in the field of industry and medicine are often widely accepted, its applications in agriculture and food production is fervently debated and mostly opposed[14].

Plant species we use today are a far cry from their wild relatives owing to plant breeding methods harnessed by farmers for several thousand years. Not sufficiently aware of the scientific principles of these methods, they have developed modern crops by transferring selective traits in order to get larger seeds, sweeter fruits and faster growth[15]. The traditional techniques for self-pollinating and cross-pollinating plants were radically improved by farmers after "founding father of genetics" Gregor Mendel (1822-1884) revealed his discovery regarding dominant and recessive alleles[16]. Plant breeders were constantly in search of new traits and variations in order to combine them with future generations[17]. The tissue culture cloning technique[18] developed in 1950s and mutation breeding[19] introduced later are

[10] R. Cunningham, 'The ABC of GMOs, SPS & the WTO: An analysis of the application of the Agreement on Sanitary and Phytosanitary Measures within the context of biotechnology and international trade', (2005), 9 S. Cross U. L. Rev. 19 2005, 21

[11] Convention on Biological Diversity (hereinafter 'Biodiversity Convention'), (1992), 1760 UNTS 79; 31 ILM 818, < http://www.cbd.int/convention/text/> accessed 21 February 2013, at art 2

[12] See D. Smits and S. Zaboroski, supra note 6, 112

[13] Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC, (2001), at art 2.2

[14] See S.Zarrilli, supra note 1, 1

[15] History of Genetically Modified Organisms, (2012) <http://www.gmcrops.ewebsite.com/articles/history.html > accessed 19 February 2013

[16] Genetic History. Gregor Mendel's Discoveries: Why was Mendel so successful? <http://library.thinkquest.org/C0118084/History/Mendel.htm > accessed 19 February 2013
However, it took almost 35 years until Mendel's findings were appreciated and deployed after William Beatson who was a don at St. John's College, Cambridge, accidently ran into several references simultaneously on Mendel's work, rediscovered him and introduced to the world. R.M.Henig "Monk in the Garden", (2000), Houghton Mifflin Company, Boston, New-York.

[17] See History of Genetically Modified Organisms, supra note 15

[18] This technique involves removing a tissue from a parent plant, disinfecting it and placing it into an artificial and fertile medium where its growth is monitored and its favorable features are identified and manipulated.< http://www.bbc.co.uk/schools/gcsebitesize/science/aqa_pre_2011/evolution/reproductionrev4.shtml> accessed 17 March 2013

regarded as "conventional" breeding practices which rely on generating mutations for developing new traits. Unlike the former method the latter involves treating plant parts with radiation in order to generate mutation[20]. In fact, every plant variation is the result of mutation implying a change in the DNA expressed in the performance of the gene which entails potential for example for inducing a number of diseases, but also for being resistant to diseases[21].

Discovery of the molecular structure of DNA in 1953 by Watson and Crick paved the way for genetic engineering introducing new opportunities deemed unimaginable until then, such as adding, deleting or inactivating genes from cells, as well as transferring genes from one species to another. Although animals and plants have long been evaluating separately, transgenic technologies allowed to combine their genes in order to achieve desirable traits[22]. In 1973 biochemist Boyer and geneticist Cohen presented the DNA cloning technique, known *inter alia* as "gene splicing", "genetic engineering" or "molecular cloning" facilitating integration of a foreign piece of DNA into bacteria's genome. The creations which they called "chimeras" expressed newly inserted genetic traits. The same technique was used later by Boyer to develop Humulin – the first GM drug administered to millions of people in the world today[23].

The first generation of GM plants, comprised of soybean, maize, cotton and canola, was characterized by pest resistance and herbicide tolerance. Soil bacterium *Bacillus thuringiensis* or "Bt" was the first pest resistant gene that was applied to furnish corn and cotton crops resistant to insects by producing toxic proteins[24]. In contrast to pest resistance and herbicide tolerance which are defined as "input traits", the development of the second generation of GM plants focuses upon "output traits", such as enhanced nutrition, better taste and longer shelf life[25]. Zarrilli characterizes "input" and "output" traits respectively as "agronomic" and "quality" traits predicting the latter's capability to benefit apart from producers the consumers as well[26].

The bright red and slower ripening "Flavor Savor" tomato introduced in 1992 was the first commercially grown GM food receiving the license from the US Food and Drug Administration for human consumption[27]. As biotechnology advanced and became widespread starting to attract more media attention, the public attitude towards GMOs became

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[19] In mutation breeding mutants with favorable characteristics are achieved through exposing plant's parts to radiation and chemicals. Through this method 2540 plant varieties were introduced between 1930-2007. <http://en.wikipedia.org/wiki/Mutation_breeding> accessed 17 March 2013

[20] B. Glass-O'Shea, 'The History and Future of Genetically Modified Crops: Frankenwoods, Superweeds, and the Developing World', (2011), 7 J. Food L. & Pol'y 1 2011, 5

[21] Kevin M. Folta, 'Atomic Gardening – The Ultimate Frankenwoods' (2012) <http://www.science20.com/kevin_folta/atomic_gardening_ultimate_frankenfoods-91836> accessed 19 February 2013

[22] Francis Crick & James Watson: DNA <http://www.essortment.com/francis-crick-james-watson-dna-40207.html> accessed 19 February 2013

[23] See B. Glass-O'Shea, supra note 20, 8

[24] Ibid.

[25] See R. B. Stewart, supra note 2, 323

[26] See S. Zarrilli, supra note 1, 1

[27] See D. Smits and S. Zaboroski, supra note 6, 112

warier developing rational and sometimes irrational concerns. While fears at the other side of the Atlantic were pacified by regulatory authorities who were insistently propagating GM products as safe, skepticism and vigilance was growing in the EU and other countries[28] propelling the development of precautionary regulations towards them. This has resulted in radically irreconcilable legal strategies between the EU and the US who are regarded as "two principal protagonists of world trade"[29].

Despite being involved in the WTO trade dispute which will be discussed in a subsequent Chapter in detail over moratoria on the approval of new GM varieties, the EU adopted GMO labeling and traceability regulations. In the US regardless of 94% of the citizens being in favor of labeling of GM foods, the regulating authorities regard labeling as promoting "unwarranted suspicion without providing any useful information" and argue that people naturally assume that strict regulation implies less safety. Although they prefer a "less regulating and more educating" approach, in 2005 two-thirds of the US consumers were unaware of the presence of the GMOs in the US food markets albeit having had them in the US food supply since 1996[30].

However, the risk-averse countries are accused of neglecting the risks of over-regulation against the risk of technology itself, since every technology implies risk of some degree[31]. Although in 2010 after seven-years of approval process the EU approved a potato intended for industrial use (not for human consumption) which is its second-ever GM crop, 70% of the EU citizens are still against embracing the GMOs[32].

2. Potential effects of GMOs

The "input" and "output" traits of GMOs are among the most cited potential benefits. While the former involves the genetical alteration of crops to render them resistant to pests, herbicides, drought, frost, extreme heat, poor soil, diseases, consequences of climate change and increasing their agricultural benefits by enhancing productivity and cutting down expenses, the latter deals with improving the nutritional, medical and vitamin characteristics of GM food[33]. By reducing pesticide and chemical use, promoting low-till or no-till agriculture, limiting agricultural clearing by enhancing productivity and reducing greenhouse gas emission[34] and decreasing contamination, refilling the rare living resources[35] the potential environmental advantages of GMOs are expected to be appreciable.

The GM crops are claimed to have the potential to be "an answer to world hunger problems" considering the food shortage in some developing countries and predictions that

[28] A. Scuro, 'Are GMOs Good or Bad Seeds in the Developing World?: A Discussion of the Growing Role of Developing Countries in the Debate over Climate Change and the Loss of Biodiversity', (2006-2007), 18 Fordham Envtl. L. Rev. 369 2006-2007, 382
[29] L.B. de Chazournes, M.M.Mbengue "GMOs and Trade: Issues at Stake in the EC Biotech Dispute" (2004) RECIEL 13 (3) 2004. ISSN 0962 8797, 289
[30] See B. Glass-O'Shea, supra note20, 16-17
[31] Ibid., 32
[32] Ibid., 20
[33] See R. B. Stewart, supra note 2, 323
[34] Ibid., 323
[35] See D. Smits and S. Zaboroski, supra note 6, 113

for the next 30 years population of the world will increase by 100 million people per year[36]. Nutritionally enhanced GM crops, such as "Golden Rice", capable of producing beta-carotene (dietary precursor of vitamin A), deficiency of which causes approximately 250 000–500 000 children to go blind every year promises to be an effective solution to this problem in impoverished regions of the world. As such, GMOs are required to be considered "in larger context of the global commitment to fighting hunger and poverty" in the world[37].

Threats to human health can be posed by accidental transfer of allergenic genes into other species (e.*g.*, when an allergenic Brazil-nut gene was transferred into a transgenic soybean variety, although in the case, it was discovered at a testing phase). Forbidden GM products may end up in food chain as well, as in the case of GM maize variety Starlink designed as an animal feed - albeit accidentally - used in human food[38]. In response to concerns to human health, it is argued that in the US where GM food is consumed in high levels (GM components contain almost 70% of processed food) no single case of damage to human health has been registered. According to the National Academies of the US, mutation breeding, rather than gene engineering deploying relatively more precise methods, represents "the most disruptive method of crop development"[39].

"Gene flow" as one of the putative risks posed by GM crops has existed prior the advent of biotechnology presenting problems for traditional agriculture in the form of excess weediness or "genetic swamping" (when a wild plant is threatened to be replaced by a hybrid one). However, the possibility of development of "super weeds" as the result of an herbicide-resistant gene finding its way into weed plants is not excluded[40]. One commentator claims that crop diversity can be affected adversely if GM technology pursues the "Green Revolution; s" [41] way by favoring few enhanced crops over numerous locally developed plants[42]. However, even conventional agriculture is capable of damaging biodiversity through agricultural clearing or intense tilling practices. After all, mankind's food acquiring process is "almost always an ecologically demanding endeavor"[43].

In addition, there is a growing concern in light of the climate change and global warming due to its "double-edged nature" since it can disturb biodiversity itself on the one hand, and facilitate utilization of biotechnology and other practices which might prove to be a non-sustainable method of development and further impair the ecosystem on the other hand[44].

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[36] Ibid. 113
[37] See B. Glass-O'Shea, supra note20, 3, 28
[38]Food and Agriculture Organization of the UN ' Weighing the GMO arguments: against' (2003) <http://www.fao.org/english/newsroom/focus/2003/gmo8.htm> accessed 27 February 2013
[39] See B. Glass-O'Shea, supra note20, 11
[40] Ibid., 13
[41] 'Green Revolution' refers to a period between 1950-1990 when agricultural production in developing countries, such as Mexico, Philippines, and China tripled due to an increased application of water, capital, pesticides and chemicals which called into question its sustainability. Ibid., 7
[42] See B. Glass-O'Shea, supra note 20, 14
[43] Ibid., 12
[44] See A. Scuro, supra note 28, 374, 393

Notwithstanding an unconvincing research and divergence of opinions among scientists on these risks, it is believed that once these genes are released, it will be an irreversible act with unfathomable consequences[45].

3. Origins of fears concerning GMOs

With regard to controversies surrounding GMOs and fervent and deeply-polarized debates over them, it is claimed that GMOs "have excited more concern and conflict than any new technology since nuclear power" and that a complicated set of historical, economic, cultural and political factors contribute to the development of diametrically different attitudes toward them"[46].

One commentator asserts that national differences and diverse cultures' respective attitudes toward food lie at the heart of the concerns regarding GMOs. While reliable and safe food supply has induced wars over domestic soil in Europe and in some developing countries in the not so far past, North America has not experienced such wars for more than a century. The EU's food system was further blighted by calamities, such as "mad cow" disease which did not afflict the food system of North America. The mentioned factors have contributed to the development of different approaches between European and American consumers making the former more attentive and vigilant to the supply of stable and safe food. Cultural divergence between nations further reinforces the opposed perception of risks and tastes of food. For instance, while making cheese from unpasteurized milk in the Netherlands is perfectly acceptable, the same practice is regarded as unfit in France[47].

Throughout history mankind has been prone to take new foods and novel ways of producing them with a pinch of salt. It was the case with the potato brought from South America to Europe, used as an ornamental plant for 250 years and linked to numerous diseases such as tuberculosis, cholera and leprosy until being accepted as valuable food in diet[48]. Alternatively, had people followed Johnny Appleseed (John Chapman), propagating grafting – bringing together preferable fruit tree part with growing part of other tree – as "wicked" and "unnatural", mankind would be deprived of copious valuable fruit assortments that it enjoys today[49].

Recent research has proved that even conventional crops are capable of generating negative impacts on human health. Although crops resulting from tissue culture cloning and mutation breeding discussed above are not imposed with stringent governmental regulation and are considered "traditional", they, in particular mutation breeding "may cause more

[45] D.Roberts "GMO technology – a gentle gene or a tyrant?" Washington State University < http://county.wsu.edu/spokane/agriculture/biotech/Documents/GMO%20Technology%20%20a%20gentle%20genie%20or%20a%20tyrant.pdf>accessed 24 March 2013
[46] See R. B. Stewart, supra note 2, 326
[47] See D. Smits and S. Zaboroski, supra note 6, 118
[48] See B. Glass-O'Shea, supra note 20, 3-4
[49] Ibid. 4

extensive changes to a plant's genome than genetic engineering"[50]. The toxic Lenape potato withdrawn from cultivation due to high concentration of the neurotoxin solanine is an illustrative example. Moreover, crops, such as corn, when exposed to pests are capable of producing toxins, which in their turn can lead to cancer or neural diseases upon consumption[51].

Surprisingly, while people do not hesitate to expose themselves to multifarious kinds of risks of everyday life (such as consuming alcohol, tobacco or high-fat food, driving cars), they perceive food risks differently considering food sacred and refuse to accept the scientific tampering with it as ethical[52].

Moreover, distrust in large biotechnology corporations is one of the major factors in opposition to the foods they produce. Entrusting GMO corporations to conduct and finance tests (in particular, on rats and other animals, rather than on people) on health and safety issues of GMOs renders them implausible, comparing it to a situation when "kids are guarding the cookie jar"[53]. In addition, these tests do not cover the long-run effects of GM products since they need to be "consumed long enough to fully realize the long term consequences"[54].

The advent of Genetic use restriction technologies (GURTs) or terminator technologies has reinforced the skeptical sentiments towards biotechnology companies. The term "terminator technologies" was coined by Pat Mooney – an opponent who succeeded in attracting the public and media attention towards these technologies. In 1998 The United States Department of Agriculture and major seed company in the US - Delta and Pine Land obtained a patent for a technique enabling to control genetic traits between generations: the ability of switching on and off particular traits includes also furnishing the seed sterile so that replicating genetic material becomes infeasible. Thus, the farmers are obliged to purchase new seeds from the seed company every year which may have severe consequences for developing world subsistence farmers[55].

Luttwak claims (as cited by Smit and Zaboroski) that "completely self-serving" large multinational corporations which are not "moral creatures" cannot be expected to evaluate the effects of GMOs objectively. As Smit and Zaboroski state:

"Only a considerable crisis, either associated with trade, health, safety, or public relations, will motivate stakeholders to turn away from GMOs. Until that time, it is probably safe to say that the pursuit of the normalization of GMOs will increase"[56].

[50] Ibid. 4-5
[51] Ibid.
[52] See D. Smits and S. Zaboroski, supra note 6, 118
[53] Ibid. 115, 118
[54] Ibid.
[55] G.Gutfield, 'Should we regulate biotechnology through the patent system? The case of terminator technology', 'The Regulatory Challenge of Biotechnology. Human Genetics, Food and Patent' (2006), Edward Elgar, Cheltenham, UK Northampton, MA, USA
[56]See D. Smits and S. Zaboroski, supra note 6, 120

It is argued that the biotechnology industry which had a "poor start" has not only treated farmers incompetently by not providing them with the promised advantages, but has also pursued a flawed market strategy through neglecting the significance of education and communication of potential benefits of GM products to consumers[57].To conclude, this Chapter has attempted to introduce a short excursion into the history and development of GMOs and agricultural biotechnology, to highlight promised benefits and perceived risks pertaining to them and to analyze the underlying fears connected with this new technology. It was concluded that although being not the most risky method, agricultural biotechnology and GMOs are strongly opposed as with all novel ways of food acquiring, since people often find it difficult to regard tinkering with food as ethical.

Chapter II International regulatory mechanism of GMOs

The Cartagena Protocol on Biosafety and pertinent WTO agreements are major international mechanisms regulating trade in GMOs. This Chapter will analyze in particular the creation and evolution of these mechanisms, which is relevant for appreciating the relationship and consistency between them.

1. Cartagena Protocol on Biosafety

In May 1992 while the public and media attention was mainly focused upon negotiations of a UN Framework Convention on Climate Change, parties were negotiating the provisions of the UN Convention on Biological Diversity at a distant location in Nairobi, Kenya[58]. The Biodiversity Convention was adopted almost at the same time with the Rio Declaration on Environment and Development. It comprises of 193 Parties so far[59]. It declares its main objective as "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources"[60]. The Article 19.3 of the Biodiversity Convention addressing Parties to "consider the need for and modalities of a protocol setting out appropriate procedures, including, in particular, advance informed agreement, in the field of the safe transfer, handling and use of any living modified organism resulting from biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity"[61] led to the development of the Cartagena Protocol on Biosafety[62].

Divergence of opinions among Parties on a variety of issues ranging from the role of the precautionary principle, commodity coverage to relationship between the Protocol and WTO agreements resulted in five-years of intense negotiations leaving even the last meeting held in 1999 in Cartagena, Colombia without outcome. The meeting in Montreal in January 2000,

[57] Ibid. 145-147
[58] See A. Scuro, supra note 28, 388
[59] List of Parties to CBD < http://www.cbd.int/convention/parties/list/> accessed 21 February 2013. Major GMO exporters, such as Argentina, Canada and the US are not parties to the Protocol.
[60] See Biodiversity Convention, supra note 11, at art 1
[61] Ibid. at art 19.3
[62] See Biosafety Protocol, supra note 5

however, resumed the Cartagena negotiations and reached an agreement which was largely attributable to the changing attitudes towards GMOs during a year which was characterized by more rigorous regulations and policies addressing them[63].

The lengthy and complicated negotiations in Montreal were largely ascribed to five negotiating blocs who were often failing to concede[64]. The Miami Group consisting of major agricultural exporters, such as Argentina, Australia, Canada, Chile, the US and Uruguay were trying to propel less restrictive regulations governing LMOs[65] and prevent the Protocol from establishing protectionist measures. Since the US who failed to ratify the Biodiversity Convention[66] was unable to speak or vote in the negotiations, it largely depended on Miami Group members to advance its interests[67].

The EU represented at high level by the EU Commissioner on the Environment Margot Wallsröm and ten environmental ministers of the EU member states constituted another group determined to reach an agreement on LMO's since the potential risks presented by them had generated tremendous concerns in the EU[68].

The Like-Minded Group composed of most developing countries denoting their commitment to protect environment from risks posed by GMOs since they possessed most of the planet's biodiversity, Compromise Group including Japan, Mexico, Norway, Singapore, South Korea, Switzerland and New Zealand seeking to achieve consensus among parties and Central and Eastern European Group composed of Russia, other post-Soviet and Eastern European countries demonstrating moderate stance during negotiations were the other blocs that emerged during the negotiations[69].

The relationship of the Biosafety Protocol with WTO agreements and the inclusion of the precautionary principle were conceivably "linked in a compromise" at the end of the negotiations. Thus, despite the EU's opposition, the Miami Group succeeded in the inclusion of the "savings clause" into the Biosafety Protocol, preventing it from prevailing over WTO agreements, which was described by the EU as "a back-door effort to send disputes to the WTO". At the meantime, the Miami Group was forced to concede encountered by the situation where all other four groups intensively endorsed the inclusion of the precautionary principle into the Biosafety Protocol[70].

The Biosafety Protocol that came into force on 11 September 2003 and has been ratified by 165 countries worldwide [71] in accordance with the precautionary approach reflected in the

[63] T. P. Stewart and D. S. Johanson, 'A Nexus of Trade and the Environment: The Relationship between the Cartagena Protocol on Biosafety and the SPS Agreement on the World Trade Organization', (2003), 14 Colo. J. Int'l Envtl. L. & Pol'y 1 2003, 2

[64] See A. Scuro, supra note 28, 389

[65] The terms LMOs (Living Modified Organisms) and GMOs are used interchangeably throughout this thesis. However it is worth to note that GMOs are wider category than LMOs as they also encompass dead modified organisms. < http://bs.biosafetyclearinghouse.net/cartagenaprotocol.shtml> accessed 20 March 2013

[66] The US although being actively involved in drafting and negotiations process of the Biodiversity Convention was never party to it. The US president George W. Bush refused to sign it in 1992, however, it was signed by President B. Clinton in 1993. Nevertheless Convention was never ratified by the US Senate, See Defenders of Wildlife at <http://www.defenders.org/publications/the_u.s._and_the_convention_on_biological_diversity> accessed 21 February 2013

[67] See T. P. Stewart and D. S. Johanson, supra note 63, 11-12

[68] Ibid.

[69] Ibid. 12-13

[70] Ibid. 18

[71] Parties to the Protocol and signature and ratification of the Supplementary Protocol <http://bch.cbd.int/protocol/parties/> accessed 21 February 2013

Rio Declaration states as its objective to "contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements"[72].

As the most essential element of the Biosafety Protocol an Advance Informed Agreement (AIA) procedure stipulates that before the first shipment of LMOs destined for intentional introduction into the environment an exporter must notify a potential importer[73], in response to which the latter makes a decision based upon risk assessment[74]. The coverage of the AIA procedure, however, is relatively limited since it extends only to LMOs to be intentionally introduced into the environment, such as seeds, live fish and microorganisms[75]. As such the AIA procedure does not encompass pharmaceuticals composed of LMOs[76], LMOs in transit or intended for contained use[77].

The LMOs intended for use as food, feed or processing (FFP or commodities, such as cotton, canola or corn) are excluded from the coverage of the AIA procedure as well[78] and a country must inform other parties about its decision on the use of LMO-FFP domestically through the internet-based "Biosafety Clearing House"[79]. At the negotiation process of the Protocol it was attempted by the Miami Group to exempt LMO-FFP from the Biosafety Protocol's coverage at all under the rationale that these commodities were unlikely to affect the environment and biodiversity. They were included, however, after the EU's argument that preventing them from being released into the environment could not be guaranteed[80]. It is argued that this provision of the Biosafety Protocol is vague and needs further clarification since keeping LMOs destined for intentional introduction into the environment from LMOs intended for direct use is practically impossible[81]. Additionally, it creates "a significant and notable loophole for exporters" that can process the LMOs before exporting, *i.e.* exporting canned GM tomato or processing canola into oil[82]. This move was arguably motivated by an intention to keep away from the WTO's realm and results in a "delicate balance" between negotiating parties' interests[83]. This provision is particularly disadvantageous for developing countries, since it is feared that imported GM food might end up at developing country's agricultural system in times of food crisis and famine disturbing biological diversity of a country and adjacent regions[84].

The Biosafety Protocol also requires the LMOs intended for intentional introduction into the environment to be clearly identified[85], while the LMO-FFPs must be accompanied by "may contain" label while being shipped[86].

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[72] See Biosafety Protocol, supra note 5, at art 1
[73] Ibid. at arts 7.1, 8
[74] Ibid. at arts 10,15
[75] See T. P. Stewart and D. S. Johanson, supra note 63, 7
[76] See Biosafety Protocol, supra note 5, at art 5
[77] Ibid. at arts 6.1, 6.2
[78] Ibid. at art 7.2
[79] Ibid.at art 11.1
[80] See D. Smits and S. Zaboroski, supra note 6, 129
[81] Ibid. 130
[82] Ibid. 126
[83] See M. Akech, supra note 3, 284
[84] See A. Scuro, supra note 28, 391
[85] See Biosafety Protocol, supra note 5, at art 18 (c)
[86] Ibid. at art 18.2(a)

Furthermore, the socio-economic considerations concerning GMOs can also be taken into account in decision-making process by Parties in accordance with their international obligations which can establish a normative framework for public participation discussed in Chapter III[87].

The opinions are also divided on the question whether the Protocol addresses food safety issues. While the US claims that disputes involving food safety must be settled exclusively under Codex Alimentarius Commission and SPS Agreement which will be discussed below, the EU contends that the Biosafety Protocol addresses not only threats to biodiversity, but to human health posed by LMOs as well, taking into consideration that damaged environment and biodiversity are capable of harming human health too[88].

Conceivably, the adoption of the Protocol was propelled by the EU and many other developed and developing countries, environmental NGOs and Green political parties with the aim to prevent the developing countries from embracing the GMOs under the US and multinational biotech corporations' insistence without developing a decent regulatory framework. The advocates of the Protocol were seeking to create a "counterweigh to the WTO system" that was undermining the environmental needs when adjudicating trade-environmental conflicts[89]. The credibility of the Protocol, however, generates mistrust since it lacks an effective dispute settlement mechanism and the alternative mechanism resolving the disputes neglects its bedrock principle[90].

The Precautionary principle

In international and domestic regulation of GMOs the role of the precautionary principle is crucial considering an inability of science to provide clear-cut evidences on possible benefits and harms of these organisms[91]. The precautionary principle originates from German environmental laws of 1970s. Further, the principle was incorporated in international multilateral agreements, such as the Rio Declaration, regarded as one of the most significant instrument for environmental protection after the Stockholm Declaration (1972). The Principle 15 of the Rio Declaration promulgates that:

> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation[92].

The precautionary principle allegedly lacking a "common understanding of its meaning or scope"[93] in its weaker formulations enables regulators to apply restrictive measures despite the presence of a degree of scientific uncertainty concerning the risk. Stewart argues, however, that different expressions of the precautionary principle are so ambiguous and incompatible that they lack an ability to serve as a "coherent basis for decision"[94].

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[87] Ibid. at art 26
[88] See T. P. Stewart and D.S. Johanson, supra note 63, 8
[89] See R.B. Stewart, supra note 2, 337
[90] See D. Smits and S. Zaboroski, supra note 6, 136
[91] See R. Cunningham, supra note 10, 22
[92] Rio Declaration on Environment and Development (hereinafter Rio Declaration), UN Doc. A/CONF.151/26 (vol. I); 31 ILM 874 (1992), at principle 15
[93] See R. B. Stewart, supra note 2, 351
[94] Ibid.

Diametrically opposed views persist concerning the application of the precautionary principle to international trade of GMOs. While some authors contend that such application threatens the further development of biotechnology depriving the mankind of its potential advantages, the others defend it since regulators need "sufficient time to understand GMO technology and comprehend its full range of possible effects before knowing how to regulate it most effectively"[95]. It is also feared that the precautionary approach enables countries to bypass trade rules and hamper trade through "fraudulently disguising strategic trade barriers"[96].

The Biosafety Protocol refers to Principle 15 of the Rio Declaration and states that it will be implemented pursuant to precautionary approach established by the Declaration. Under the Biosafety Protocol, precautionary measures of an importing country must be reviewed by it against new scientific information in case it is requested by an exporting country[97]. Unlike the SPS Agreement, however, the measures do not have to be provisional, since the Parties are not obliged to regularly review their precautionary measures[98]. As such, the precautionary principle as provided for in the Biosafety Protocol is directly opposed to SPS Agreement.

It should be noted that the WTO Appellate Body in its decision on EC-Hormones dispute[99] discussed *infra* turned down the EC's (European Community) argument that the precautionary principle was a full-fledged rule of customary international law and exempted the EC from its obligations under Article 5.1 of the SPS Agreement which obliges it to conduct a scientific risk assessment. However, some commentators point out that the Biosafety Protocol's recognition of the precautionary principle as the best way to regulate the GMOs is a cause to celebrate for the risk-averse nations[100].

2. WTO agreements

The GATT 1947 which came into existence after the World War II to eradicate the origins of wars and restore the international relations through efficient and fair trade was amended after almost half a century resulting in GATT 1994. In January 1995 it was replaced by the World Trade Organization (WTO) which currently consists of 158 members and covers 90% of world trade[101].

The WTO attempted to consider the significance of the environmental protection in its Preamble by emphasizing the importance of "optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing so"[102]. Moreover, WTO's

[95] See R. Cunningham, supra note 10, 23
[96] See D. Smits and S. Zaboroski, supra note 6, 127
[97] See Biosafety Protocol, supra note 5 , at arts 10 (6), 11(8), 12(2)-(3)
[98] Ibid. at art 10 (5)
[99] Appellate Body Report, EC Measures Concerning Meat and Meat Products (Hormones), WT/DS26/AB/R, WT/DS48/AB/R, adopted 13 February 1998, DSR 1998:I, 135 <www.wto.org/english/tratop_e/dispu_e/320abr_e.doc> accessed 23 February 2013, at paras 16.121
[100] See D. Smits and S. Zaboroski, supra note 6, 137
[101] Members and observers, (2013) < http://wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm> accessed 27 February 2013
[102]The Agreement establishing the World Trade Organization WTO Agreement: Marrakesh Agreement Establishing the World Trade Organization, Apr. 15, 1994, THE LEGAL texts: The results of the Uruguay Round of multilateral trade negotiations 4 (1999), 1867 U.N.T.S. 154, 33 I.L.M. 1144 (1994) [hereinafter Marrakesh Agreement or WTO Agreement]. <http://www.wto.org/english/docs_e/legal_e/04-wto.pdf> accessed 22 February 2013, at pmbl.

Committee on Trade and Environment established in 1994 is charged with the task of researching the relationship between multilateral trade and environmental systems. Nevertheless, WTO has commonly been criticized for its anti-environmental stance in trade-environmental disputes[103].

The WTO agreements applicable to trade in GMOs, such as GATT, SPS and TBT[104] were developed before the pervasive adoption and commercialization of GMOs. The WTO dispute settlement panels and the Appellate Body are the major dispute settlement mechanisms addressing the trade conflicts involving GMOs[105]. Together with panels and Appellate Body reports the agreements constitute the primary source of WTO law and the disputes under the WTO are settled by applying them[106]. However, as it was stipulated in Appellate Body's report on Japan - Taxes on Alcoholic Beverages dispute, while panel reports "create legitimate expectations among WTO Members", WTO is not bound by the principle of *stare decisis*, i.e. precedent decisions may not be followed[107].

The most important principles of GATT 1947, such as prohibition of protectionist activities[108] in the form of bans, licenses, quotas and "Most Favored Nation" principle[109] which prohibits discrimination of "like products" of other member countries were incorporated into GATT 1994 which is one of the pertinent WTO agreements applicable to trade in GMOs. It also contains a provision allowing for measures for protection of human health and the environment in case such measures do not constitute "arbitrary or unjustifiable discrimination … or a disguised restriction on international trade"[110]. Generally, it has been burdensome to justify the measures intended for the protection of health and environment against GATT's strict requirements[111].

The health and safety exceptions provided for in Article XX(b) of GATT were further developed through the SPS Agreement which came into existence as a result of the Uruguay Round trade negotiations in 1995. It regulates the application of sanitary and phytosanitary (relating to the health of plants) measures as scientifically unjustified barriers to trade[112] and requires non-discrimination and national treatment to facilitate international trade[113]. Despite the WTO's success in decreasing worldwide trade barriers and "transforming the world to a free trade marketplace", it is alleged that through measures claiming to safeguard health, environment and human rights countries are creatively protecting the trade and support domestic producers against competition. Thus, if not all, but in a significant number of cases health and environment measures are being misused as a "weapon of trade"[114].

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[103] G. L. Gaston and R. S. Abate, 'The Biosafety Protocol and the World Trade Organization: Can the Two Coexist?', (2000), 12 Pace Int'l L. Rev. 107 2000, 117

[104] See notes 108, 112, 137

[105] See R. B. Stewart, supra note 2, 334

[106] See T. P. Stewart and D. S. Johanson, supra note 63, 33

[107] Appellate Body Report, Japan – Taxes on Alcoholic Beverages, WT/DS8/AB/R, WT/DS10/AB/R, WT/DS11/AB/R, adopted 1 November 1996, DSR 1996:I, 97, p 15-16 < http://www.worldtradelaw.net/reports/wtoab/japan-alcohol(ab).pdf> accessed 22 February 2013

[108] General Agreement on Tariffs and Trade 1994, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, THE LEGAL TEXTS: THE RESULTS OF THE URUGUAY ROUND OF MULTILATERAL TRADE NEGOTIATIONS 17 (1999), 1867 U.N.T.S. 187, 33 I.L.M. 1153 (1994) [hereinafter GATT 1994], at art 3

[109] Ibid. at art 3

[110] Ibid. at art 20

[111] See M. Akech, supra note 3, 277

[112] Agreement on the Application of Sanitary and Phytosanitary Measures (hereinafter SPS Agreement), (1995), 1867 UNTS 493, at art 19

[113] Ibid. at art 2.3

[114] See D. Smits and S. Zaboroski, supra note 6, 121

Although SPS Agreement does not establish specific standards, but only general rules, it still encourages countries to comply with the standards and recommendations developed by international institutions, such as Codex Alimentarius Commission (food safety standards), International Office of Epizootics (animal health standards) and Secretariat of the International Plant Protection Convention (plant health standards)[115]. The measures under SPS Agreement must be based upon science[116] and cannot be used as disguised barriers to trade[117]. However, by providing sufficient scientific justification countries may apply more rigorous measures than allowed by international standards[118].

Without a specific reference to the precautionary principle the SPS Agreement still enables a member to provisionally apply SPS measures justifying them with available relevant information where pertinent scientific evidence is insufficient. Nevertheless, within a reasonable period of time a member is obliged to acquire additional information and carry out more objective risk assessment[119]. The precautionary principle as provided for in the Biosafety Protocol is directly opposed to the SPS Agreement; while the latter obliges an importer to provide scientific evidences to justify the ban or restriction of the import[120], the former charges an exporter to substantiate security of its products[121].

EC – Hormones. WTO Appellate Body decision on EC – Hormones[122] dispute interpreting the SPS Agreement was the most relevant decision concerning the trade in GMOs. The Appellate Body ruled against the EC in 1998 after US and Argentina's complaint regarding the ban of use of six growth hormones and importation of meat treated with these hormones into the EC. The EC was found in breach of Article 5.1 of the SPS Agreement since it did not meet the risk assessment requirement resulting in "some ascertainable risk"[123]. Its argument that the precautionary principle was established as a rule of customary international law and exempted the EC from the obligations of Article 5.1 of the SPS Agreement was also turned down.[124] While refusing to accept a "theoretical risk" delivered by the risk assessment[125], the Appellate Body acknowledged the possibility to count on the "scientific theories or conclusions embraced by only a minority of scientists"[126]. It recognized an even very small ascertainable risk revealed by risk assessment to be able to leave countries with a wide discretion in choosing regulatory measures[127]. In 2004 the EC challenged the retaliatory tariffs on its products as a response to the ban claiming to have obtained a new scientific evidence of risk which could justify the ban. The Appellate body rejected the EU's claim to invoke Article 5.7 of the SPS Agreement, since "new scientific developments call into question whether the body of scientific evidence still permits a sufficiently objective assessment of risk"[128].

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[115] See SPS Agreement, supra note 112 , at art 3.4
[116] Ibid. at pmbl. and art 2.1
[117] Ibid. arts 2.2, 2.3
[118] Ibid. art 3.3
[119] Ibid. art 5.7
[120] See SPS Agreement, supra note 112, at art 5.8
[121] See Biosafety Protocol, supra note 5, at art 10.1(C)
[122] Panel Reports, European Communities – Measures Affecting the Approval and Marketing of Biotech Products, WT/DS291/R /WT/DS292/R / WT/DS293/R, Add.1 to Add.9, and Corr.1, adopted 21 November 2006, DSR 2006:III-VIII
[123] Ibid. paras 207, 208, 253(j)(k)(l)
[124] Ibid. paras 16, 121
[125] Ibid. para 186
[126] Ibid. para 194
[127] Ibid. para 187
[128] Ibid. para 725

EC – Biotech. However, the first ever international dispute involving the international trade in GMOs was the EC Biotech dispute where moratoria on approval of GM crops within the EC's borders and prohibition of certain GM products by some member countries were challenged by the US, Canada and Argentina before WTO Panel in 2003. As the EU's major trading partner the US claimed to have endured considerable economic loss since its exportation was rejected by the EU and claimed these measures to be protectionist and in breach of the WTO rules[129]. In clarifying the question about the applicability of WTO agreements to the dispute the Panel ruled that this issue depended on the purpose of the measure involved and that the SPS Agreement was the most pertinent agreement to resolve the dispute in question[130].

The Panel decided that according to Article 5.1 of the SPS Agreement the EC member countries needed to justify the restrictions by risk assessment which was feasible, since the EC's approval of the disputed products was based on sufficient scientific information. This fact excluded member country's capacities to opt for Article 5.7 of the SPS Agreement which allows for provisional application of restrictions in the anticipation of new adequate information for objective risk assessment[131].

According to Stewart, the EC – Biotech case provided an important guideline for the determination of "undue delay" which is a complicated and fact-specific issue. Although it did not emphasize its length, but its justification as essential, the lengthy delay renders its justification more difficult[132]. The Panel ruled that laws considered as inadequate cannot justify the processing of applications on approval and "evolving science" cannot serve as an excuse for countries to contravene the SPS provisions. It also stated that when evaluating the new scientific information the regulatory authority should react "as expeditiously as could be expected of it" in the circumstances[133].

Stewart also claims that the Panel's decision on the EC - Biotech dispute is a major guide helping to identify the current applicable international trade rules that regulate GMOs which together with the EC – Hormones case entail negative consequences for developing countries by depriving them of the opportunity to prohibit, restrict GMOs or to embrace a "wait and see" position. By rejecting the applicability of the Biosafety Protocol it preserved the strict risk assessment requirement that can be onerous for countries lacking appropriate capabilities and resources to carry it out. In contrast, the developed countries with advanced scientific and technological capabilities will be able to enjoy considerable liberty in choosing a GMO regulatory framework[134].

Moreover, relying on WTO's dispute settlement mechanism and winning the cases through the legal means rather than by scientifically substantiating the safety of products, generate negative publication, damages the reputation of biotech industry and distresses consumer confidence[135].

[129] See M. Akech, supra note 3, 273
[130] See EC – Biotech case, supra note 122
[131] Ibid.
[132] See R.B. Stewart, supra note 2, 366
[133] See EC-Biotech, supra note 122, at para 7.1499
[134] See R. B. Stewart,supra note 2, 361
[135] D. Smits and S. Zaboroski, supra note 6, 140

In addition, it is believed that the EU's GMO labeling and traceability requirements have the potential to be a subject of future trade disputes needing to be resolved under WTO law[136].

Implementation of legitimate product standards and voluntary and mandatory labeling requirements which are not addressed by the SPS Agreement are regulated by Agreement on the Technical Barriers to Trade (TBT Agreement) which is developed according to Tokyo Round Standards Code. In contrast to the SPS Agreement, the standards provided for by the TBT Agreement are "non-safety related attributes of products, such as the characteristics of how a product was produced" not requiring a scientific risk assessment. A non-exhaustive list of legitimate objectives such as consumer protection, fair competition and market transparency may permit the restriction of trade[137]. Since the risk assessment requirements of the TBT Agreement are wider and more flexible than those of SPS Agreement's, it would conceivably demand less effort to justify restricting trade measures under the former. Ostovsky argues (as cited by Akech) that because the SPS Agreement's ambit is "too narrow to encompass the concerns that surround GMOs" disputes involving GMOs can be better resolved under more general TBT Agreement, adding that risks posed by GMOs "go beyond risk to the sanitary and phytosanitary"[138].

3. Relationship between the Biosafety Protocol and the WTO agreements

Smit and Zaboroski contend that despite both pro-GMO and anti-GMO camps satisfaction of the outcome of the Biosafety Protocol's negotiations, it come as "nothing more than an impotent compromise" implying also the UN's failure to resolve the highly contentious GMO issue[139]. Despite the risk-averse countries' efforts not let the Biosafety Protocol to be overridden by other international agreements, six countries, *i.e.* the Miami Group, with total population of 500 million impaired the Biosafety Protocol capable of regulating the safe transfer, handling and use of GMOs in countries with more than 6,500 of populace[140]. Commentators claim that two main negotiating group's compromise resulting in the inclusion of both the precautionary principle and the "savings clause" into the Biosafety Protocol has led to an ambiguity and confusion[141].

It has been argued by major GMO exporting countries that the Biosafety Protocol's provisions, in particular the right to refuse the importation of GMOs is in breach with their "long-standing trade rights" as the WTO members. Nevertheless, Gaston and Abate reject the incompatibility between these two instruments attributing the interaction between them to an underlying difference between trade agreements requiring a degree of scientific evidence to implement restrictive trade measures and environmental agreements favoring the precautionary approach in response to potentially dangerous products[142]. However, they claim that the rules of international treaty law and international trade case law provide little guidance to substantiate this argument[143].

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[136] See R. B. Stewart, supra note 2, 342
[137] The Agreement on Technical Barriers to Trade (1995)
[138] See M. Akech, supra note 3, 281
[139] D. Smits and S. Zaboroski, supra note 6, 137
[140] See G. L. Gaston and R. S. Abate, supra note 103, 123
[141] See T. P. Stewart and D. S. Johanson, supra note 63, 5
[142] See G. L. Gaston and R. S. Abate, supra note 103, 114
[143] Ibid.,109

According to Vienna Convention on the Law of Treaties, in case of incompatibility between two agreements on the same subject matter and between countries which are the parties to both agreements, the latest treaty applies[144]. Its principles, however, do not apply to international agreements containing a "savings clause", identical to clause in Biosafety Protocol's Preamble construing its relationship to other agreements. By including the "savings clause" the Biosafety Protocol has given the priority to the economic interest of some Parties over environmental concerns of the others[145]. However, the "savings clause" of the Biosafety Protocol is not similar to the one contained in the Biodiversity Convention, stipulating that its provisions "shall not affect the rights and obligations of any Contracting Party deriving from any existing international agreement, except where the exercise of those rights and obligations would cause a serious damage or threat to biological diversity"[146] conceivably can apply in environment *versus* trade disputes[147]. Moreover, since the Biodiversity Convention and the Biosafety Protocol are more subject-specific in relation to the GMOs than more general WTO agreements, according to Vienna Convention the Convention and the Protocol should most likely prevail[148]. However, the Vienna Convention does not also apply to non-Parties' rule of conduct whereby becoming impotent in resolving the relationship between the Biosafety Protocol and the WTO agreements in case one of the parties to the dispute is a non-Party[149].In the E-Biotech case discussed in the previous section, the EC's effort to justify the restricting measures by the Biosafety Protocol was rejected by the Panel for two reasons: first, some parties of the dispute, in particular the US, Canada and Argentina hadn't ratified it; second, the precautionary principle was not applicable[150].

The relationship between the Biosafety Protocol and the WTO agreements has significant implications for Multilateral Environmental Agreements (MEAs) capable of adversely affecting trade, since they may be challenged by countries suffering economic loss which in its turn may render MEAs inane. Gaston and Abate indicate the "lack of international coordination in the formulation of international trade and environmental law" as the main reason of the contention between these two domains[151].

Although the Biosafety Protocol's inability to adequately address the trade in GMOs was pro-actively predicted almost right after its adoption, the fact that it has recognized the precautionary attitude as the best way to approach GMO issues and acknowledged their difference from other products is definitely the cause for celebration[152]. Nevertheless, the WTO Panel's stance towards the Biosafety Protocol and the precautionary principle in EC-Biotech dispute was "a very negative message sent regarding the validity of the Protocol, the UN, or any other subsequent attempt to place effective and binding regulatory control on the GMO industry"[153]. Conceivably, the EU's concern during the negotiations of the Biosafety Protocol expressed by the EU Commissioner Margo Wallström as "what we agree here should not be undermined later in the context of the WTO" has substantiated[154]. From the

[144] United Nations, Vienna Convention on the Law of Treaties, 23 May 1969, United Nations, Treaty Series, vol. 1155, p. 331, available at: <http://www.unhcr.org/refworld/docid/3ae6b3a10.html> , accessed 25 February 2013, at art 59
[145] See G. L. Gaston and R. S. Abate, supra note 103, 114
[146] Biodiversity Convention, supra note 11, at art 22
[147] See G. L. Gaston and R. S. Abate, supra note 103, 120
[148] Ibid.
[149] Ibid., 110
[150] See EC-Biotech, supra note 122
[151] See G. L. Gaston and R. S. Abate, supra note 1034, 123
[152] See D. Smits and S. Zaboroski, supra note 6, 137
[153] Ibid. 138
[154] See T. P. Stewart and D. S. Johanson, supra note 63, 15

perspective of the precautionary principle and the importance of environmental protection as emphasized in the Biosafety Protocol, this can be called a regrettable development.

Chapter III Developing countries: former Soviet republics

Prior to starting an analysis of the GMO regulatory policies of the former Soviet countries, this Chapter will seek to examine the regulatory framework of GMOs in developing countries of the world. This strategy will be helpful in identifying the post-Soviet countries' stance among developing countries over GMO regulations, determining the similarities, differences and unique features in their situation, as well as ascertaining the capacity of measures deployed by developing countries to establish independent and favorable GMO regulatory schemes for former Soviet countries.

1. Countries at the regulatory crossroads

Developing countries "trapped in the crossfire of conflict" between pro-GMO and GMO-skeptic developed countries have much more at stake since they are more vulnerable to both the potential risks and benefits of GMOs. On the one hand GMOs own the potential to help developing countries to resolve food security problem, manage the stresses of climate change and provide environmental benefits, on the other hand they can pose risks which these countries can find challenging to address due to lack of the expertise and resources[155].

The developing countries mostly located at the South hemisphere although are richer in biodiversity and genetic material, however still depend on developed North in terms of technology and innovation which is often criticized for exhibiting a neo-colonial feature[156]. Divergence of opinions over GMOs, however, is not North-South, like it was the case with many international environmental controversies: sharp differences persist among both developed and developing nations[157].

The "dichotomy in environmental thinking" between risk-taking countries favoring economic growth and risk-averse countries preferring precautionary approach existed for quite a long time and was clearly evident in relation to the Kyoto Protocol of the UN Framework Convention on Climate Change adopted in 1997[158]. In relation to GMOs at one end of the spectrum reside the EU and Organization for Economic Co-operation Development (OECD) and most of their member countries favoring the process-oriented and restrictive approach which reflect the attitude of general public and consumers rather than biotechnology corporations[159]. It is claimed that these countries, in particular, the EU have highly influenced developing countries' GMO policies. As the result of anti-GM campaigns carried out by

[155] See R. B. Stewart, supra note 2, 322
[156] See A. Scuro, supra note 28, 384
[157] See R. B. Stewart, supra note 2, 320-321
[158] See A. Scuro, supra note 28, 371
[159] Ibid.

NGOs such as Friends of the Earth and Greenpeace International presenting GMOs as "sinister American scheme to poison or enslave the poor" many developing countries have rejected to embrace them and developed precautionary attitude[160]. Paarlberg (as cited by Glass-O'Shea) assumes that the rich and developed countries' consumer objection against GMOs originates from the fact that they receive little benefit from them since most of the benefits are gained by farmers and biotech companies and marginal benefits are seen as trivial in highly productive agricultural systems[161].

The main agricultural exporters, such as the US and Canada who prefer the product-oriented approach toward GMOs and seek to facilitate international trade in them reside at the other end of the spectrum. The WTO EC - Biotech case discussed in detail above was the culmination of trade disputes generated on the basis of these diagonally opposed views over GMOs[162].

The developing countries which find themselves somewhere in between of this spectrum demonstrate a wide range of GMO regulatory policies. According to Stewart, three main factors influence the development of GMO regulatory frameworks in these countries. First, unlike developed countries, developing countries are much more dependent on agriculture in terms of GDP, employment and international trade. Second, developing countries with their large populace are vulnerable to food shortages, undernourishment and hunger not like the industrialized countries where agricultural subsidies result in food excess. The faster developing countries, however, might also find it important to improve their agriculture in order to feed their "growing and more affluent" population[163]. The demand for diverse and nutritional food increases proportionally to the income levels in these countries[164].Third, deficiency of technical, legal, administrative means and resources to develop GMO R&D programs to assess and handle the risks which result in inferior GMO policies neglecting the potential advantages, as well as health and environmental hazards of these technologies. Stewart claims that SPS Agreement produces "de facto double standards" since unlike developed countries that are capable of conducting an appropriate risk assessment and enjoy wide latitude of policy choices regulating GMOs, developing countries suffer a much heavier onus[165].

The rising food prices in 2007-2008 which was attributed to a wide range of reasons, including high oil prices, increased population and severe weather conditions and generated riots and protests both in developing and developed countries led to mitigation in opposing countries' attitude towards GMOs and accelerated their acceptance. While the EU started to examine GMOs potential to decrease food prices and was called to relax and review its approval and importation policy, the G8 at its annual summit decided "to promote science-

[160] See B. Glass-O'Shea, note 20, 20. It is claimed that Agriflore Ltd., an international company which was growing organic food in Zambia was behind the Zambia's refusal of food aid in 2002, whose population was experiencing a famine.
[161] Ibid. 21
[162] See R. B. Stewart, note 2, 326
[163] Ibid.
[164] See B. Glass-O'Shea, supra note 20, 32
[165] See R. B. Stewart, supra note 2, 365

based risk assessment". In 2007-2008 the popularity of GM crops in developing countries reached its highest point when China, the Philippines, Honduras, Egypt, Kenya, Malawi and many other countries expressed readiness to embrace GMOs[166]. Consequently, in 2008 90% of 13.3 million farmers in 25 countries growing GM plant were small-scale farmers from developing world[167].

By and large, developing countries can be categorized into three groups according to their GMO regulatory schemes. The first group includes the advanced developing countries, such as Argentina, Brazil and South Africa who are among the largest GMO exporters producing and exporting GM soybean, maize and cotton in large amounts. Extensive GMO R&D programs, special biosafety regulatory programs and some special measures such as labeling adopted in these countries are fractional and lack the enforcement and implementation mechanisms[168].

While some developing countries, such as China, India, Thailand, Indonesia, Cuba, Columbia, Egypt, Kenya and others pertaining to the second group have substantial GMO R&D programs and developed some local GM strains, have embraced "wait and see" position and haven't approved and commercialized GM crops yet[169].

Most of the developing and almost all of the least developing countries constitute the third group with no or limited GMO R&D programs some of which (in particular, African countries such as Zimbabwe, Zambia, and Madagascar) intensely reject embracing GMOs. The development of biosafety regulatory programs in countries belonging to the second and third group is in initial stage and assisted and supported by the Biosafety Protocol and the United Nations Environment Program – Global Environment Facility (UNEP-GEF)[170].

As it was construed above, the existing international framework regulating trade in GMOs does not provide for a clear guidance and exhibits compromises between conflicting interests. Their vague language and unclear concepts leaves their application and interpretation to the mercy of the WTO panels and Appellate body. Akech even argues that by avoiding to develop clear rules, the industrialized countries seek to maintain their freedom in shaping the suitable domestic regulatory framework in the field of GMOs[171].

Developing country GMO regulatory frameworks differ also according to their status either as an exporter or importer/regulator. The WTO law, in particular the EC - Biotech decision is disadvantageous for a developing country as a GMO exporter in the sense that it doesn't offer any support for it to cultivate and export GM crops or its non-GM counterparts to developed country since a developed country able to conduct a favorable risk assessment can enjoy a wide discretion in regulating them, including prohibiting or restricting. Stewart refers to Article 10.1 of the SPS Agreement requiring to "take account of special needs of

[166] Ibid. 328-329
[167] See B. Glass-O'Shea, note20, 22
[168] See R.B. Stewart, note 2, 333
[169] Ibid.
[170] Ibid.
[171] See M. Akech, supra note 3, 284

developing countries" when preparing and applying SPS measures "a virtually dead letter insofar as legal enforcement goes"[172].

However, based on the "proportionality test" and "risk/risk tradeoffs" rationales developing countries in their roles as GMO exporters can resist to restrictive GMO regulations by developed countries. During the "proportionality test" the industrialized countries environmental and health benefits stemming from restrictive GMO regulations are placed against developing countries economic detriment originating from the same regulations. Whereas the "risk/risk tradeoffs" provides for the confrontation of the environmental and health interests of both developed and developing country, since the latter may claim to be deprived of environmental and health benefits offered by GMOs as the result of restrictive policies. Nevertheless, it is unlikely that the WTO dispute settlement mechanism would apply these approaches when resolving conflicts involving GMOs on account of high consumer objection towards GMOs in the EU and many other countries[173].

A developing country in its role as importer/regulator is also in unfavorable position since the decision also limits its ability to restrict the authorization or use of GMOs[174]. An importing country with appropriate scientific and technical resources is able to carry out a risk assessment which could prove a product's harm, and the country can develop its policy accordingly. However, a country with poor resources will not be able to ascertain its harms and will then be obliged to import it because it lacks an adequate risk assessment. Nevertheless, being well-resourced can act as a double-edged sword for a country, since it can help to ascertain the safety of an imported good for a present time and prevent the restriction of trade. However, as it was discussed in Chapter I, the safety of the GMOs in the long run still needs to be substantiated by the conclusive scientific evidences.

The importance of the Biosafety Protocol which was believed by the developing countries to be a significant safeguard of their interest in international trade of GMOs is weakened since the EC Biotech decision turned down the precautionary principle's independent legal role and rejected the Biosafety Protocol's applicability to the disputes in which a member is not party to it. As such, the EC - Biotech decision "casts a legal cloud on the Protocol regime"[175].

Three scenarios are possible for developing country when faced with the urge to shape its policy vis-à-vis GMOs. The developing country can prohibit or restrict the GMOs, or it can approve the use and commercialization of it. The consequences of these approaches were discussed in detail in previous Chapter.

In third scenario developing country can choose a "wait and see" attitude in relation to GMOs. This strategy is followed by a considerable number of developing countries. The divergence in domestic political opinions, uncertainties about the economic, environmental and social consequences of GMOs, insufficient regulatory powers, clashing international

[172] See R. B. Stewart, note 2, 366
[173] Ibid. 357-358, 375-376
[174] Ibid.
[175] Ibid. 368

pressures, uncertainty created by the international trade regulatory mechanisms, developed county's regulations and consumer approaches may propel developing country to intentionally delay the conclusive decision concerning GMOs until these problems are resolved[176]. In this case under the WTO law developing country must either conform to the Article 5.1 of the SPS Agreement by conducting risk assessment or justify its move by the lack of sufficient scientific information for conducting such risk assessment. Otherwise developing country may be accused of not ensuring regulatory measures "without undue delay" as provided for by Article 8 and Annex C(1)(a) of the SPS Agreement. As seen from the EC Biotech case, however, the Panel regarded the justification of the delay, not its length as considerable, also rejecting EC's justification by "evolving science" and "need for a prudent and precautionary approach" for its delay of GMO approval[177]. Nevertheless, while admitting that obtaining newly developed scientific information may serve as an excuse for regulatory delays, the Panel still charged the state to react "as expeditiously as could be expected of it"[178].

However, restricted scientific, technical and administrative capacities and lack of resources can be cited as reasons for regulatory delay by a developing country, although the justifications put forward by the EC in the EC Biotech case are less likely be supported by Panel were they advanced by a developing country. However, Stewart contends that "less strong facts" of the case different from those of the EC Biotech, such as "an openly avowed moratorium" and its period (five years) could be decided differently in relation to a developing country[179].

2. Bilateral pressures influencing developing country GMO policies

The WTO's failure to meet the developing countries needs and accommodate their interests which exposed it to a crisis of legitimacy since the Seattle Ministerial in 1999 coupled with an uncertainty and ineffectiveness of the international regulatory framework of trade in GMOs which was discussed in above enables developed countries to deploy bilateral political and economic pressures to influence the adoption of desirable regulatory policies in developing countries. Technical assistance and food aid provided to developing countries often comes with strings attached either to force the recipient to adopt favorable regulatory framework, or to gain new markets for GM crops. The Special and Differential Treatment (SDT) regime under the WTO provides for development assistance and provision of an aid to developing countries though these obligations are not legally binding for developed countries. Each group of developed countries at the opposite side of the spectrum thus influence the development of opposing attitudes towards GMOs in developing countries; hence, while the

[176] Ibid. 364
[177] See EC Biotech, supra note 122, paras 7.1519-7.1530
[178] Ibid. para. 7.1499
[179] See R. B. Stewart, note 2, 365

US finances the GMO R&D programs, the EU funds health and environment activities and biosafety programs[180].

According to the WHO study, sector-based and uncoordinated international regulation of GMOs prevents the developing countries from establishing adequate GMO policy[181]. Some commentators argue that while trying to assist the developing countries in creating their regulatory framework for biotechnologies UNEP actively promotes European "regulation-creep" which may leave these countries in disadvantageous position with regard to benefits of GMOs[182].

The US has actively harnessed the bilateral pressures for the adoption of conducive GMO regulations in countries, such as China, Croatia, Sri Lanka and Bolivia, and for the acceptance of GM food aid by countries facing a food crisis while accusing those refusing to receive the aid of "crimes against humanity" since they were preferring to starve their population to death rather than feed them with GMOs[183]. Described bilateral political and economic pressures are capable of paralyzing decision-making in the developing countries and hampering their ability to effectively enforce the policy that addresses their "unique concerns" and national interests[184].

Promoting public participation in decision-making concerning GMOs is offered by a significant number of authors as an optimal solution for the developing country governments. For this purpose, Glover (as cited by Akech) disapproves separating the risk assessment and public participation processes criticizing scientist for regarding the public as too ignorant and irrational to perceive scientific principles. This strategy accepting public as a "passive receiver of information about biotechnology" restricts public's possibility to participate in shaping the regulatory frameworks of GMOs[185]. Moreover, as is often the case with the developing countries, regulators charged with the regulation of biotechnologies may be unbiased towards the issue, or scientist may be affected by research financing institutions. Therefore, by democratizing the decision-making procedures concerning GMOs and promoting public participation in them can enable the developing country governments to better manage the bilateral pressures and develop regulatory schemes that meet domestic specific concerns rather than reflect developed country interests[186].

The Biosafety Protocol provides a normative framework for countries for realization of the abovementioned task since it mandates its Parties to promote and facilitate public awareness, education and participation, access to information, consulting the public in decision-making processes concerning GMOs, informing the public through a Biosafety

[180] See M. Akech, supra note 3, 265, 268
[181] Modern food biotechnology, human health and development: an evidence-based study (2005), Food safety Dep't, WHO, < http://who.int/foodsafety/publications/biotech/biotech_en.pdf> accessed 25 February 2013
[182] See B. Glass-O'Shea, supra note 20, 21
[183] During food crisis in Zimbabwe in 2001-2002 Zimbabwean government's reluctance to accept GM corn offered by the US generated immense pressure from the USAID and World Food Program. See M. Akech, supra note 3, 290
[184] Ibid.
[185] Ibid. 291-283
[186] Ibid. 291-298

Clearing House and to cooperate with other Parties when fulfilling these obligations[187]. However, the WTO regime offers a "limited amount of accommodation" for consideration of public opinion, since in decisions on disputes settled under WTO regime the significance of public opinion is only recognized in the risk management stage, but neglected in the risk assessment phase.[188] This approach has been criticized by numerous commentators, including Foster (as cited by Thayyil) who argues for "a role for subjective assessment of magnitude through incorporation of public opinion, making public opinion an inherent part of risk assessment"[189] .

Moreover, reinforcement of national academia in developing countries is often recommended as an instrument not only capable of influencing public opinion through conducting an objective risk assessment, but also serving as a mediator by building bridge between conflicting developed country pressures concerning development of domestic GMO regulation. Although local NGOs and other non-state actors are capable of playing a significant part through selecting and disseminating information by their campaigns, they are often prone to adopting political agendas of their foreign sponsors while promoting or discouraging GMOs[190].

Surveys in some developing countries have revealed that academia enjoys more trust and considered more reliable by public than NGOs and other non-state stakeholders[191]. In this regard, the unbiased and mediating role of national academia funded preferably by local governments need to be properly appreciated since they can assist governments in both managing developed country pressures and objectively evaluating GMOs advantages and risks whereby helping to address local concerns of each country.

3. Regulatory framework of GMOs in former Soviet countries

In the aftermath of the collapse of the Soviet Union which had ruled for 70 years, 15 countries gained their independence[192] and began transition to market economy by rebuilding and restructuring their economies[193]. According to geographical, cultural and other common characteristics these countries are divided into 5 groups: the Eastern European (Ukraine, Belarus, and Moldova), the Baltics (Latvia, Lithuania, and Estonia), the Southern Caucasus (Azerbaijan, Armenia, and Georgia), the Central Asian (Kazakhstan, Kyrgyzstan, Tajikistan,

[187] See Biosafety Protocol, supra note 5, art 23
[188] N.Thayyil "GMOs in Europe. Law, Technology and Public Contestations" (2012), p 156-157
[189] Ibid.
[190] P.Aerni "The Impact of the Diverging Transatlantic Regulations on the Management of Natural Resources in Developing Countries" (2006) , Working paper No 10. Center for Comparative and International Studies (ETH Zurich and University of Zurich), 9, 13-14
[191] Ibid. 16. The surveys were carried out in South Africa, Mexico and the Philippines.
[192] Many of them, including Azerbaijan, Armenia, Georgia, Kazakhstan, Turkmenistan, Estonia, Latvia, Lithuania, Moldova and Ukraine experienced short-lived independence between 1918-1920, however countries like Belarus, Uzbekistan, Tajikistan, Kyrgyzstan became independent for the first time after the Soviet Union's dissolution.
[193] According to International Monetary Fund's World Economic Outlook Report of April 2012 (available at <http://www.imf.org/external/pubs/ft/weo/2012/01/pdf/text.pdf > accessed 17 March 2013) except for Estonia, all 14 former Soviet countries are categorized as developing countries, considering per capita income level, export diversification and degree of integration into the global financial system of these countries. Nevertheless, for the sake of completeness, Estonia's GMO regulatory framework will also be analyzed in this thesis.

Turkmenistan, and Uzbekistan) and Russia. These countries' GMO regulatory frameworks are almost identical embracing mostly precautionary attitude. Except for Russia, Uzbekistan, and Turkmenistan, all of them possess national biosafety frameworks developed by the assistance of the UNEP-GEF. 13 of them have ratified the Biosafety Protocol (except for Uzbekistan and Russia), 10 of them are already the WTO members (except for Belarus, Azerbaijan, Kazakhstan, Turkmenistan, and Uzbekistan) (see Table 1. in the Annex), whereby three of them (Estonia, Latvia, and Lithuania) are also the members of the EU since 2004.

Eastern European countries

As a result of *Ukraine*'s policy to actively discourage GMOs, proportion of them in Ukrainian market is effectively decreased[194]. According to the Ukrainian experimental food research center, while in 2007 about 50% of products contained GMO, in 2008 this number reduced to 8%, and today only 5% of all products contain GMOs[195]. Under new rules regulating product labeling, Ukraine tries to change the current definition of products containing GMO as products where the proportion of GMO exceeds 0.9 and consider all products containing any percentage of genetically modified ingredients as GMO[196]. This decision has already led to problems with WTO to which Ukraine has been accepted as a member in May 2008. The draft resolution on the abovementioned issue is on the WTO website and the country is harmonizing it with WTO members in accordance with the TBT Agreement[197]. The draft resolution has caused strong resistance from the U.S. and Canada because new rule would reduce the export of products with a share of less than 0.9% GMO in Ukraine from these countries by 90%. In an official letter the Canadian Ministry of Foreign Affairs and International Trade asked the Ukrainian government to clarify the relevance of the new definition and expressed its anxiety that new labeling "could lead to doubts about the safety of consumers or other characteristics of products, despite the fact that they have passed a risk assessment and were considered safe for human consumption" and that this decision could be an "additional barrier to trade which goes against the obligations of Ukraine to the WTO"[198].

Since the provisions of the resolution "On establishing the procedure for labeling food products that contain genetically modified organisms (GMOs) or are produced using GMOs, and put into circulation" were ignored by producers, on 17 December 2008 the Verkhovna Rada (Ukrainian legislative body) adopted changes to the laws "On safety and quality of food products" and "On the protection of consumers' rights" which meant that all food products in circulation in Ukraine had to be labeled in Ukrainian language indicating whether they contain or do not contain genetically modified organisms[199]. According to the Institute for

[194] All About Feed, "Ukraine tightens GMO policy", 22 March 2012 <http://www.allaboutfeed.net/Process-Management/Management/2012/3/Ukraine-tightens-GMO-policy-AAF012979W/>, accessed 26 February 2013
[195] Ibid
[196] Resolution of the Cabinet of Ministers of Ukraine as of 13 May 2009 No. 468, "Resolution on approval of the new Order of labeling of food products containing genetically modified organisms", < http://members.wto.org/crnattachments/2010/tbt/UKR/10_0973_00_e.pdf> accessed 26 February 2013
[197] See All about feed "Ukraine tightens GMO policy", supra note 182
[198] Ibid.
[199] Ukrainian Agribusiness Club "New law about the GMO labeling in Ukraine" 11 January 2010 <http://www.agribusiness.kiev.ua/en/news/ukraine/11-01-2010/1263197897/> accessed 26 February 2013

Ecohygiene and Toxicology of Ukraine, all GMOs are illegal in Ukraine and no GMO has been registered yet[200] since no evidence has been submitted about the safety of GMOs to human health[201].

In March 2012 Ukrainian President signed a law amending the law on the state biosecurity system when creating, testing, transporting and using GMOs. According to the law, legal entities that sell GMO products for the first time need to submit a declaration about the business entity and about goods containing GMO or those produced using them, also indicate the number of the goods in the state register of GMOs. Business entities supplying their clients with goods containing GMOs have to provide them with copies of the declaration. Entities that received GMO products have to retain this declaration for five years from the day of delivery of the products. Central executive bodies are charged with creating a network of laboratories to test for GMOs in goods, while the Cabinet of Ministers should approve a resolution on the network of laboratories to test for GMOs. The law indicates that the scientific and methodological coordination of the work of the testing laboratories for detecting GMOs in products will be implemented by the scientific and methodological center testing goods for GMO contents[202].

Although in *Belarus*, which was one of the main agricultural manufacturers during Soviet era production declined as the result of the Chernobyl accident in 1986 and collapse of the Soviet Union in 1991, the production stabilized and even increased last years[203].

Belarus is a Party to the Biosafety Protocol and the importation of GMOs is carried out in accordance with its requirements. The legislation of the country does not stipulate any specific condition for the importation of GMOs not intended for release into the environment[204]. The Law on "Safety in Genetic Engineering Activities" adopted 9 January 2006 establishes the legal principles for carrying out these kinds of activities[205]. The country's biosafety policy exhibits differences adopted in other countries of the region since it aims at harnessing the advantages of biotechnologies for its economic growth and does not embrace a precautionary approach because the risks presented by these technologies are regarded as identifiable and avoidable[206].

[200] Fresh Plaza "Genetically modified organisms are illegal in Ukraine" 31 January 2011, <http://www.freshplaza.com/news_detail.asp?id=75307> accessed 26 February 2013
[201] ProAgro, "Any GMO in Ukraine has no bases for legalization" 31 January 2011 <http://www.quality.ua/en/newsssq/show/79> accessed 26 February 2013
[202] The ChamberBlog "Ukrainian president signs law on tightening control over sales of goods containing GMOs," <http://blog.chamber.ua/2012/03/ukrainian-president-signs-law-on-tightening-control-over-sales-of-goods-containing-gmos/ > accessed 26 February 2013
[203] FAO, Research and Extension Div., "The Status of Agricultural Biotechnology and Biosafety in Belarus", 2008, Rome (Italy), <ftp://ftp.fao.org/docrep/fao/011/ak226e/ak226e00.pdf >, accessed 26 February 2013
[204] UNEP-GEF, "Draft National Biosafety Framework for the Republic of Belarus", <http://www.unep.org/biosafety/files/BYNBFrep.pdf >, accessed 26 February 2013
[205] Biosafety Clearing-House, Law, Regulation or Guideline, http://bch.cbd.int/database/record.shtml?documentid=103684, accessed 26 February 2013
[206] Marie-Claire Cordonier Segger, Frederic Perron-Welch, Christine Frison, "Legal Aspects of Implementing the Cartagena Protocol on Biosafety", 2013, Cambridge University Press, p 231

Despite not producing any GM crops currently, according to Genetics Institute of the Belarusian National Academy of Sciences with the aim of creating GM crop line the country will plant and test the GM potato, flax and rapeseed in 3 years. The construction of the site in Minsk had to be completed in 2012 which would enable the country to present GM products to its markets in 2015. Nevertheless, the awareness of citizens about GMOs remains low. The poll has revealed that about 50% of them do not know anything about GMOs, while about 30% knows a little [207].

Since research in biotechnology is one of the main priorities, in comparison with other former Soviet countries the genetic engineering in Belarus demonstrates steadfast development and is endorsed by the Belarusian government. Belarusian scientists collaborate with Monsanto Corporation to create modified potato types and work with Russian scientist to develop GM animals, also possessing sufficient expertise for the development of GM microorganisms[208].

Moldova is in the initial phase of biotechnological and genetic engineering methods' application in agriculture, pharmaceuticals and environment protection (production of food protein and feed protein, vitamins, biologically active substances, reproduction of rear species). Although GMOs are not commercialized, they are experimentally produced for scientific objectives[209].

While the country does not grow GMOs, there are certain products in its market containing GMOs. Tests conducted within the National Biological Security System Development Project in 2004 has revealed that six of nine samples - soy flour, soy `meat`, ground soy oil-cake imported from the USA, Israel, Poland, Ukraine, Romania and Brazil contained 5% GMOs[210]. As with all other post-Soviet countries Moldova also lacks laboratories and equipments for testing GMOs. Public awareness about GMOs is also insufficient. The poll in 2004 has revealed that only 56% of respondents were aware of GMOs. It is believed that raising public awareness could reduce fears among people towards GMOs[211].

[207] International Information Group, "Belarus plans to launch GMO site in 2012", 4 August 2011, <http://www.interfax.com/newsinf.asp?id=263850>, accessed 26 February 2013
[208] Ibid.
[209] Biosafety and biosecurity legislation in Moldova, Biosafety and biosecurity experts' workshop 2009, http://www.stcu.int/bb2009/
[210] CheckBiotech "Moldova denies growing genetically modified crops", 3 December 2004 <http://greenbio.checkbiotech.org/news/moldova_denies_growing_genetically_modified_crops>accessed 26 February 2013
[211] Ibid.

NGOs in Moldova actively contribute to the development of national biosafety framework of the country. The content of the Law on Biosafety which was adopted in 2001 was significantly influenced by the NGOs seeking to harmonize it with Deliberate Release Directive (Directive 2001/18/EC) by including labeling and public participation provisions into the law The Law stipulates also the rules of import and export of GMOs, their contained use and deliberate release into the environment[212].

A National Biosafety Committee established by the Government of Moldova in 2004 is mandated with making decisions and authorizing activities concerning GMOs. The Committee informs the public regarding the governmental decisions about GMOs, holds consultations and hearings and considers comments from public while shaping its GMO policies[213] which can be considered by other post Soviet countries as a progressive practice.

Baltic States

The first legal document regulating the status of GMOs in *Estonia* was the "Seed and Vegetative Propagation Material Act" (01.06.1998, RT I 1998,52/53,771) requiring the labeling of the retail packaging of certified GM seed and vegetative propagation and cultivation material with the letters "GMO"[214]. An Act on Deliberate Release into the Environment of Genetically Modified Organisms which came into force in 1999 and was replaces by a newer version in 2004 stipulates the written permission of Ministry of Environment for the GMO's to be released into the environment and be placed in the market[215]. Regulatory approach in this field in Estonia is generally based on precautionary principle and although it may seem that the country has created sufficient legal framework and institutions to implement this principle, some authors suggest that lack of legal practice is obvious and the implementation of this principle is confusing[216].

The Ministry of the Environment is the competent authority responsible for the implementation of the Biosafety Protocol and prepares national reports on its implementation. Apart from the Ministry of Environment the GMO regulation is executed also by Ministry of Agriculture (responsible for licenses for handling and marketing of GMO food) and Ministry of Social Affairs. Two advisory committees – Gene Technology Committee and (at the Ministry of Environment) and GMO Food Committee (at the Ministry of Agriculture) conduct risk analysis of GMOs or products containing or consisting of them, but also of products derived from but not containing GMOs[217]. Soybean, corn, cotton and rape-seed are the most common GMOs in the Estonian markets.

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[212] Capacity Building and Strengthening of Partnership of Public, Civil Organizations and Business in Biosafety Issue in Moldova (2005) http://rolnictwo.eko.org.pl/parts.php?id=4&lang=en accessed 23 March 2013

[213] Ibid,

[214] FAO Corporate Document repository: Estonia < http://www.fao.org/docrep/005/Y2722E/y2722e0p.htm >accessed 15 March 2013

[215] Deliberate Release Into the Environment of Genetically Modified Organisms Act, 1 May 2004

[216] Hannes Veinla, "GMO regulation in Estonia", Avosetta Meeting on GMOs (Siena, 29-30 September 2006)< http://www-user.uni-bremen.de/~avosetta/estonia_06.pdf> accessed 26 February 2013

[217] EESTi: gateway to Estonia, Genetically Modified Organisms», <https://www.eesti.ee/eng/teemad/keskkond_loodus/looduskaitse/geneetiliselt_muundatud_organismid,> accessed 26 February 2013

In December 2004 the Estonian Union for the Protection of Nature has called government and society to declare Estonia a GMO-free zone. There have been attempts to start negotiations with the European Commission for getting special status for Estonia[218]. 287 landowner have declared their lands "GMO-free"[219].

GMO debates in *Latvia* arouse right after the EU membership when the country had to harmonize its legislation with that of the EU's and determine its stance towards GMOs. On 13 May 2009 Supervisory Council for GMOs has permitted the sale of GMOs in Latvia on condition of examination beforehand, but has banned GMO production in this country[220]. Among former Soviet countries, Latvia might perhaps be called the most anti-GMO.

According to Zinde, the possibility of biotechnological application to agriculture in Latvia is quite low and the debates about the use of GMOs creates more public mobility and activates civil society even more than an economic crisis[221]. Among the EU countries Latvia is on the 4th place for GMO denial (75% of population is against it) which is also sometimes called "eco-nationalism" or "agricultural nationalism"[222].

The Ministry of Environmental Protection and Regional Development of Latvia has declared that the cultivation of GMOs in municipal lands will be banned. Almost all of the municipalities have decided to become GMO-free. Experts even suggest that until the end of 2012 cultivation of GMOs may be prohibited nationally[223]. The measures against GMOs are carried out in governmental level. In 2009 Ministry of Environmental Protection and Regional Development organized a poll „Pro or con the GMO in Latvia" and together with the Ministry of Agriculture made proposals to the Law on GMO turnover which were supposed to facilitate the creation of GMO-free zones[224].

There are six types of GM food available in *Lithuanian* markets which are cheaper than the regular food by a third. The country possesses a reserved attitude towards GMOs and almost half of the population is against them[225]. The country has adopted legislation on co-existence of GMOs with traditional and organic farming which requires farmers 30 days prior

[218] Delfi, «Greens want to declare Estonia GMO-free», 17 December 2004, <http://rus.delfi.ee/daily/estonia/zelenye-hotyat-obyavit-estoniyu-zonoj-svobodnoj-ot-gmo.d?id=9328214>accessed February 2013

[219] GMO-free Europe: Estonia,< http://www.gmo-free-regions.org/gmo-free-regions/estonia.html > accessed 26 February 2013

[220] Z. Linde, Discursive aspects of GMO risk policy in Latvia, 2010, University of Latvia, Centre for Bioethics and Biosafety, Faculty of Biology, Kronvalda

[221] Ibid.

[222] Schwartz, Katrina Z. S. (2007), 'The Occupation of Beauty: Imagining Nature and Nation in Latvia', East European Politics and Societies 21 (2): 259, DOI: 10.1177/0888325407299781 < http://eep.sagepub.com/content/21/2/259.abstract > accessed 26 February 2013

[223] Vladislav Vorotnikov, «Latvia on the brink of complete ban of GMO products», 6 August 2012 <http://www.allaboutfeed.net/Process-Management/Management/2012/1/Latvia-on-the-brink-of-complete-ban-of-GMO-products-AAF012634W/>accessed 26 February 2013

[224]Ministry of Environmental Protection and Regional Development of Latvia «More than 35 000 inhabitants are against the GMO in Latvia», 17 March 2009, <http://www.varam.gov.lv/eng/informacija_presei/preses_relizes/?doc=8442> accessed 26 February 2013

[225]Ministry of Environment of the Republic of Lithuania, «Genetically modified organisms still surrounded by controversy in Lithuania», % January 2010, <http://www.am.lt/VI/en/VI/article.php3?article_id=247> accessed 26 February 2013

to planting GM seeds to inform Ministries of Agriculture and Environment of their intention by providing information concerning the place of cultivation and GM crops that are planned to be planted[226]. National Law on GMO Management that was adopted 12 June 2001(Nr.56-1976) mandates the Ministry of Environment with the establishment of a GMO database and issuance of permission for the activities involving GMOs and informing public about it.

Southern Caucasus

While no specific legislation regulates GMOs in Azerbaijan, provisions of different laws partially address the issue. The adoption of the "Law on Organic Agriculture" which paved the way for the importation of GMOs to Azerbaijan in July 2007 was allegedly influenced by the WTO. The requirement of the Article 16.9 of the Law concerning the indication of the use of GMOs and derivatives thereof on the labels of the organic agricultural and food products is neglected in Azerbaijan.[227] However, Article 27 of the "Law on Seed Growing" bans importation of the plant seeds derived from genetic engineering to Azerbaijan[228].

The Law on the "Usage of Genetically Modified Organisms" which is expected to be adopted soon will allow analyzing the composition of food imported to *Armenia* within a year, and in case of finding more GMOs than accepted in them, ban the entry of such food to Armenia. The Article 8 of the "Law on Food Safety" issued in 2010 requires mentioning the amount of GMOs in the label of the food which contains them[229].

The statement of the Green Party of *Georgia* that was released in October 2012 introduced a list of GM foods which consisted of meat, fish and other products currently sold in country's markets. According to the statement the products were produced in Russia and delivered to Georgia by one of the largest distribution companies[230]. Earlier that month new Prime Minister of Georgia Bidzina Ivanishvili declared that import of GM seeds and seeding would be banned to the country. He also talked about the importance of applying mandatory labeling to GM products in the near future and government's commitment to the "preservation of local cultures and development of bio farms"[231].

Central Asia

[226]Biodiversity Information System for Europe, BAP Report 2010: Action: A5.2.2 for Lithuania <http://biodiversity.europa.eu/countries_and_networks/lithuania/bap/action?id=A5_2_2> accessed 26 February 2013

[227] "Azerbaijan is helpless to prevent GMOs", 17 April 2002, <http://veteninfo.az/sosial/3702.html> accessed 26 February 2013

[228] Law on Seed Growing of the Republic of Azerbaijan, 11 March 1997, No. 257-IG < http://cis-legislation.com/document.fwx?rgn=14488 > accessed 26 February 2013

[229] The Law of the Republic of Armenia on Food Safety, 8 December, 1999 < http://www.parliament.am/law_docs/301299HO25eng.pdf?lang=eng> accessed 26 February 2013

[230] N.Kirtzkhalia, "Green Party: Main part of genetically modified food supplied to Georgia from Russia" 31 October 2012, http://en.trend.az/capital/business/2082361.html accessed 26 February 2013

[231] N.Kirtzkhalia, **"**Labelling of genetically modified products to become mandatory in Georgia", 28 October 2012, < http://en.trend.az/capital/business/2081298.html> accessed 26 February 2013

According to the National Biotechnologies Center of *Kazakhstan*, in light of the global warming cultivation of drought resistant GM varieties will be soon necessity in Kazakhstan. However, National Consumers League of the country has expressed the importance of starting Kazakhstan's own research into the GMO safety issue and conservation of the purity of its local crop varieties, especially the wheat which is highly valued in the whole world[232]. GM products are required to be registered in the "National Register of Genetically Modified Objects", can be produced only after permission of the environmental and sanitary-epidemic expertise and need to include information about the ingredients derived from living modified organisms with the threshold of 0.9%[233]. Following the information about the negative impact of the GM corn NK 603 which is resistant to Roundup herbicide on the health of rats, it was banned in the territory of the country in October 2012[234].

Despite developing its biosafety program in the framework of UNEP-GEF Project in 2004, there's not any legislation regulating GMOs in *Kyrgyzstan* which results in importation of GM seeds and products into the country without any obstacle. In October 2012 some parliament members drew attention to the necessity of adopting the law to ban the cultivation, production, import and sale of GM foods[235]. However, as one MP noted the implementation of such law could result in "fines running into the billions" for Kyrgyzstan which was the first former Soviet country to be accepted to WTO in December 1998. To this end, the importation of GMOs destined solely for contained use is regarded as a solution to the problem. The impact of GMOs on domestic agriculture is one of the main concerns since as a rural country 60% of Kyrgyzstan's 5 million population rely on agriculture for subsistence[236].

In *Tajikistan*, the Law on Biological Safety which was adopted in 2005 regulates activities on development, testing, production, import, export and release into the environment and at markets of GMOs and aims to reduce the risk posed by GMOs on human health, biodiversity, ecological balance and environment[237]. The lack of enforcement mechanism, technical equipment and specialists makes it almost impossible to control the spread of GMOs in the country.

Law of the Republic of *Turkmenistan* on the Quality and Safety of Food Products (18.04.2009 №31-IV) completely bans the cultivation, importation and distribution of GMOs in the country. Article 16 forbids the use of GMOs in food production in country, while

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[232] Dmitriy Khegai, "GMO may become a necessity for Kazakhstan", TengriNews, 9 August 2012 <http://en.tengrinews.kz/science/GMO-may-become-a-necessity-for-Kazakhstan-12074/>accessed 26 February 2013

[233] Ibid.

[234] TengriNews "Kazakhstan bans import of NK603 genetically modified corn", 29 October 2012 <http://www.gmwatch.org/latest-listing/51-2012/14363-kazakhstan-bans-import-of-monsanto-gm-maize>, accessed 26 February 2013

[235] GMO-free Europe "Parliamentary Committee orders Kyrgyz Government to develop mechanisms of ban on GMO" , 25 September 2012 <http://www.gmo-free-regions.org/stop-the-crop-action/update/news/en/26364.html > accessed 26 February 2013

[236] A.Osmonaliyeva "Fears of GM crop invasion in Kyrgyzstan " < http://www.nwrage.org/content/fears-gm-crop-invasion-kyrgyzstan > accessed 15 March 2013

[237] Convention on Biological Diversity, Tajikistan – main details <http://www.cbd.int/countries/profile/?country=tj#status> accessed 26 February 2013

Article 21 prohibits importation of such products. Under Article 25 such products are regarded as unfit and risky for human health and environment.

Despite adopting a National Biodiversity Strategy and Action Plan in 1997[238] *Uzbekistan* is not Party to Biosafety Protocol. Due to lack of appropriate legislative regulation the import of GMOs to country is not banned officially. However, Article 16 of the Law of the Republic of Uzbekistan on the Quality and Safety of Food Products (30.08.1997, N 483-I) allows for prohibition of food products presenting danger to human life and health. Nevertheless, as one of the famous cotton producers in the world Uzbekistan has achieved considerable success in developing cotton biotechnological programs[239].

Russia

While Russia ratified the Biodiversity Convention in April 1995, the country is not a Party to the Biosafety Protocol and has not developed national biosafety legislation. However, Federal Law on the Environmental Protection (10.01.2002 N 7-ФЗ) providing for requirement on the mandatory ecologically testing of GMOs effectively halters their cultivation in country. Moreover, Federal Law on Mandatory Labeling of Food Products containing GMOs (12.12.2007 N204 - ФЗ) entitles consumers to right of receiving necessary and reliable information about the food products. Thus, producers are obliged to inform consumers in case products contain more than 0.9% GMOs in them.

Conceivably, the issue of WTO membership is actively influencing country's GMO regulatory framework. According to the "letter of exchange" signed by the Russian trade minister and the US trade representative, upon entry to the WTO Russia undertook the obligation to accord with the US on regulatory system of agricultural biotechnology. On 22 August 2012 Russia became a WTO member after 19 years-long negotiations. Prior to this Russian Government made efforts to lift restrictions on GMOs in order to facilitate country's accession to the organization. In July 2012 the Russian Federal Service on Surveillance for Consumer rights protection and human well-being proposed to completely lift the restrictions from GM technologies and referred to the experience of other countries, such as the US, Argentina, Brazil and Japan in this field[240]. Interestingly, according to sociological researches the majority of Russians do not consider GMOs as precarious[241].

However, Russia temporarily suspended Monsanto Corporations NK-603 corn seed in September 2012 after a French scientists' sensational study[242] claiming that rats fed on this corn developed tumors and died earlier than those fed on regular corn. The NK-603 corn seed was relatively expensive, however developed significantly better and provided 20% increase

[238] National Strategy and Action Plan on Biodiversity Conservation of the Republic of Uzbekistan, 1997 < http://www.cbd.int/doc/world/uz/uz-nr-01-en.pdf > accessed 15 March 2013
[239] GMO Compass: Cotton < http://www.gmo-compass.org/eng/database/plants/21.cotton.html > accessed 26 February 2013
[240] Ibid.
[241] Creation of GMO-free zones in Russia < http://www.biosafety.ru/index.php?idp=116&idnt=84&idn=791 >accessed 15 March 2013
[242] J.Amos "French GM-fed rat study triggers furor" 19 September 2012 < http://www.bbc.co.uk/news/science-environment-19654825 > accessed 15March 2013

in profit. Critics claim that Russian Government's decision did not have much to do with the safety concerns and was an effort to protect Russia's fragile agriculture from the competition presented by subsidized US agriculture[243]. The National Association for Genetic Safety of Russia revealed its plan to conduct a unique research on rats fed by GMOs in March 2013 where cameras installed in rat cages will broadcast the experiment 24/7[244].

Conclusion

As relatively young independent states, former Soviet countries have developed their biosafety regulatory frameworks with the assistance of UNEP-GEF, embracing mostly a precautionary approach towards GMOs whereby pertaining to a group of states which comprises most of the developing countries and is successfully influenced by the European stakeholders promoting preventive GMO regulation[245]. Nevertheless, some of them exhibit a more open attitude in relation to GMOs expressing willingness to approve and cultivate them, citing stresses of climate change and economic interests.

The development of secondary legislation on the basis of national biosafety schemes is also increasingly influenced by developed country and large biotechnology corporation's interests, as well as by WTO membership. Most of the former Soviet countries legislation on food safety provides for provisions for the regulation of GMOs. However, they are claimed to be not-responding to changes in the world market and technological advancements[246] which results in importation of GM products to these countries in an uncontrolled amounts transforming their markets into a disposal dump of unclaimed goods in other developed countries[247].

The lack of up-to-date technical facilities and sufficient scientific expertise in developing countries affects risk assessment, management, monitoring and detection systems, which in its turn impact the development of national regulatory frameworks. Countries like Turkmenistan, Tajikistan and Kyrgyzstan do not possess any test sites and special laboratories, while these facilities in Armenia, Azerbaijan, and Kazakhstan need considerable upgrading. Among other countries Belarus demonstrates a radically different attitude towards GMOs by disregarding a precautionary approach and promoting biotechnology research at the governmental level in order to deploy its advantages for economic development. Kazakhstan shows a tendency towards cultivation of GM crops on the rationale of the consequences of global warming and climate change, and Uzbekistan succeeds in research programs in cotton strains; these countries can therefore also be characterized as pro-GMO countries.

[243]RT "EU sides with Monsanto in 'GMO Cancer Corn' word war", 5 October 2012 <http://rt.com/news/corn-study-gm-french-711/> accessed 26 February 2013
[244] GMO-free news from Russia 29 September 2012< http://www.gmo-free-regions.org/gmo-free-regions/russia/gmo-free-news-from-russia.html> accessed 26 February 2013
[245] See P.Aerni, supra note 190, 22
[246] V.Mammadov and A.Mustafayeva "CIS Countries Legislation on the Issue of Genetically Modified Products" (2011), 2-3
[247]Genetically Modified Organisms < http://dia.zp.ua/dopcontent.php?itemid=12> accessed 23 March 2013

Like in other developing countries, pressures from the developed country aiming at affecting national biosafety schemes are evident in these countries as well. Some of them have encountered the pressure to develop their national biosafety framework in a manner that can facilitate an acceptance and entrance of GMOs in their markets. While the example of Russia evidenced the influence of the potential WTO membership on its GMO policy, in the case of Ukraine, a new rule providing for labeling products containing more than 0.9% GMOs as GM products has led to discontent with WTO, as well as with the US and Canada who hold Ukraine liable for being in breach of the TBT Agreement. Conceivably, the validity of the regulatory system for GMOs in these countries will be questioned as large biotechnology corporations enter their markets where they see great potential for their GM products.

However, by democratizing the decision-making procedures regarding GMOs and promoting public participation in them can enable these developing country governments to better manage the bilateral pressures and develop regulatory schemes that meet domestic specific concerns rather than reflect developed country interests. As it was discernible from the discussions above, unlike the WTO regime, the Biosafety Protocol provides for a normative framework for this purpose.

Moreover, reinforcement of national academia in former Soviet countries can serve as an instrument not only capable of influencing public opinion through conducting an objective risk assessment, but also serving as a mediator by building bridge between conflicting developed country pressures concerning development of domestic GMO regulation. Although local NGOs and other non-state actors are capable of playing a significant part through selecting and disseminating information by their campaigns, they are often prone to adopting political agendas of their foreign sponsors while promoting or discouraging GMOs.

According to surveys in other developing countries, academia enjoys more trust and considered more reliable by public than NGOs and other non-state stakeholders[248]. In this regard, the unbiased and mediating role of national academia funded preferably by local governments need to be properly appreciated since they can assist former Soviet country governments in both managing developed country pressures and objectively assessing GMOs advantages and risks whereby helping to address local concerns of each country.

[248] See P.Aerni, supra note 190, 9

Countries	Biosafety Protocol[249]	WTO membership[250]	National biosafety frameworks[251]
Ukraine	September 11, 2003	16 May 2008	"Draft National Biosafety Framework of Ukraine " 2009
Belarus	September 11, 2003	Negotiations on accession are continuing	"Draft National Biosafety Framework for the Republic of Belarus" 2004
Moldova	September 11, 2003	July 26, 2001	"Development of the National Biosafety Framework for the Republic of Moldova" 2004
Latvia	May 13, 2004	February 10, 1999	"Development of National Biosafety Framework for the Republic of Latvia" 2004
Lithuania	February 0 5, 2004	May 31, 2001	"National Biosafety Framework in Lithuania" 2004
Estonia	June 22, 2004	November 13, 1999	"Development of the National Biosafety Framework of Estonia" 2003
Azerbaijan	June 30, 2005	Negotiations on accession are continuing	"National Biosafety Framework of Azerbaijan " 2005
Armenia	July 29, 2004	February 05, 2003	"National Biosafety Framework for Armenia" 2004
Georgia	February 02, 2009	June 14, 2000	" The Draft National Biosafety Framework for Georgia "2005
Kazakhstan	December 7, 2008	Negotiations on accession are continuing	" National Biosafety Framework Document of the Republic of Kazakhstan" 2004
Kyrgyzstan	January 03, 2006	December 20, 1998	"Development of the National Biosafety Framework in the Kyrgyz Republic" 2005
Tajikistan	May 12, 2004	March 02, 2013	"National Biosafety Framework of the Republic of Tajikistan"2004
Turkmenistan	November 19, 2008	No official interaction	-
Uzbekistan	Non-party	Negotiations on accession are continuing	-
Russia	Non-party	August 22, 2012	-

Annex. Regulation in former Soviet Union states

Table 1. Status of entry into force of Biosafety Protocol, WTO membership and development of national biosafety frameworks

[249] Parties to the Protocol and signature and ratification of the Supplementary Protocol <http://bch.cbd.int/protocol/parties/> accessed 5 March 2013

[250] Members and Observers < http://wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm> accessed 5 March 2013

[251] National Biosafety Frameworks < http://www.unep.org/biosafety/National%20Biosafety%20frameworks.aspx> accessed 5 March 2013

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- Agreement on Technical Barriers to Trade (1995)
- Cartagena Protocol on Biosafety, 2226 U.N.T.S. 208; 39 ILM 1027 (2000); UN Doc. UNEP/CBD/ExCOP/1/3, at 42 (2000)
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- Draft of the Law on the Usage of Genetically Modified Organisms of the Republic of Armenia
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- National Biosafety Framework of the Republic of Moldova, UNEP/GEF Project GF/2716-02-4520 (2004)
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