

# ETHIOPIAN FLORICULTURE AND ITS IMPACT ON THE ENVIRONMENT: Regulation, Supervision and Compliance

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## Introduction

Floriculture can be defined as “a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and for floristry, comprising the floral industry.”<sup>1</sup> It can also be defined as “The segment of horticulture concerned with commercial production, marketing, and sale of bedding plants, cut flowers, potted flowering plants, foliage plants, flower arrangements, and noncommercial home gardening.”<sup>2</sup>

Flowers are luxurious products with high social value and rarely used for food. The demand for these luxurious products has increased in the international market in recent years. The international market for flowers reached \$40 billion at the end of 2008.<sup>3</sup> The Netherlands is the leading exporter accounting for some 54 percent of world trade.<sup>4</sup>

Floriculture is one of the booming sectors in Ethiopia. The first private floriculture companies, Meskel flower and Ethio-flora, started activities around 1997 on a few hectares of land<sup>5</sup>. Today, the Ethiopian Investment Agency has given permit to 251 investors in the floriculture sector until 2008. Out of these, 61 are operational, 21 are at implementation stage, 134 are at pre-implementation stage and 36 permits have been cancelled.<sup>6</sup> This number does not include companies solely run by Ethiopians, as they do not apply to

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<sup>1</sup>See [www.answer.com/library/Dictionary+for+Gardeners-cid-30567/](http://www.answer.com/library/Dictionary+for+Gardeners-cid-30567/) last retrieved on June 2, 2009

<sup>2</sup>See [www.answer.com/library/Sci%2DTech+Encyclopedia-cid-30567/](http://www.answer.com/library/Sci%2DTech+Encyclopedia-cid-30567/) last retrieved on June 2, 2009

<sup>3</sup> Mitiambo, P.M., *Floriculture Value Chain; the Case of Kenya*, ESAMI, 2008, at. 3

<sup>4</sup> *Id.*, at. 3

<sup>5</sup> Nigussie Kassa, *Floriculture Industry in Ethiopia: Trends, Prospects and Challenges*, Jimma University College of Agriculture and Veterinary Medicine, August, 2006, at 7

<sup>6</sup> Ethiopian Investment agency, *HortiFlora Data Base raw data*, June 10, 2009

the Ethiopian Investment Agency but rather to regional investment bureaux for a permit. According to the report of the Oromia Investment Bureau, Oromia accounts for 94% of the investment in the floriculture sector and the number of companies registered in the region reached 134 (62 local, 54 foreign and 18 joint-ventures) in 2006.<sup>7</sup> Recent data show that the region has allotted more than 3,491.04 hectares of land to the sector.<sup>8</sup>

Ethiopia has earned US\$ 186 million from horticulture exports out of which 80% was generated by flower exports in 2008.<sup>9</sup> The floriculture farms engage, according to the 2008 statement of the Ministry of Trade and Industry, around 30,000 employees<sup>10</sup> (60,000 according to others<sup>11</sup>). The Ministry of Trade and Industry disclosed that in the 2008/09 Fiscal Year, the country planned to earn \$ 306 million from the flower sector.<sup>12</sup> Such plans seem to continue unless their sustainability and future expansion are affected by the global financial crisis. The level of production has made the nation the sixth greatest rose exporter in the world and the second in Africa. A UN Special envoy said that “We were surprised to learn that Ethiopia is the second-largest producer of roses in Africa, with Kenya leading, and sixth in the world after Holland, Colombia, Ecuador, Kenya and Israel. Seventy percent of the flower export goes to the Netherlands, the biggest auction center for flowers and the rest to Russia, the U.S, and Japan etc...”<sup>13</sup>

The rapid growth of floriculture in Ethiopia is due to different factors like suitable climatic and natural resources, high level of support by the government, favorable investment laws and incentives, proximity to the global market, efficiency of the transport system and availability of abundant and cheap labor.<sup>14</sup> The floriculture industry has also organized itself into an

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<sup>7</sup> Oromia Investment Commission/Bureau, *Investment Profile*, Master Printing Press, April, at 4

<sup>8</sup> Oromia Investment Bureau, *Flower data base*, accessed on June 12, 2009

<sup>9</sup> See

[http://www.floracultureinternational.com/index.php?option=com\\_content&task=view&id=885&Itemid=7&ed=47](http://www.floracultureinternational.com/index.php?option=com_content&task=view&id=885&Itemid=7&ed=47) Last visited on May 20, 2009.

<sup>10</sup> ‘Addis Zemen’, a daily Amharic newspaper of the Ethiopian government published by Ethiopian Press Agency, Issued on Saturday August 9, 2008

<sup>11</sup> Reuters Africa, *Ethiopia says recession hits Dutch flower sale*, Mon Mar 2, 2009, <http://af.reuters.com/article/investingNews/idAFJ0E5210BX20090302/> last visited on June 3, 2009.

<sup>12</sup> See ‘Addis Zemen’ Supra note 10

<sup>13</sup> UN Special, *Ethiopian Millennium – Coming up Roses; After Coffee - Ethiopia’s Other Export*, September 2007, pages 40 and 41.

<sup>14</sup> See Nigussie Supra note 5, at 31. See also Federal Negarit Gazeta, *Investment Proclamation No. 280/2002* Federal Negarit Gazeta, *Investment (Amendment)*

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association called the, Ethiopian Horticulture Producers and Exporters Association (here after EHPEA), which is helping the sector.

Due to the growth of the industry, environmental concerns are indeed growing. This article looks at some of these environmental concerns relevant for Ethiopia. The article confines itself to some of the very prominent environmental concerns. Environmentalists are raising many concerns in relation to the expansion of floriculture in Ethiopia such as the use of pesticides and chemical fertilizers, disposal of waste materials, and the protection of water bodies. According to environmentalists, the industry uses too much pesticides and chemical fertilizers which damage the environment. They believe that too much pesticide is getting into water bodies damaging the biodiversity and excessive chemicals are killing useful organisms in the soil. Environmentalists are also concerned, that waste materials will damage the environment – will get into the soil, into water bodies or be used by people and cause serious damage.

The article assesses the industry's environmental impact and the threat it is creating to the natural environment. The first section examines these allegations after the introduction. In the second, third and fourth sections, the regulatory instruments – national policies and laws, code of practice developed by the sector and the market/labeling system are assessed. Specifically, this will include environmental impact assessment in the industry, the presence or lack of laws and standards in the use of chemical fertilizers and pesticides and the practice of monitoring of the same, if any, the feasibility of tasks done by the floriculture farmers and agencies to minimize the adverse environmental impact of the sector's water use and disposal of waste. Moreover, the extent to which the industry observes the compliance standards required in binding instruments and regulatory schemes will be assessed.

Literature has been reviewed to assess the impact of the industry on the environment and to explore some lessons from other nations. In addition, legislation, policies, strategies and reports have been consulted where necessary. Empirical data obtained through interviews with floriculture farmers, agency officials and experts on the subject have also been used to indicate the degree of the threat and the extent of compliance.

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*Proclamation No. 375/2003, and Federal Negarit Gazeta, Council of Ministers Regulations on Investment incentives and Investment Areas Reserved for Domestic Investors (Council of Ministers Regulations No. 84/2003)*

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## 1. Environmental Impact of the Floriculture Activities

With the expansion of the floriculture industry, there is a growing concern as to its adverse effect on the national environment. Ato Tsegaye Abebe, Head of EHPEA, is aware of this concern and stated that, “When any new sector is introduced into a country there are inevitably concerns about the impact of the sector on the local environment....”<sup>15</sup> This section highlights the kinds of environmental risks - use of fertilizers, pesticides, and safe disposal of wastes - involved, the extent of the threat and the activities undertaken by other nations to combat the risk.

### 1.1- Fertilizers

Some environmentalists are of the opinion that the environment is unique and irreplaceable, and therefore no “price” can or should be assigned to it. This argument is typically used against policies that trade off environmental objectives against economic interests. The argument may be criticized because “if taken literally it would make daily living impossible”<sup>16</sup> and prohibit any development activities. The viable course of action thus seems to be minimizing the adverse impact of floriculture on the environment.

Much criticism has been forwarded against chemical fertilizers. Yet, in the absence of realistic alternatives to chemical fertilizers and pesticides in agriculture, the insistence to their use continues.<sup>17</sup> The only alternative to chemical/artificial fertilizers, is the use of organic<sup>18</sup> cultivation.<sup>19</sup> Nitrogen in

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<sup>15</sup> See Flora Culture International, supra note 9.

<sup>16</sup> David G. Abler, 659 *NAFTA*, [North Atlantic Free Trade Association], *Agriculture and the Environment*, 28 *Tulsa L.J.* 659, Summer, 1993, International Agriculture Symposium.

<sup>17</sup> *Id.*

<sup>18</sup> There is no a general consensus in the society as to what ‘organic production’ means. But According to the US Organic Foods Production Act of 1990, in April 1995 the National Organic Standards Board (NOSB) reached a consensus and defined organic agriculture as (a)n ecological production management system that promotes and enhances biodiversity, biological cycles, and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain, and enhance ecological harmony. See also Claire S. Carroll, 117 *What does “organic” mean now? Chicken and wild fish are undermining the Organic Foods Production Act of 1990, evolution of the legal definition of “organic”-business interests must be stopped from re-defining “organic” contrary to the purpose of the Organic Food Production Act of 1990*, 14 *San Joaquin Agric. L. Rev.* 117,2004.

<sup>19</sup> Artur Granstedt and Lars Kjellenberg, *Long-Term Field Experiment in Sweden: Effects of Organic and Inorganic Fertilizers on Soil Fertility and Crop Quality*, (In

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fertilizer can produce nitrates, which can be washed away from fields by rain or irrigation, eventually finding their way to water bodies and soil. Water pollution, soil and water quality degradation, human and cattle health effects, air pollution, risk on aquatic life, as well as water logging and salinization are only a few of the undesired impacts discussed below.

#### a) Effects on Health

Many diseases such as *Methemoglobinemia*, Japanese encephalitis (JE), cancer etc. have been noted due to use of chemical fertilizers. Research demonstrates that “on rare occasions, nitrates have caused infants to become ill or die of *Methemoglobinemia* (more commonly known as blue-baby syndrome).”<sup>20</sup> *Methemoglobinemia* occurs when the excess nitrates that remain in the soil move into the ground water and when this water is used for drinking by human beings as a result of which the nitrite interferes with the oxygen carrying capacity of the blood.<sup>21</sup> Nitrates are also suspected to cause cancer, especially stomach cancer, and non-Hodgkin's lymphoma, although the proof is inconclusive and the intensity of these risks is unknown.<sup>22</sup> Excess use of urea also causes a human disease called *Japanese encephalitis (JE)*, which mainly affects children between the ages of four to fourteen years.<sup>23</sup> Cattle are also exposed to many diseases when they graze on fields with high content of chemical fertilizers.<sup>24</sup>

#### b) Effects on Soil

A growing crop does not take up all the nutrient ions in the fertilizer applied to the soil. Generally, healthy soil contains enough nitrogen fixing bacteria, which fixes sufficient atmospheric nitrogen to supply the needs of the growing plants.<sup>25</sup> But continued use of chemical fertilizers may destroy these nitrogen-fixing bacteria and many other micro- and macro- organism of the soil.<sup>26</sup> In addition, acids in chemical fertilizers, such as sulfuric acid and hydrochloric acid, which tends to increase the acidity of the soil, reduces the soil's beneficial organism population and interferes with plant growth.

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Proceedings of an International Conference in Boston, Tufts University, Agricultural Production and Nutrition, Massachusetts March 19-21, 1997.) at 5

<sup>20</sup> See David G. *Supra* note 16.

<sup>21</sup> Rumita Chowdhury, *Effects of Chemical Fertilizers on the Surrounding Environment and the Alternative to the Chemical Fertilizers*, ENVIS Newsletter, Indian Environmental Society, Vol VII, No III, 2004, at 7

<sup>22</sup> See David G. *Supra* note 16.

<sup>23</sup> See Rumita Chowdhury *Supra* note 21.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

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### c) Effects on Aquatic Life

There are many fertilizers, which leak through the soil to the ground water or ditches and streams, thus causing water pollution. In a process known as *eutrophication*, fertilizer washed from fields into surface waters stimulates algae growth, which blocks sunlight needed by aquatic vegetation putting their survival at stake.<sup>27</sup> This loss in vegetation disrupts the food chain, leading to the death of economically important aquatic life. Moreover, this causes depletion of oxygen found in the water thus degrading the quality and usability of the water.<sup>28</sup>

### d) Effects on Atmosphere

Some fertilizers, like Urea, spread in the fields with the help of sprayers and the ammonia therein react with the water present in the air causing the formation of ammonia oxide, and hence air pollution.<sup>29</sup>

### e) Water Logging and Salinization

Abler wrote that “Naturally, some water seeps into the ground from irrigation ditches and canals. In what is called water logging, this seepage can cause the subsoil water table to rise to the root zone of crops, killing them. The problem can be compounded by salinization, which occurs when water logging brings harmful salts to the surface.”<sup>30</sup> Some plants, e.g. tomatoes, have very low tolerance for salt making growth nearly impossible in saline soil. Salinization occurs because salt is left behind as irrigation water evaporates,<sup>31</sup> or from leaking of salt and minerals from the soil due to water use for agriculture.<sup>32</sup>

During their growth cycle, the West Australian Government has recommended the following to minimize the adverse effect of fertilizers on the environment:<sup>33</sup>

- Regular monitoring of the soil nutrient concentrations (nitrogen, phosphorous and potassium) in the bed and adding fertilisers only when necessary;

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<sup>27</sup> See David G. Abler, *Supra note 16*.

<sup>28</sup> Steven Ferrey, *Environmental Law – Explanation and Examples*, Aspen Publishers, NY, US, 2004, at. 3

<sup>29</sup> See Rumita Chowdhury *Supra note 21*.

<sup>30</sup> See David G. *Supra note 16*.

<sup>31</sup> *Id*

<sup>32</sup> See Ferrey, *supra note 28*, at 8

<sup>33</sup> Department of Water, Government of West Australia, *Water Quality Protection Note - Floriculture activities near sensitive water resources*, 17 July 2006. at 5 [www.water.wa.gov.au/](http://www.water.wa.gov.au/) Last visited on May 26, 2009.

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- Testing the soil prior to planting and managing the soil pH, essential humus (containing carbon to sustain useful soil microorganisms), salinity and variable nutrient; and
- Tracing element requirements of plants.

Moreover, it suggested that *fertigation* (the controlled application of soluble fertiliser in irrigation water), and computer based programs, such as *Fertijet* and *Fertigal*, or plant leaf tests be used to determine the appropriate amount of fertiliser required.<sup>34</sup> If there is the argument that this is not practical, application of small amounts of fertiliser suitable for growth stage of the plants should be done<sup>35</sup> in spite of all the drawbacks highlighted above.

## 1.2- Pesticides

Pesticides (which include herbicides, insecticides, fungicides and more) can contaminate organisms, soil, water, turf, and other vegetation. It is estimated that less than 0.1 percent of the applied pesticide reaches the target pest, leaving 99.9 percent as a pollutant in the environment, including the soil, air, and water, or on nearby vegetation.<sup>36</sup> The adverse effect of pesticide use includes degrading water and soil quality, effect on non-targeted lives like soil organisms, aquatic life, human beings, insects, cattle etc, air pollution, and increase of pesticide resistance by targeted pests.

### a) Water

Pesticides can move from the site of application via drift, volatilization, leaking, and runoff. Pesticides, including herbicides, can and do leak to contaminate ground water. Once ground water is polluted with toxic chemicals, it may take many years, a huge expense and a complex process for the contamination to be cleaned up. As a result, the contamination (by pesticides) of ground and surface water, which supplies the greatest part of drinking water, is a serious problem worldwide.<sup>37</sup> When pesticides contaminate water, they can be harmful to the fish and other marine or freshwater animals that live there.

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<sup>34</sup> *Id.*

<sup>35</sup> *Id.*

<sup>36</sup> Pimentel, D. *Amounts of pesticides reaching target pests: environmental impacts and ethics*. *Journal of Agriculture and Environmental Ethics* 8, 1995:17-29.

<sup>37</sup> David Pimentel, *Overview of the Use of Genetically Modified organisms and Pesticides in agriculture*, *Indiana Journal of Global Legal Studies*, Fall, 2001 (9 Ind. J. Global Legal Stud. 51): Symposium: Sustainable Development, Agriculture, and the Challenge of Genetically Modified Organisms)

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### b) Soil Organisms

Soil is a dynamic living system with a variety of micro- and macro- floral and faunal species including *bacteria*, *actinomycetes*, *fungi*, *nematodes*, *arthropods*, *crustaceans* and *earthworms*.<sup>38</sup> These flora and fauna play a primary role in the degradation of plant and animal residues and other organic matter in the environment as well as in nitrogen fixation, nitrification and the release of nutrients from soil minerals.<sup>39</sup> Anything that affects their activities in turn affects the function of soils in crop production, and in the global carbon and nitrogen cycles.<sup>40</sup>

### c) Pesticide Resistance

The extensive use of pesticides has resulted in the development of pesticide resistance in many insect pests, plant pathogens, weeds, and rats.<sup>41</sup> Worldwide, more than 500 insect and mite species, more than 150 plant pathogen species, and more than 275 species of weeds have become resistant to herbicides. The estimated cost of pesticide resistance in pests in the United States, for example, is estimated to reach \$1.4 billion annually<sup>42</sup>.

### d) Non – Target Organisms

The effect of pesticide on non-target organisms is also immense. It has been reported that about ten million non-target organisms including thousands of domestic animals are poisoned each year throughout the world.<sup>43</sup> Moreover, it destroys the population of natural enemies, whose destruction and lack of biological control in agriculture, result in food loss due to pests which can

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<sup>38</sup> *Impact of Long Term Pesticide Usage on Soil Properties Using Radiotracer Techniques*, Report of a Final Research Coordination Meeting organized by the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture and held in Hangzhou, Zhejiang, Peoples' Republic of China, 24-28 May 1999, at p. 1

<sup>39</sup> Doetsch, R.N., Cook, T.M., Eds, *Introduction to Bacteria and Their Ecobiology*. Univ. Park Press, Baltimore, Maryland, USA (1974). See also Frankenberger, W.T., Jr. and M.A. Tabatabai. 1991. *Factors affecting L-asparaginase activity in soils*. Biol. Fert. Soils 11:1- 5).

<sup>40</sup> Jess Silver and Becky Riley, *Environmental Impact of Pesticides Commonly Used on Urban Landscapes*, September 2001, Northwest Coalition for Alternative to Pesticides/NCAP, Eugene, Oregon.) Pages 8-18). See also Impact of Long Term Pesticide Usage, *Supra note 38*.

<sup>41</sup> David Pimentel & Hugh Lehman, *Assessment of Environmental and Economic Costs of Pesticide Use, in the Pesticide Question: Environment, Economics, and Ethics* 47, 1993, at 55. See also Vandana Kaushik, *Problem Posed by Fertilizers and Pesticides*, IRENet, ENVIS Newsletter, Indian Environmental Society, Vol VII, No III, 2004

<sup>42</sup> See, David Pimentel, *supra note 41*, at 60.

<sup>43</sup> *Id.*

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increase by as much as fifty-eight percent.<sup>44</sup> Pesticide use also has an adverse effect on the pollination process as honey and wild bees are vital for pollination of about one-third of fruits, vegetables, and other crops worldwide.<sup>45</sup> Wild birds and mammals are also hurt by the application of pesticides.<sup>46</sup> The ethical issue that arises at this juncture is the extent to which it is justifiable to destroy thousands of species for the purpose of killing the “harmful” few.

#### e) Air Pollution

Many pesticides can volatilize (that is, they can evaporate from the soil and foliage, move away from the area of application, and contaminate the environment).<sup>47</sup> As much as 80-90 percent of applied pesticides can be volatilized within a few days of application.<sup>48</sup> Research conducted in the US shows the availability of pesticide residues in air.<sup>49</sup>

Accounting for all of these effects, a conservative estimate of the total damage to the environment and public health caused by pesticides is about \$9 billion each year.<sup>50</sup> Research is not available to show how much of this impact is contributed by the floriculture sector, but it is obvious that the sector usually uses more fertilizer than conventional farming.

### 1.3. Waste Disposal

Floriculture activities produce different types of waste ranging from liquid to solid, hazardous to non-hazardous, and in effect require safe waste disposal

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<sup>44</sup> *Id*

<sup>45</sup> David Pimentel et al., *Economic and Environmental Benefits of Biodiversity*, 47 *BioScience* 747, 753 (1997).

<sup>46</sup> David Pimentel et al., *Environmental and Economic Impacts of Reducing U.S. Agricultural Pesticide Use*, in 1 *CRC Handbook of Pest Management in Agriculture* 679 (David Pimentel et al. eds., 2d ed. 1991).

<sup>47</sup> Glotfelty and Schomburg. *Volatilization of pesticides from soil in Reactions and Movements of organic chemicals in soil*. Eds. BL Sawhney and K. Brown. Madison, WI: Soil Science Society of America Special Pub, 1989.; and Que, S. et al.. *Factors effecting the volatility of DDT, dieldrin, and dimethylamine salt of (2,4-dichlorophenoxy) acetic acid (2,4-D) from leaf and glass surfaces*. *Bull. Environ. Contam. Toxicol.* 13(3): 1975, at 284-290.

<sup>48</sup> Majewski, M. and P. Capel. *Pesticides in the atmosphere: distribution, trends, and governing factors. Volume one, Pesticides in the Hydrologic System*. Ann Arbor Press Inc. pg. 1995. 118.

<sup>49</sup> USGS. *Pesticides in the atmosphere: current understanding of distribution and major influences*. Fact Sheet FS-152-1995. <http://water.wr.usgs.gov/pnsp/atmos/> Last visited on May 27, 2009

<sup>50</sup> See David Pimentel, *Supra* note 37

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and differentiated treatment. Empty chemical containers (fertilizers, pesticides) and their washing waters and obsolete chemicals are the major spheres of concern in addition to which other agricultural waste such as cut off crop parts, unused soil, and waste water are generated in the sector.

In the UK, waste has been understood as any substance which constitutes a scrap material or an effluent or other unwanted surplus substance arising from the application of a process; or, any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled (not explosive).<sup>51</sup> Hazardous wastes are those which contain hazardous substance(s) in a quantity liable to cause death, injury or impairment to living beings, pollution of waters, or an unacceptable impact on the environment if not properly treated, handled or disposed of.<sup>52</sup> It is believed that toxic/hazardous wastes have an adverse effect on the environment and human health. These include increased exposure to cancer, and children born near toxic waste sites can be physically deformed or have developmental disabilities.<sup>53</sup>

There are different types of waste disposal mechanisms including landfill, incineration, anaerobic digestion and recycling. Unfortunately, they are unevenly implemented partially because of the cost involved. The most common disposal methods, in the UK, for example, are landfill (the disposal of waste material or refuse by burying it in natural or excavated holes or depression<sup>54</sup>) and to a lesser extent incineration. A less common but more sustainable method of waste disposal is anaerobic digestion (a process whereby waste decomposes in an enclosed chamber, unlike in a landfill site). Recycling of waste is also a means whereby organic waste breaks down over a few weeks into mulch which can be used as soil fertiliser. In the UK, it is a criminal offense for a person to deposit controlled waste at an unlicensed site or to knowingly cause or knowingly permit it to be deposited at such a site.<sup>55</sup> It is also a criminal offense to treat, keep, or dispose of controlled waste other than in compliance with a license, or to treat, keep, or dispose of controlled

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<sup>51</sup> See [http://www.envocare.co.uk/hazardous\\_waste.htm/](http://www.envocare.co.uk/hazardous_waste.htm/) last visited on May 27, 2009, See also EPA 90, s.75.

<sup>52</sup> Id.

<sup>53</sup> See <http://www.answers.com/topic/toxic-waste/> last visited on May 26, 2009.

<sup>54</sup> See Microsoft® Encarta® 2008. © 1993-2007 Microsoft Corporation. All rights reserved.

<sup>55</sup> UK Environmental Protection Act 1990, Chapter 43, §33(1) (a), (6).

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waste “in a manner likely to cause pollution of the environment or harm to human health” whether or not a person has a license.<sup>56</sup>

Under the US legal regime, the Resource Conservation and Recovery Act of 1976 (RCRA) has defined ‘solid wastes’ as “any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.”<sup>57</sup> Wastes can also be classified as hazardous and non hazardous wastes by considering their effect on human health and environment.

In the US, land disposal<sup>58</sup> sites are determined according to the nature of the waste and its threat to the environment and human health.<sup>59</sup> Accordingly, three classes of land disposal sites are in use in the United States. Class I, “Waste Management Units for Hazardous Waste,” is used primarily for hazardous waste treatment<sup>60</sup> residues. Class II, “Waste Management Units for Designated Waste”, are designated solely for certain solid hazardous wastes, such as asbestos. Class III, “Landfills for Non hazardous Wastes,” accepts common household waste and construction debris.

It is not hard to know that empty chemical containers contain residual amounts of chemicals and require safe disposal. In an effort to ensure that this residue is handled, recycled or disposed of properly, procedures have been

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<sup>56</sup> *Id.* at, Chapter 43, §33(1) (c), (6).)

<sup>57</sup> 42 U.S.C. 6903(27) (2000). See also Jeffrey M. Gaba, *Rethinking recycling*, 38 *Envtl. L.* 1053 (2008)

<sup>58</sup> US law defines disposal as a discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters. See 42 USCA § 6903(3), and also Richard B. Gallagher, J.D., John Kimpflen, J.D., and Tim A. Thomas, J.D., § 1158. *Hazardous waste treatment, storage, and disposal facilities*, 61C *Am. Jur. 2d Pollution Control* § 1158, 2009.

<sup>59</sup> See Robert *Supra* note 57, at § 24

<sup>60</sup> “The term ‘treatment’, when used in connection with hazardous waste, means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste non hazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume. Such term includes any activity or processing designed to change the physical form or chemical composition of hazardous waste so as to render it non hazardous.” 42 USCA § 6903(34) See also Richard B. Gallagher, J.D., John Kimpflen, J.D., and Tim A. Thomas, J.D., § 1158. *Hazardous waste treatment, storage, and disposal facilities*, 61C *Am. Jur. 2d Pollution Control* § 1158, 2009).

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prescribed by different institutions<sup>61</sup> in harmony with the national legal frameworks. According to the Princeton and Penn State universities, chemical containers that have been emptied must be triple-rinsed with water or other suitable solvent and dried before disposal.<sup>62</sup>

The West Australian government believes that liquid waste and leachate from floriculture activities may contain high levels of nutrients, pesticides and other chemicals derived from different sources.<sup>63</sup> Its guideline further state that, “Flower preservative solutions normally contain carbohydrate, usually in the form of sucrose, plus a bactericide, fungicide, and a wetting agent. These latter chemicals prevent organisms developing in the vase water and blocking the cut stems, and improve water uptake. Some long used floral preservatives may also contain heavy metals; however there are now alternative low toxicity preservatives available.”<sup>64</sup> As a result, the guideline puts reuse or recycling of liquid wastes residuals as a primary option. Or else, it should be collected and stored in ‘an impermeable container’ or ‘solar evaporation pond’, and be transported offsite for safe disposal at a local government approved waste facility, remote from any sensitive environment.<sup>65</sup>

The guideline recommends recycling to be used as a primary method of disposing solid wastes (includes packaging, washed chemical drums, bags, and inert waste material, such as clean soil or rock), or disposing of them “outside any sensitive environment at a local government approved waste disposal facility”.<sup>66</sup>

Water is the first and foremost substance under threat as a result of floriculture activities discussed above. To minimize, if not avoid, the adverse effect of floriculture activities on water, especially due to the use of chemical fertilizers, pesticide and unwarranted waste disposal, the west Australian government’s guideline, *inter alia*, recommends a separation distance of at least 100 metres between non-contained floriculture, i.e. the farms that involve irrigation and/ or regular additional inputs of chemicals (including fertilizers) directly to soil connected to the environment and drinking water source bores (i.e. the place where drinking water well or drilled hole or tunnel

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<sup>61</sup> *Disposal of Empty Chemical Containers*, Penn State Environmental health and Safety (EHS), Available at [www.ehs.psu.edu](http://www.ehs.psu.edu), Princeton University Environmental Health and Safety (EHS) Guidelines, available at <http://web.princeton.edu/sites/ehs/chemwaste/mtcontainers.htm>, last visited on May 25, 2009.

<sup>62</sup> *Id.*

<sup>63</sup> See Department of Water, Government of West Australia *Supra note 33*.

<sup>64</sup> *Id.*, at 6

<sup>65</sup> *Id.*, at 6

<sup>66</sup> *Id.*, at 6

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is found) or the full supply level of surface water storage reservoirs and their feeder streams. It is to be noted that fully contained plant growing on the contrary does not have on-site discharge.

Adequate separation distances should be maintained between floriculture and natural waterways to minimise the risk of degradation of water quality; a minimum vertical separation distance of two metres to the maximum groundwater table (end of wet season for free draining soils), should be maintained to avoid water logging and allow for soil contaminant filtration and aerobic microbial action. Besides, the sites of flower farms should be gently sloping ground where gradients are between one in 10 and one in 200.<sup>67</sup>

## **2. Regulatory Framework and Compliance: National Policies and Laws**

The problems stated above will be very severe if the controlling framework, within the sector or from government, is loose. Policy plays a vital role in the formulation and implementation of any regulatory framework. Based on the national policy, laws have been enacted. The Environmental Policy of Ethiopia and Ethiopian Water Resource Management/ Sector Policy are a few which are substantiated by laws.

### **2.1- Environmental Policy**

The Environmental Policy of Ethiopia (EPE)<sup>68</sup> included various policy directions which address the need to protect and develop the environment and conserve national resources for sustainable use. As a key guideline principle, the policy takes the position that when a compromise between short-term economic growth and long-term environmental protection is necessary, it is better to err on the side of caution as far as possible because rehabilitating a degraded environment is very expensive.<sup>69</sup>

EPE underlines the necessity of undertaking full environmental, social and economic impact assessment of all development programmes.<sup>70</sup> Other than the EPE, the Ethiopian Water Sector Policy and the Ethiopian Water Sector Strategy<sup>71</sup> make it very clear that environmental conservation will be

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<sup>67</sup> *Id.*, at 3-5.

<sup>68</sup> FDRE, *Environmental Policy of Ethiopia (EPE)*, 1997.

<sup>69</sup> *Id.*, Section 2.3(f) page 5.

<sup>70</sup> *Id.*, Section 3.1(s) page 8 and Section 4.9 (a-c) page 18.

<sup>71</sup> FDRE Ministry of Water Resources, *Ethiopian Water Resource Management/ Sector Policy*, 2001, Section 2.2.2 (A) page 9, and FRDE Ministry of Water Resources,

an integral part of all water related projects. To this end, Environmental Impact Assessment (EIA) is mandatory in all water resource projects. Moreover, standards and classification systems will be established in relation with the various water uses by laying down quality standards and quantity including limits and ranges of desirable and permissible levels, waste discharges, source development, catchments, management, etc.<sup>72</sup> But there seems to be a gap regarding when and by whom these standards are to be formulated.

EPE underlines recycling waste water when it is found to be safe for health and environment or when the recycling cost is not high.<sup>73</sup> With regard to fertilizer use, EPE promotes the use of organic matters.<sup>74</sup> EPE also regulates waste management by stipulating that waste disposal guidelines and strategies, and regulations to enforce them will be formulated, and an effective monitoring system will be established.<sup>75</sup>

However, the extent to which these guidelines have been formulated during the last 12 years since the EPE came into existence is a point of controversy. Standards to control discharge of pollutants from the agricultural sector have not yet been formulated. Yet, there is inadequate awareness about the environmental harm caused by the usage of pesticides and chemicals in the agricultural sector. Recycling of wastes, control of imports and control of unused hazardous chemicals have to be considered as well.<sup>76</sup> Providing “adequate regulation of agricultural (crop and livestock) chemicals and micro-organisms” should also be undertaken in addition to the precaution required in minimizing and preventing, if possible, the discharge of hazardous substances and application of the ‘polluters pays’ principle.<sup>77</sup>

## 2.2. Legislation

Although there are gaps in the sphere of implementation, laws have been enacted, however insufficient they may be, to regulate the floriculture sector. Upon the issuance of permit, investors give an undertaking that they will be

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*Ethiopian Water Resource Management/ Sector Strategy*, 2001, Section 4.1.10(1), page11.

<sup>72</sup> *Id.* Water Policy Section 2.2.2 (c) page 10 and Water Strategy Section 4.1.10(1) page11.

<sup>73</sup> *See EPE Supra note* 68, Section 3.4 (j) page 11 and Section 3.4 (a) page 11.

<sup>74</sup> *Id.* Section 3.1(c) and (d) page 7.

<sup>75</sup> *Id.* Section 3.8 (g-i) page 16 and 17

<sup>76</sup> *Id.* Section 3.8 (m-o) page 17).

<sup>77</sup> *Id.* Section 3.8 (a-d) page 16

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bound by and work according to national laws.<sup>78</sup> As a result, irrespective of nationality and place of investment, the entire floriculture activity is governed by these laws.

Polluting<sup>79</sup> the environment is prohibited as stipulated in various laws.<sup>80</sup> For example, the Water Resource Management Proclamation prohibits disposing of waste into any water bodies unless one gets a permit from the appropriate authority.<sup>81</sup> Public Health Proclamation only allows disposal of waste in a *pecially designated* place and in a manner which does not affect public health, and allows disposal of solid, liquid or any other waste in a manner which does not contaminate the environment or affect public health.<sup>82</sup> However, the attention given to the environmental impact of the floriculture wastes is very poor and is evident in the weak link between the farms and EPA.<sup>83</sup>

With regard to hazardous waste and chemicals, Article 4 of the Environmental Pollution Control Proclamation stipulates that generation, transportation and use of a chemical categorized as hazardous or of restricted use requires a permit from the EPA or the relevant regional environmental agency (hereafter REA).<sup>84</sup> Moreover, as per Article 6 of the same, the EPA, in consultation with competent agencies, is required to formulate standards, among other things, for the discharge of effluents into water bodies and sewage systems, for the types and amounts of substances that can be applied to the soil or be disposed of on or in it, and waste management standards specifying the levels allowed and the methods to be used in the generation, handling, storage, treatment, transport and disposal of the various types of

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<sup>78</sup> *Ato Taddese Gashaw*, Agricultural Projects Facilitation and Aftercare Expert in the Federal Investment Authority, an interview conducted on June 03, 2009.

<sup>79</sup> Pollution is defined as “any condition which is hazardous or potentially hazardous to human health, safety, or welfare or to living things created by altering any physical, radioactive, thermal, chemical, biological or other property of any part of the environment in contravention of any condition, limitation or restriction made under this Proclamation or under any other relevant law”. Art.2(12)of *Environmental Pollution Control Proclamation No. 300/2002*

<sup>80</sup> Importation of new equipment that is used to control pollution shall, upon verification by the Authority, be exempted from payment of custom duty and other additional incentives are foreseen in the future.

<sup>81</sup> Art 10(2) and 11 (1) (d) of *Water Resource Management Proclamation No 197/2000*,

<sup>82</sup> Art 12 of *Public Health Proclamation No 200/2000*

<sup>83</sup> *Ethiopia: Cut flower Bonanza: At What Cost?* Jimma Times, Published 02/18/2008 - 3:18 p.m. GMT, By Tamiru L. Obole | JT Senior Reporter, available at <http://www.jimmatimes.com/article.cfm?articleID=17680/> last visited on May20, 2009.

<sup>84</sup> Art of Article 4

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waste. But the Environmental Council (EC)<sup>85</sup> of EPA has to some extent, succeeded in coming up with standards but only with regard to the discharge to water and emission to air of twelve different kinds of industries.<sup>86</sup>

The other regulatory device underlined under the policies we have seen so far and emphasized in most environmental legislation is the necessity of Environmental Impact Assessment (EIA)<sup>87</sup> before engaging in development activities. With such an end in view, the Environmental Impact Assessment Proclamation authorizes EPA to issue directives that will help to select projects not likely to have negative impacts and that would not require environmental impact assessment, and projects likely to have negative impacts and requiring environmental impact assessment.<sup>88</sup> In April 2009 the Environmental Council has approved ‘a directive issued to determine the categories of projects subject to the Environmental Impact Assessment’. The directive is yet to be published so that it can be ready for implementation. Yet, it is indeed a good development that ‘*horticulture and floriculture development for export*’ are among the 22 (twenty two) types of projects which require Environmental Impact Assessment. Moreover, Articles 11 and 12 of the Proclamation require EPA to follow up and monitor the implementation of the project already done according to the EIA and to see whether circumstances have occurred which might require a new EIA to be done.<sup>89</sup>

Moreover, the Environmental Impact Assessment Proclamation requires a licensing agency, prior to issuing an investment permit or a trade or an operating license for a project, to ensure that the EPA or REA has approved it. Without authorization from EPA or REA, no person can commence

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<sup>85</sup> To understand the powers of the EC see Arts.7-10 of the, *Environmental Protection Organs Establishment Proclamation No. 295/2002*

<sup>86</sup> “The Environmental Council has approved the Industrial Pollution Prevention and Control Regulation, directive and standards in April 2009. Under the standards, the types and amounts of discharge to water and emission to air from twelve kinds of industries are determined. However, these standards and directives are not yet published and ready for implementation.

<sup>87</sup> EIA is defined as “the methodology of identifying and evaluating in advance any effect, be it positive or negative, which results from the implementation of a proposed project or public instrument” Art 2 (3) of *Environmental Impact Assessment Proclamation No. 299/2002*

<sup>88</sup> Art 5 of, *Environmental Impact Assessment Proclamation No. 299/2002*,

<sup>89</sup> See also Art 6(5)-(7) of *Environmental Protection Organs Establishment Proclamation No. 295/2002*

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implementation of any project that requires environmental impact assessment according to the 2002 EIA Proclamation.<sup>90</sup>

### 2.3- Modalities of implementation

The relationship between the Ethiopian Investment Agency and EPA does not seem to have the due harmony and concerted cooperation towards ensuring the environment compliance standards set forth in the policies and various laws. A few years ago, the investment office used to request EPA to provide approval of the EIA report of the project before issuing a permit. But with the aim of accelerating the issuance of the investment permits and to ensure a 'one window shopping' service, the Ethiopian Investment Agency started issuing the permit before EIA was done. The Investment Agency then notified EPA after issuance of investment permits so that EPA can deal with the investor.<sup>91</sup> Issuance of an investment license before EIA has clearly reduced the incentive of investors to go through the process of impact assessment. Hence, neither the EPA nor the investment agency could find it easy to demand and effectively implement EIA report from investors.

The two offices seem to have failed to conduct coordinated efforts to solve the gap. According to Ato Solomon Kebede, Head of EIA Service, the solution provided by the government is transferring EIA review to each sectoral agency, like the Ministry of Trade and Industry, the Ministry of Health, the Investment Agency etc. This is an indication of how the matter became fragmented and the power of reviewing EIA reports and monitoring the same given by the proclamation to EPA has been given to agencies involved in the implementation of the project. Consequently, EIA reports of the floriculture sector are expected to be reviewed and supervised by the Ministry of Agriculture and Rural Development according to Ato Solomon.

For obvious reasons, these agencies cannot be regulatory bodies of a project over which they have an interest, and when the project is funded by the national government. Even worse, agencies do not have sufficient expertise to review EIA. However, donors in many instances have refused to accept EIA review accomplished by agencies, and when this occurs EPA has been called to review the EIA.

Ato Solomon added that as a result of the current negotiations between EPA and the Development Bank of Ethiopia, the Bank made EIA statements

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<sup>90</sup> See EIA Proclamation *Supra* note 86, at Article 3

<sup>91</sup> Ato Solomon Kebede, Head EIA Service, EPA, interview conducted on June 12, 2009 in his office and see Ato Taddese Gashaw, *Supra* note 78.

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and EPA's review a precondition for the grant of loan to the floriculture sector. As a result, around 10 floriculture farms have done EIA reports; not with the aim to fulfill the legal requirements but only to get a bank loan from the Development Bank of Ethiopia. Yet, companies also have the option of obtaining loan from other banks and EIA statements will not be required by any of these other local banks. It is surprising to hear that Sher, the largest floriculture company in Ethiopia with 500 hectares of farm around Zeway, has not done EIA yet. Environmental Impact Assessment should have been proactive task, but now it is being demanded after the company has gone far in production and after it has become too late to stop production for the mere lack of EIA. On the other hand, Ato Fekede Terefe and Ato Ahmed Hussien,<sup>92</sup> experts in Oromia Investment Bureau and Oromia Land and Environmental Protection Bureau respectively, confirmed that EIA review is not being done by their respective offices.

EHPEA and EPA have agreed, to incorporate EIA within the EHPEA's Code of Practice which will be discussed later. In the opinion of this writer and Dr Glenn,<sup>93</sup> because of its limited staff, EPA may have considered the *Code of Practice* as a substitute regulatory framework. It is noted, indeed, that EIA should have been more proactive because EHPEA's members have already started operation making EIA study nearly unrealistic, except when a member wants to extend its farm or get a new site.

Another pertinent issue relates to the manner of allocation of land to floriculture and the kinds of land given. In Oromia region, which comprises around 94% of the current production area,<sup>94</sup> government holdings – covered with forest or unoccupied, communal holdings such as grazing lands, and some times private holdings are given for floriculture production upon payment of compensation. In such instances, the availability of water (underground or surface), favorability of the altitude, soil, temperature etc will be considered. However, the impact of the production on the local environment is not considered yet. This might be because the government's intention at this early stage is to attract investors in the sector. This proves

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<sup>92</sup> *Ato Fekede Terefe*, Investment projects Follow-up Performer, Oromia Investment Bureau, an Interview conducted on June 3, 2009, and *Ato Ahmed Hussein*, EIA expert in Oromia Land and Environmental Protection Bureau, an interview conducted on June 10, 2009.

<sup>93</sup> *Dr Glenn Humphries*, EHPEA Training Coordinator. Interview conducted on May 23, 2009 at 9:30 in her office, Gelila Building 2<sup>nd</sup> Floor.

<sup>94</sup> *Ethiopian Herald*, Saturday August 9, 2008, government newspaper published by Ethiopian Press Agency in English.

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that the need to protect sensitive water areas<sup>95</sup> from possible and irreversible damage is not yet felt in Ethiopia. Dr Glenn is of the opinion that concentrating floriculture farms in a certain locality might negatively affect the environment – pollution, draining the water resource etc- and requires the attention of the land allocating agency.

The Environmental Office of Oromia was established in 2002. It has been restructured and renamed the Oromia Land and Environmental Protection Bureau in 2009. This Bureau is now conducting land management plan and has accomplished 47% of it.<sup>96</sup> Accordingly, allocation of land for all activities is done by this bureau which was previously carried out by the Investment Bureau. The land management plan will designate the type of land and its potential use, including floriculture. Ato Ahmed adds that this study is expected to take into account levels of environmental impact before allocating land to the floriculture sector. Ato Ahmed also indicated that concentration of farms in a certain locality, evident now around Holleta, Koka, Zeway and Debre Zeit, might affect the amount of available ground water and complaints have been made by neighboring floriculture farms.

According to Ato Solomon, the floriculture sector is booming in Ethiopia but is not properly regulated by the government. Ato Solomon characterizes the situation as ‘Deregulation of the floriculture Sector’, and some of the reasons for this according to him are the following;<sup>97</sup>

- a) Lack of sufficient laws to regulate the sector,
- b) The existing laws are not well implemented,
- c) The floriculture sector has political support and lobbies the government in many respects,
- d) EIA has not been requested by any office, like land allocation offices, credit associations, custom offices etc,
- e) Lack of political commitment within government agencies to enforce laws, and
- f) Government’s desire to attract FDI (Foreign Direct Investment) is manifested in deregulation of the sector.

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<sup>95</sup> See the discussion under Section 1.3 above about sensitive water courses and its protection in Australia. This resources according to West Australian government *includes public drinking water source areas, conservation valued wetlands and waterways, and aquifers or waters with significant economic, social and/or cultural values.* ( Department of Water, Government of West Australia, *supra* note 33

<sup>96</sup> Ato Ahmed Hussein, *supra* note 90.

<sup>97</sup> Ato Solomon Kebede, *supra* note 89.

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One may say that we have enough water and land to grow as much flower as we want today. However, no one can be sure about the future and the precautions recommended by the EPA need to be considered and decisions ought to be made based on adequate research findings about the sustainability of the resources that are being allocated for the sector.

### 3. Self-Regulation: Code of Practice adopted by flower farms

Ethiopian Horticulture Producers and Exporters Association (EHPEA) developed its own Code of Practice<sup>98</sup> (hereinafter the Code) in 2007 with the aim of providing "...a mechanism that enables the Ethiopian floriculture sector to achieve the highest performance standards by continuous improvement and sustainable development thereby improving the competitive position in the market."<sup>99</sup> In the process of developing the Code, review of Ethiopian laws, the concerns and labels of the international market, stakeholders' concern and the interests of farmers have been taken into account.<sup>100</sup>

The Code sets the minimum requirements a flower farm has to fulfill to get the certification for the Bronze Level, which is compulsory for all EHPEA members.<sup>101</sup> A flower farm will receive EHPEA Code Accreditation after its compliance is proved through independent verification from an internationally accredited verification body selected by tender.<sup>102</sup> The higher standards and compliance criteria of the Silver Level and the Gold Level are not yet finalized although the Code states that they "are in preparation" and will entitle to MPS GAP/ EUREP GAP Certification and MPS SQ/ FFP Certification which are international market labels.<sup>101</sup>

Compliance at this Bronze level, among other things, ensures that the farm does or refrains from the following:<sup>103</sup>

- a) Measure, document and evaluate every month its performance on water consumption, pesticide use, fertilizer use, waste management and energy consumption;

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<sup>98</sup> EHPEA, "*EHPEA Code of Practice for Sustainable Flower Production - Bronze Level*", which is a 'Living Document'. Its first version was issued and launched on June 2007, and the second version (version 1.2), which is the basis of the discussion in this article, was issued on October 2008.

<sup>99</sup> *Id.*, at. 2

<sup>100</sup> *Id.*, at. 1

<sup>101</sup> *Id.*, at 5

<sup>102</sup> *Id.*, at 6

<sup>103</sup> *See*, (P.22 note)

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- b) Assess the risk related to the environment and occupational health and safety and put in place suitable mitigating actions in accordance with the Environmental Impact Assessment procedures;
- c) Not to purchase, store or use banned and un-registered (excluding temporary permission to use products) pesticide products as per WHO list of internationally banned pesticide products;
- d) Implement safe pesticide use and storage;
- e) Ensure that personnel related to pest control activities are trained.

The Code further, lists compliance criteria for this level in Annex 1.<sup>104</sup> This annex has three chapters – Production Management, Environmental Management and Personnel, Labour and Human Resource Management – which are further divided into Sub-topics together with Requirement and Compliance Criteria and Reference Documents under each topic.

Under the first chapter of the Annex (titled Production Management), much has been said about the management of the farm, record, monitoring of inputs and the like. Section 1.2 deals with ‘Farm Site Risk Assessment’ and requires farmers to make risk assessment periodically and take corrective measures and minimize risk, if any, especially when taking new land or expanding on a new site. The use of inputs is also regulated under the chapter. The use of Methyl Bromide for soil and substrate fumigation (to sterilize soil and substrate) is prohibited except until the existing stock is used up or under exceptional circumstances when permitted by the EHPEA Board. The Code, however, does not say anything about the circumstances that entitle a farmer to the permission.

Methyl Bromide is an ozone-depleting substance regulated under the Montreal Protocol that is used as a fumigant on crops, for pest control in structures and stored commodities and for quarantine treatments<sup>105</sup> and smaller amounts are also used in the preparation of other organic compounds.<sup>106</sup> The bromine from methyl bromide is 60 times more destructive to ozone on an atom-per-atom basis than the chlorine from

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<sup>104</sup> Annex II listed ‘Useful References’ including Ethiopian legislations related with the floriculture sector.

<sup>105</sup> United Nations Environment Programme (UNEP), *Floriculture and the Environment - Growing Flowers without Methyl Bromide*, [www.unep.org/ozonaction/](http://www.unep.org/ozonaction/) Last visited on May 20, 2009.

<sup>106</sup> *Methyl bromide*. (2009). Encyclopædia Britannica. Ultimate Reference Suite. Chicago: Encyclopædia Britannica.

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CFCs.<sup>107</sup> UNEP's Methyl Bromide Technical Options Committee has identified alternatives for the vast majority of current uses and many of these are already successfully used around the world.<sup>108</sup>

Recognizing its threat to the ozone layer, the international community is taking serious measure against methyl bromide and the parties to the Montreal Protocol have agreed to a global phase-out schedule for methyl bromide in 1997.<sup>109</sup> This schedule requires that industrialized countries phase out methyl bromide by 2005. Developing countries must freeze methyl bromide consumption by 2002, with a 20% reduction in 2005 and a phase out by 2015. Whether or not the Code's scheme coincides with the international scheme thus requires further inquiry including the questions on how long and how often the Board gave permission for its use.

Chapter one of the Annex further sets standards for 'Monitoring and Evaluation of the Use of Inputs', that is, water consumption, pesticide use, fertilizer use, waste disposal and energy consumption. Instead of setting the amount to be used, this section only requires farmers to have a written procedure on these matters and a clear and traceable record of it. Obviously, floriculture is intensive farming and a relatively high amount of pesticides and fertilizers might be used in the greenhouse than in the conventional farming. Dr Glenn<sup>110</sup> admits this fact. However, she argues that the amount and the manner of using pesticides and fertilizers are highly regulated by the discipline, the market for the product and the price of the chemicals. She further explains that the amount of fertilizer used is determined by the soil analysis result. The appropriate amount of fertilizer will be dissolved in water which is used only to wet the soil and the root of the plant. As a result, the amount of fertilizer that gets in to the soil and that will not be used by the plant is minimal.

With regard to pesticides, Dr Glenn argued that the amount of pesticide used is limited to the need of the targeted pests. Crop hygiene and cultural

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<sup>107</sup> CFS (trichlorofluoromethane) was used extensively as aerosol-spray propellant, refrigerant, solvent, and foam-blowing agent after WWII. But due to its negative effect on the ozone layer, a ban was imposed on the use of CFCs in aerosol-spray dispensers in the late 1970s by the United States, Canada, and the Scandinavian countries. In 1990, 93 nations agreed to end production of ozone-depleting chemicals by the end of the century, and in 1992 most of those same countries agreed to end their production of CFCs by 1996. ("*chlorofluorocarbon (CFC)*." Encyclopædia Britannica. Ultimate Reference Suite. Chicago: Encyclopedia Britannica, 2009.)

<sup>108</sup> See UNEP *Supra note* 104.

<sup>109</sup> See UNEP *Supra note* 104.

<sup>110</sup> *Dr Glenn Humphries, Supra note* 92.

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practices will be implemented to minimize the appearance of pests from the very beginning. If the crop scouting shows the existence of pests, the nature of the pest and the nature of the weather will be studied before spraying to determine whether or not treatment is needed and whether it is the right time. The product selection will be determined by factors like effectiveness, resistance management, cost, availability, environmental impact and operators' safety. Besides, the application of pesticide should be at the right time, with the correct amount and on the right target. Consequently, there will be only a little amount which will run off the plant to get into the soil unlike out door spraying by airplane, which happens in conventional farming.

The second chapter of the Annex lists requirements for safe 'Environmental Management' which calls for farmers to demonstrate possession of appropriate storage facilities for fertilizers and pesticides. A dry and secure place for storing fertilizers is necessary so that fertilizers can be free from risk of fire, contaminated water courses and employees. Moreover, the proper recording of fertilizers (purchased and used) is stated as a requirement.

More stringent standards are set for the pesticides than for fertilizers for obvious reasons. This includes storing pesticides in 'suitable constructed stores.' The Code of Practice has indicated the material to be used for its construction, the facilities to be provided, safety equipments to be installed, its location on the farm and contact with employees, the need for labeling and keeping it in the original container, and safe disposal of 'obsolete' pesticides. In addition, national and international regulations have to be observed in the transportation of pesticides and the use of agrochemical products. The use of measuring equipment and mixing equipment and the application of safety measures are also regulated. During spraying of toxic products, unprotected persons are not allowed to be in the greenhouse and re-entry is prohibited for some hours after spray. The spraying is also regulated and must be done by a well trained and equipped sprayer; the date must be recorded as well as the site. The type of pesticide that is used, the amount and volume of spray and the reason for its application must be stated. The equipment and clothes should as well be washed after spray.

Waste disposal management methods are treated in the second chapter of the Annex. Different types of treatment of wastes are possible as waste handling is defined according to type of waste (plastics, paper, wood, chemicals). A site must be available for the disposal and standard procedures for the treatment and disposal must be used, especially if the waste is toxic. A more detailed procedure has been indicated in the Code for handling and disposal of chemical product packaging. To this effect, it says "Rinse (at least three times), remove and store empty packaging such that human exposure to

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the products, its re-use, and environmental pollution are avoided.” Accordingly, water used should then flow back to the spraying equipment. Moreover flower farms are required to “pierce or compress the stock in a labeled area prior to incineration in a *Silsoe incinerator*” followed by “burial or collection by an officially approved collection and disposal scheme in accordance with local legislation”.

However, detailed procedures for the disposal of obsolete chemicals, which are also a threat to the environment, have not been provided. Ato Solomon said that wastes generated by the floriculture sector should have been disposed of on a disposal site determined by EPA. Incineration sites for obsolete chemicals, which are too costly to be handled by a single farm, should have been established for disposal of chemical wastes. In determining this site, impact assessment will be studied and a closed incineration site will be established. Ato Solomon adds that in addition to the weakness of the system of control of imports of chemicals, their disposal is also one of the challenges of the sector. Returning the obsolete chemicals to their place of production is also an alternative. But, for the time being the sector is functioning independently with an imperfect regulation by government agencies.

Dr Glenn Humphries, EHPEA Training Coordinator, explained what will happen to the water and empty container after washing.<sup>111</sup> The water will be accumulated in a spray tank, which will be sprayed in the greenhouse or treated to make it safe. The spray tank will be washed and the water will be accumulated in a special hole in which there is charcoal at the bottom to trap the chemicals, and the rest will be decomposed by microbes in the soil. The washed containers will be pierced so as to make them unusable for any other purpose or by the local community. They will then be accumulated in a designated area and will be burned at about 1000 °C. She added that the smoke and the ash resulting from the burning do not have adverse effect on the environment. Recycling of the empty containers, however, has not been done yet.

The third chapter of the Annex is about personnel, labour and human resources management. It requires, among other things, that personnel working on each activity, especially those handling chemicals should get the required training on their safe handling.

The Code made it very clear that all EHPEA members will be obliged to meet the Code’s standards and non-members are also encouraged to

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<sup>111</sup> *Id.*

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comply.<sup>112</sup> A farmer will get EHPEA Code Accreditation certificate after compliance is proven through independent verification from an internationally accredited verification body selected by tender.<sup>113</sup> This has been started as a pilot project on ten floriculture farms. Dr Glenn explained that the ten farms have been selected on a voluntary basis and EHPEA has, as a pilot project, made a decision to empower these farms, which had some demonstrative experience in the sector. These first ten flower farms<sup>114</sup> received the certificate of code of practice for sustainable flower production after a one-year auditing process by a Dutch company, Control Union Certification, on February 26, 2009 and the cost was covered by the Ethio-Netherlands Horticulture Partnership and EHPEA.

It is very clear that the Code's standards can be a regulating framework for the sector in minimizing adverse environmental impact. However, only 10 out of more than 86 floriculture farms have so far met the terms of the Code. According to Dr Glenn, the second and the third auditing will be conducted very soon ensuring greater compliance from the farm. Moreover, EHPEA has a plan for all its members to get the certificate by the end of 2009. This seems ambitious in view of the world economic recession which affects the sector. Not all floriculture farms operating in Ethiopia have joined EHPEA,<sup>115</sup> thereby putting non-members outside the regulatory framework of the Code. It is to be noted that only 10 of the farms are regulated by the Code leaving more than 85% of the farms unregulated.

#### 4. Market Label

Many Dutch owned floriculture farms are operating in Ethiopia and more than 65% of Ethiopia's floriculture product goes to the Dutch market. In addition, there is a very close relation between the two nations in the floriculture sector and this has led to the Ethio - Netherlands Horticulture Partnership Agreement. Dr Glenn<sup>116</sup> also believes that Ethiopian floriculture

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<sup>112</sup> See, The Code, *supra note* 96, at. 5

<sup>113</sup> See, The Code, *Supra note* 96, at 6

<sup>114</sup> These are ET Highland Flora, Maranque Plants, Florensis, Ethio-Agri CEFT, Red Fox Ethiopia, Ethiopia Cuttings, Lafto Roses, Olij (Avon) Roses Ethiopia, Dunga Floriculture and Minaye Flowers that operates with in 75 Kms radius of Addis Ababa in Holeta, Sebeta, Koka and Debre Zeit towns.

<sup>115</sup> Though the exact figure is not known around 80% - 90% of the floriculture farms are members of EHPEA. Dr Glenn believes that non-members are mostly farms that are under construction phase and which did not start production.

<sup>116</sup> Dr Glenn Humphries, *Supra note* 91.

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is highly regulated by the MPS<sup>117</sup> market system and the EHPEA Code of Practice was inspired by it. As briefly discussed below, the market label system helps the floriculture sector develop environment friendly operation. Focus is made to the MPS label/market system which has its origin and development in Holland but has grown to operate in the international floriculture market.

#### **4.1- Origin and Operation of the MPS Label/Maret**

The MPS mainly is owner/administrator and developer of certification schemes for the horticultural sector. It appeared in 1993 as a regional project in the Westland, Holland. Various groups made up of growers, educators and researchers developed a certification programme aimed at reducing the environmental impact of the floriculture sector and improving the sector's image. By the end of 1994, around one thousand growers were already registering their environmental data with it and certification began in January 1, 1995 with MPS-ABC/D qualification.<sup>118</sup> In February 1995, MPS was turned into a national association of all the Dutch flower auction houses. It now has grown into an organisation which is active in more than 50 countries.<sup>119</sup>

MPS issues certificates for floriculture growers including MPS-ABC–environmental certification; MPS-Socially Qualified – for social aspects, such as safety, health and working conditions; MPS-GAP – certification for compliance with demands from the retail sector; MPS-Quality – quality care certificate; MPS-QualiTree – proper quality and maximum reliability; ETI – Ethical Trading Initiative; ISO 9001:2000 – certificate in the field of quality care; and MPS-Florimark production – the TOP certificate for TOP companies with TOP products.<sup>120</sup>

#### **4.2- Kinds of MPS Certificates/Labels**

##### **4.2.1- MPS-ABC: Registration and qualification**

MPS-A, B and C are environmental registration certificates. The qualifications MPS-A, B and C are awarded to MPS participants who record their usage of crop protection agents, fertilisers, energy and waste over four-week periods. At the end of the period, participants send the recorded data to

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<sup>117</sup> MPS - 'Milieu Project Sierteelt' in Dutch literally means 'Floriculture Environment Project'. Official site of MPS : [www.mymps.com/](http://www.mymps.com/)

<sup>118</sup> See <http://www.mymps.nl/?id=321/> last visited on May 15, 2009.

<sup>119</sup> *Id.*

<sup>120</sup> *Id.*

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MPS, to be processed using calculation rules. A maximum number of achievable points have been set for each theme. Participants are awarded qualifications four times a year namely MPS-A, B or C based on the total number of points achieved. The qualification MPS-A stands for the most environmental-friendly cultivation, while the qualification participant (D) is awarded when a participant has registered for three successive periods or has registered for 13 periods and scored less than 10 points on the four themes.<sup>121</sup> Hence, according to Dr Glenn, EHPEA Training Coordinator,<sup>122</sup> the MPS A/B/C market will regulate the amount and kind of input – water, pesticides, fertilizers and energy, and waste management – and give A or B or C grade based on the current system. Especially, weighting, solubility in water, threat to fish and other aquatic life, toxicity, volatility of fertilizers and pesticides will be considered.

MPS-ABC registration is becoming a precondition for accreditation under other certificates. It also helps farms meet market demand, increase sales, receive an MPS report, be entitled to use the logo emblem, be included in the MPS database accessible to all purchasers, profile themselves as responsible and sustainable business undertakings, and comply with all legislation.<sup>123</sup>

#### **4.2.2- MPS Socially Qualified: Healthy and Safe Working Practices**

MPS Socially Qualified (SQ) is a certificate that allows growers to demonstrate that their products are cultivated under good working conditions. MPS-SQ includes requirements on health, safety and terms of employment, and respect for universal human rights, the codes of conduct of local representative organizations, and International Labour Organization (ILO) agreements. This certificate is becoming a pre-condition for entry into the market system in some nations now, and will likely be used by many in the future.<sup>124</sup>

#### **4.2.3- MPS-GAP: Meeting the requirements of retail**

MPS-GAP is a label with which you can anticipate the retail market demands. The MPS-GAP certification scheme is based on criteria formulated by the European retail organisation EUREP for safe, sustainably-cultivated, high-quality and traceable products. These criteria are expressed in Good

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<sup>121</sup> See <http://www.my-mps.com/asp/page.asp?sitid=665/> last visited on May 15, 2009.

<sup>122</sup> Dr Glenn Humphries, *Supra note 91*.

<sup>123</sup> See my mps, *Supra note 120*.

<sup>124</sup> *Id*

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Agricultural Practice (GAP). MPS-GAP is benchmarked with the EUREPGAP<sup>125</sup> flowers and plants scheme.<sup>126</sup>

### 4.3- Benefit of MPS Award and Environmental Standards

The basic purposes of participating in the MPS certification are diverse depending on the type of certification. But generally, they help a floriculture farm to meet environmental standards, its purchasers' interest, stay competitive in the market, meet government regulations and enhance production efficiency on the farm. Due to the growth of consumer power, they are putting minimum conditions for entry into the market. A growing number of purchasers are making MPS ABC registration a requirement for their suppliers. The British retail channel involves GAP and social requirements (MPS-SQ) for suppliers as of 2006. Other countries are expected to follow suit. It means it is becoming difficult to get opportunity in the market without GAP (e.g. MPS-GAP) approval. Flowers and plants are increasingly being sold through the retail channel, which subjects suppliers to strict requirements.

These are developments offering enormous opportunities for the floriculture sector. It could tap new markets, retain or expand existing markets or be a pioneer. A floriculture farm must also enhance its company image and reduce the level of risk for its client through the guaranteed traceability of products. To this end, MPS-GAP trademark may be an option which a farm can use for promotional and packaging purposes. In addition, MPS-Quality enables growers to guarantee the reliability of the product information and services that are provided.

Consumers are also becoming ever more critical on cultivation methods and the origins of the products that they purchase. In addition to the environment, international supermarket chains are increasingly focusing on social aspects. As a result, the demand for products grown under good, healthy and safe working conditions is increasing. MPS-SQ certificate positively addresses this concern of consumers, and enhances the market and confidence in the product.

Moreover, MPS-Florimark award entitles a product to a golden label enabling farms to be selected TOP companies with TOP products. Thus, participating in the MPS system is beneficial to flower farms. Almost all

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<sup>125</sup> EUREP GAP stands for 'European Retailer Producer working group programme to develop a system for the certification of Good Agricultural Practice' and EUREP is the registered trademark for this group,

<sup>126</sup> See <http://www.my-mps.com/asp/page.asp?sitid=661/> last visited on May 15, 2009.

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certification puts environmental protection standards as a minimum requirement and helps the floriculture sector to pay attention to environmental impacts.

Floriculture companies functioning in Ethiopia have been involved in the MPS certification system though the data are not conclusive. For instance,<sup>127</sup> Langanu Lily Flowers Plc has received ETI – Ethical Trading Initiative and MPS Socially qualified certification in 2009 (data up to 20-05-2009). In addition, Olij Roses Ethiopia in 2009, and Maranque Plants PLC, A.Q. Roses PLC and Golden Rose Agrofarm Ltd in 2008 have secured the MPS Socially Qualified certification (Upto 19-05-2009). When we see the MPS ABC/D certification profile, six companies have MPS-A, one MPS-C, one MPS-D and two more have MPS-D (Up to 09-06-2009). These are, DJ.J. Kothari & Co. (Eth) Ltd. (A 78), E.T. Highland Flora plc. (A 78), Roses PLC , (A 87), Alliance Flowers Plc (A 85), Oromia wonders Plc (A 77), Dugda Floriculture Deu Plc (A 81), Holetta Roses PLC (B 59), Olij Roses Ethiopia (C 55), Sher, the largest floriculture farm holder in Ethiopia, and Ethiodream PLC have only MPS D, participation certificate.

The extent to which the MPS system enhances environmental compliance standards depends on whether the flower farms have MPS certificates. But the above data is disheartening as only few are under MPS certified companies list. Hopefully, more companies will get under the list because the marketability of a flower farm's product can eventually be at stake unless customers are ensured that it operates under socially and environmentally responsible standards.

## Conclusion

The floriculture sector is booming in Ethiopia making the country the second largest rose exporter in Africa and the sixth in the world. Floriculture is also growing in the world market. Meanwhile, however, environmental concerns are growing because, floriculture requires intensive use of chemical fertilizers and pesticides and needs huge amounts of water than conventional farming in addition to thoroughly monitored waste management system. If it is not well managed, whatever the farms put on the ground, sooner or later, will end up in the water or soil. The substances, like nitrate, which are found in fertilizers and pesticides, are hazardous for the environment.

The impact of pesticides on the environment includes degrading water and soil quality, adverse effect on non-targeted lives (such as soil organisms,

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<sup>127</sup> Fully certified companies list is available on MPS official site  
<http://www.mymps.nl/?id=379/> last visited on June 10, 2009, summary by the writer.

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aquatic life, human beings, insects, cattle etc), air pollution, and increased pesticide resistance by targeted pests. In its strict sense, a fertilizer, unlike pesticides, is not inherently toxic. Yet, fertilizer runoff from farms has dire consequences. Water pollution, soil and water quality degradation, human and cattle health hazards, air pollution, risk on aquatic life, as well as water logging and salinization are some of the adverse effects of fertilizers. Disposal of waste produced by the sector includes empty chemical containers (fertilizers, pesticides), washing waters and other agriculture waste like cut off crop parts, unused soil, unused chemicals and waste water. These are indeed threats to the environment unless proactive prevention measures are put in place.

In spite of some gaps in the regulatory framework and although there are problems of effective regulation of the floriculture sector, Ethiopia has developed policies and legislation to protect and preserve the environment. Moreover, the international market system plays a significant role in forcing farms to comply with environmental standards. The Code of Practice formulated by EHPEA is also another self-regulatory framework, and its members are expected to observe environmental compliance standards in the course of their activities. But only few flower farms (of this expanding sector) have committed themselves to this Code of Practice, thereby making the environmental threat an imminent concern. The respective government agencies are thus expected to promptly empower themselves and minimize the threat through appropriate institutional and regulatory frameworks that can benefit from the environment friendly market pressure and the code of conduct that is at the initial stage and process of being put into practice.

Unless the activities of the sector are well managed, supervised and subjected to an effective regulatory system, the floriculture sector might, to a substantial degree, become a threat to the national environment. The government is thus expected to empower its regulatory offices (EPA, Ethiopian Investment Agency, Ministry of Water Resources, Ministry of Agriculture and Rural Development, Ministry of Capacity Building, and its respective regional bureaus, and the newly established Ethiopian Horticulture Development Agency<sup>128</sup>) and give due attention to the adverse environmental impact which is already observable rather than offering priority to short-term income generation at the expense of the environment. ■

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<sup>128</sup> See, Council of Ministers Regulation No 152/2008 that established the agency together with its objectives, powers and duties.

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## Acronyms

CFCs	Chlorofluorocarbons
EC	Environmental Council [Ethiopian
EHPEA	Ethiopian Horticulture Producers and Exporters Association
EIA	Environmental Impact Assessment
EPA	Environmental Protection Authority/Agency
EPE	Environmental Policy of Ethiopia
EUREP GAP	EUREP GAP stands for 'European Retailer Producers Good Agricultural Practice'
FDRE	Federal Democratic Republic of Ethiopia
MPS	<i>Milieu Project Sierteelt</i> ' in Dutch literally means 'Floriculture Environment Project'
MPS GAP	<i>Milieu Project Sierteelt</i> ' Good Agricultural Practice'
MPS SQ	<i>Milieu Project Sierteelt</i> ' Socially Qualified
REA	Regional Environmental Agency
UNEP	United Nations Environment Programme

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