

## **Abstract of: Changing Biodiversity, Changing Markets Links between agricultural trade, markets and biodiversity**

While many gaps in knowledge relating to the definition and quantification of biodiversity, as well as the classification and proper identification of species exist, the information that does exist tells a compelling story about the severity of the problem of species loss and loss of biodiversity on the planet. One of the areas of human activity which has significant impacts on species loss and the loss of biodiversity is agriculture.

The purpose of this paper has been to examine some general aspects of the relationship between agricultural trade liberalization and biodiversity and agrobiodiversity, as well as the state of research focussing on this relationship. Clearly, such an examination needs to be more in-depth. At the same time, several tentative conclusions flow from this paper.

The first is that technological change and agricultural trade liberalization are changing patterns of agricultural production and distribution. This pattern is generally away from more traditional, small-scale and self sufficient production, to larger-scale production requiring a shift towards greater amounts of external sourcing of increasingly homogenized farm components. A corollary of the shift towards larger scale, more interconnected agricultural production is the concentration of agricultural production in general into the hands of fewer and fewer players.

The second is that the overall effect on biodiversity of this changing pattern is an empirical question and the subject of some debate. In particular, there remain questions relating to whether the intensification of agricultural production - which it is argued localizes effects and potentially simplifies and lowers the costs of environmental regulation - benefits overall biodiversity.

The third is that while the effect of the changing patterns of agricultural production on overall biodiversity is subject to debate, there is little question that the pattern towards more intensive and interconnected agricultural production is decreasing agrobiodiversity through the replacement of many traditional varieties of agricultural species (both plant and animal) with fewer mass produced and often genetically manipulated, higher yielding agricultural species.

The fourth is that more research is needed to get a firmer understanding of the links between agricultural trade liberalization, changing patterns of agricultural production and distribution, and the effects on biodiversity. This should involve research focussed both on the intensification/extensification debate specifically, as well as on the connections between agricultural trade liberalization and biodiversity more generally. Before such research can be effectively undertaken, however, several challenges need to be overcome, including:

- a. limitations involving knowledge on biodiversity itself, e.g. how to quantify it. This requires not only further primary research on biodiversity (e.g. species identification), but also on research which continues in the same vein as the OECD and many other organizations on the development of indicators appropriate to understanding the state of biodiversity, indicators that allow us to answer the question "is biodiversity improving or getting worse?"
- b. the incorporation of such indicators into modeling frameworks that have traditionally been used to analyze effects of agricultural trade liberalization on agricultural production patterns, so that this previous work can help also to analyze the effects of trade liberalization on biodiversity.

- c. the incorporation of different aspects of agricultural effects that are required to understand the relationship of agricultural trade liberalization on biodiversity, namely land-use change, habitat fragmentation, changes in farm production and land abandonment, changing production methods (technological innovation and efficiency gains, plant genetic resources, agrochemical inputs and pesticides), international transportation (including alien invasive species), as well as socio-economic impacts on farm income and equity and agricultural organization.

Finally, gaps in knowledge and data do not exist only within biodiversity: There are also gaps related to intra-firm trade and their impacts on markets, pricing and environment/biodiversity feedback effects. Intra-firm trade already makes up a significant portion of agricultural trade and production, yet remains outside of most trade rules. Moreover, unlike tariffs and subsidies, intra-firm trade data is not publicly available. Access to such information provides many potential opportunities both for understanding the relationship between trade and environment in general, as well as for the relationship between trade liberalization, the environment and biodiversity in particular.

The opportunity for increased understanding of the relationship between trade and the environment lies in the fact that so much trade now takes place within firms. The opportunity for a better understanding of the relationship between agricultural trade liberalization and the environment more specifically lies in the fact that intra-firm trade itself could be seen as embodying trade in the context of a liberalized environment. Of course, the opportunities would need to be realized through cooperating with firms that conduct intra-firm trade.