

# “THE NEW DYNAMICS ON THE EXCHANGE OF GERMPLASM AND THE NEW ATTITUDES OF THE PLANT GENETIC RESOURCES’ RESEARCHERS”

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*“...access to the genetic resources [held in IARCs] by farmers, breeders  
and national agricultural research systems throughout the world,  
and the scientific research they undertake, is one of the major pillars  
on which present and future world food security rests”*  
Food and Agriculture Organization (FAO)

## INTRODUCTION:

It is incontestable that genetic resources are valuable resources.<sup>1</sup> This assertion is applicable both to those resources located *in situ*, such as on farms, and *ex situ* such as in the germplasm collections of materials held in International Agricultural Research Centres (IARCs), such as the International Network for Genetic Evaluation of Rice (INGER)’s collection, but also in the collections maintained by National Agricultural Research Centres (NARCs).

This analysis will focus on the *ex situ* collections, and will try to elucidate the changing dynamics of the exchange of germplasm materials for perform research and breeding. For this purpose I will need to examine, on one hand, the role of institutions holding those materials, such as IARCs, NARCs and private companies, and on the other hand, institutions trying to access and research those materials.

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<sup>1</sup> In 2009, the Genetically Modified seed market value was estimated to be \$10.5 billion, while the crops growing from those seeds were calculated to be in the neighborhood of the \$130 billion. The Economist, Attack of the really quite likeable tomatoes, p.16, feb 27-march 5, 2010

The analysis starts with the observation made by some scholars that the equation that includes Plant Variety Protection (PVP), patents and undisclosed information has impacted the access to PGR for research and breeding.<sup>2</sup> As a result, a significant modification has occurred in the dynamics of germplasm exchange that takes place within agricultural research institutions.

## IMPACT OF PATENTS, PVP AND UNDISCLOSED INFORMATION ON THE ACCESS TO PGR FOR RESEARCH AND

### BREEDING:

PVP and undisclosed information regimes are not as broad and strict as patents are. This might be the reason why in some developing countries the post-TRIPS<sup>3</sup> strategy was to develop its own PVP. Egelyng and Blakeney concluded however, that the efforts and resources invested by Asian nations in developing their own PVP's might prove to be futile, given the increasing preference by IP regime users for patents.

This is because patents are broader in their protection scope. In this sense, it is clear now that the apparent willingness of patent offices to grant patents,<sup>4</sup> "[t]he acceptance of broad claims, the uncertainty about the

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<sup>2</sup> Correa, Carlos, "Access to Plant Genetic Resources and Intellectual Property Rights" in *IP in Biodiversity and Agriculture: Regulating the Biosphere*, (Sweet & Maxwell, London, 2001); Egelyng, Henrik and Blakeney, Michael, "Plant Variety Protection in Asia: Some Issues of Implementation and Implications for Germplasm Exchange Networks", in *IP in Biodiversity and Agriculture: Regulating the Biosphere*, (Sweet & Maxwell, London, 2001).

<sup>3</sup> Agreement on Trade and Related Aspects of Intellectual Property

<sup>4</sup> Blakeney, Michael, *Intellectual Property Rights and Food Security*, (CABI, Wallingford-Massachusetts, 2009).

"One of the most startling facts to a lay person about the current patent prosecution system is that it is virtually impossible for an Examiner to finally reject an application. Persistent applicants have the ability under PTO rules to amend their applications, and to abandon and refile continuation (or continuation-in-part) applications, as many times as it takes to get the patent issued. Further, since patent Examiners have a limited amount of time to spend on each application, and since they are rewarded based on the number of files they finish processing,"<sup>2</sup> there is an obvious incentive for Examiners to allow rather than reject questionable applications in order to get the application off their desk." In *An Empirical Study of the Twenty-Year Patent Term*, *Mark A. Lemley*, 22 *AIPLA Q. J.* 369 (1994), p.417

limits of the patent-holder's rights, and the aggressive enforcement of patent rights, may, however, limit research and breeding activities".<sup>5</sup>

Furthermore, the IP strategy adopted by companies currently include all the intellectual property tools available, combining patents with PVP, so as to achieve the greatest protection possible not only for products, but also for cultivars, utilities, processes and everything that can be afforded protection.<sup>6</sup>

#### THE INGER CASE:

Established in 1975, the International Network for Genetic Evaluation of Rice (INGER) is an international network for the exchange, evaluation, release, and use of genetic resources. The institution is credited for the release of 667 varieties in 62 countries, resulting in economic benefits estimated at US\$1.4 to \$1.6 billion,<sup>7</sup> each of them saving local breeders 4-5 years' of work.<sup>8</sup>

INGER's work has been possible because of the contributions of varieties and germplasm made by international agricultural research centres<sup>9</sup> and also by rice-growing countries through their national

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<sup>5</sup> Correa, Carlos, p. 128

<sup>6</sup> Egelyng and Blakeney, p. 95

<sup>7</sup> Evenson and Gollin 1997, Brady 2004; in <http://seeds.irri.org/inger/>, accessed on March 10, 2010; "Yale economists Evenson and Gollin estimated that each released variety contributes US\$2.5 million annually to the global economy", in [http://seeds.irri.org/inger/index.php?option=com\\_content&task=view&id=18&Itemid=182](http://seeds.irri.org/inger/index.php?option=com_content&task=view&id=18&Itemid=182), accessed on March 10, 2010.

<sup>8</sup> Javier, Edwin and Toledo, Maria, "Joint account with interest", in Rice Today, International Rice Research Institute, October-December 2004, Vol.3 No. 4, in <http://books.google.com/books?id=qkYNDZ1LZyoC&printsec=frontcover#v=onepage&q=&f=false>

<sup>9</sup> Such as the International Rice Research Institute (IRRI), the Africa Rice Center (AfricaRice), and the Centro Internacional de Agricultura Tropical (CIAT).

agricultural research centres. However, it has been observed that the latter sort of contributions have declined from 445 in 1995 to 94 in 1999.<sup>10</sup>

This change of trend was due in part to the growing perception of countries that it is important to maintain sovereignty over their PGR, as reflected by the adoption in 1992 of the Convention of Biological Diversity (CBD).

Not least important was the impact of recurrent biopiracy incidents. “Many [NARCs] became reluctant to share their germplasm, fearing that their materials may be misappropriated, and so undermining the INGER tradition of unrestricted flow of rice germplasm” (Javier, Edwin and Toledo, Maria, 2004, p. 24). In 2001, Egelyng and Blakeney concluded that “it seems likely that the exchange of germplasm through INGER will come to a complete halt, unless new rules of the game are invented”. (Egelyng and Blakeney, 2001, p. 98)

FAO was the relevant institution for tackling this problem and drafting this novel regulation.<sup>11</sup> The new rules for access crystallized on FAO’s International Treaty on Plant Genetic Resources for Food and Sustainable Agriculture (ITPGRFA)<sup>12</sup> and its Standard Material Transfer Agreement (SMTA).<sup>13</sup> These rules establish “that all seeds received and distributed by INGER have material transfer agreements barring recipients from claiming any form of intellectual property protection on the material or related

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<sup>10</sup> Egelyng and Blakeney, p. 96

<sup>11</sup> Resolution 3 of the Final act to the CBD recognized that access to *ex situ* germplasm collection managed by IARCs, such as INGER, fell on the arena of FAO’s International Treaty on Plant Genetic Resources for Food and Sustainable Agriculture.

<sup>12</sup> Concluded in 2001, ITPGRFA had the goal of achieving conservation and sustainable use of PGRFA, in the framework of access and benefit sharing provided in the CBD.

<sup>13</sup> In 2006, an SMTA was concluded. It includes the rules for access to the materials protected by the ITPGRFA.

information. These measures have been effective, and INGER started to receive more contributions from [NARCs] in 2003.”<sup>14</sup>

As we can see, according to INGER the trend of declining contributions has been reversed. One of the factors that must have lubricated this change is FAO’s 2001, ITPGRFA new set of rules. Moreover, an extra dose of legal certainty about access and benefit sharing<sup>15</sup> for PGRs has been added with the FAO’s subsequent resolution on SMTAs. This legal tool also prevents parties from claiming IP rights on the facilitated materials.<sup>16</sup> However, the system is flexible because it allows the new varieties derived from those materials to be protected with IP rights.<sup>17</sup> The extent to which a new variety proves to be novel is unclear, though. If patent offices accept, as they have done in the past, that the isolation of the facilitated material is to be in a changed form, then there is still a misappropriation menace. As we can perceive, the biopiracy threat is still floating in the air.

#### BIOPIRACY CONSEQUENCES ON NATIONAL BEHAVIOUR:

There is abundant literature that illustrates different biopiracy episodes related to IARCs’ materials.<sup>18</sup> Biopirates have taken the form of governmental agricultural agencies, universities and private entities. Nations, which as mentioned before are among the main contributors to the collection of the IARCs, are

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<sup>14</sup> Javier and Toledo, p. 24

<sup>15</sup> For instance, SMTA’s article 6.7 read jointly with its Annex 2 establish that the recipient shall pay a fixed 1.1% of the sales of the commercialized product into the mechanism established by the Governing Body for this purpose. Likewise, article 13 provides for other forms of benefit sharing such as technical information, access to technology and capacity building.

<sup>16</sup> SMTA, Article 6.2

<sup>17</sup> See footnote 15.

<sup>18</sup> See generally IP in Biodiversity and Agriculture: Regulating the Biosphere, Ed. Drahos and Blakeney (Sweet & Maxwell, London, 2001); Blakeney, p. 97-102.

less enthusiastic to continue providing them with genetic resources.<sup>19</sup> Some developing countries seem to have changed their strategy and are strongly supporting and financing their own research centres.<sup>20</sup>

#### NATIONAL RESEARCH and THE NEW COLLABORATIONS AMONG PGR RESEARCHERS:

Regarding agricultural research, rich developing countries have taken action inside their own laboratories. The governments of China, Brazil and India are developing new plant varieties. For instance, in 2009 India's public sector developed and marketed a new cotton variety.<sup>21</sup>

Furthermore, these nations seem to be also supporting local cooperation with companies, which are not necessarily local.<sup>22</sup> Brazil, the second largest user of Genetically Modified (GM) crops, is allocating funds to

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<sup>19</sup> Blakeney, p. 101.

<sup>20</sup> The change of trends in the financing of research has also followed a remarkable change. "The IARC of the CGIAR were at the forefront of the public agricultural research effort, which until the 1990s represented some 80% of funding for agricultural research. Subsequently, the research expenditures of national research institutes have exceeded that of CGIAR, but more significantly, the investment in agricultural research by private seed companies has increased to about one third of global expenditure." Blakeney, p. 97.

<sup>21</sup> The Economist, Attack of the really quite likeable tomatoes, p.16, Feb. 27, 2010. India's government support for public research on GM cotton should not surprise anyone if we take into account that India's cotton output ranks second in the world and that it is estimated that in the immediate future around 90% of all Indian cotton production will be based on GM cotton. This high percentage is the really surprising figure, especially considering that it has only been 14 years since the first GM crops were planted commercially. <http://in.reuters.com/article/topNews/idINIndia-38083820090218>, accessed on 14 March, 2010.

<sup>22</sup> This was already predicted by some scholars. "Exploiting bio-diverse stock in world markets [...] requires a high level of R&D capability as well as marketing and distribution systems. Developing states wishing to exploit their biodiversity through trade will probably need to develop joint ventures and strategic alliances with those transnational companies which control global distribution and marketing structures for food, agricultural and medicinal products." Drahos, Peter, 2001, p. 65.

develop their own industry. It is investing in local research centres, like Embrapa, that in partnership with a German chemicals firm, locally developed a herbicide-tolerant soybean.<sup>23</sup>

On the other hand, companies are teaming up with conglomerates of researchers to foster innovation. Monsanto made its mapping of the rice genome available to the International Rice Genome Sequencing Project (IRGSP)<sup>24</sup> researchers, “who have agreed to use a single germplasm, to share materials and information, to immediately make public completed portions of the genome, to achieve certain accuracy standards, and to coordinate their work.”<sup>25</sup>

#### CONCLUSIONS FROM THIS ANALYSIS:

Given the new sovereign value granted to PGR, the uncertainty about the rights protecting these contributions to IARCs, such as INGER, and the market value of each new variety, we can confirm a change in the trend regarding agricultural research and access to PGRs.

#### 1. CHANGE OF TREND IN THE NATIONAL CONTRIBUTIONS TO INGER and IARCs GERMPASM COLLECTION:

IARCs role as the most prolific agricultural researchers is over since more than a decade ago. However, this does not mean that their future work will be irrelevant. INGER and IARCs work have been fundamental for providing new varieties for combating hunger throughout the world. Here, they do remain at the forefront

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<sup>23</sup> The Economist, Taking root, p.68, Feb. 27, 2010.

<sup>24</sup> A list of the members, which include NARCs, can be found at <http://rgp.dna.affrc.go.jp/IRGSP/members.html>, accessed on 14 March, 2010.

<sup>25</sup> Barry, Gerard, The Use of the Monsanto Draft Rice Genome Sequence in Research, <http://www.plantphysiol.org/cgi/content/full/125/3/1164>, accessed on March 14, 2010.

place. Their research work will still need the contribution of nations' PGRs, though. In this front, it is hard to assess how large is the reversion of the trend observed in the last decade.

In other words, although INGER states that after 2003 the figures for national contributions of plant varieties have risen up again after the steep decline of previous years, it still is unclear what this increase will amount to. In order to assess in this issue, it would be necessary to have access to the current contribution of nations, not only to INGER but also to other IARCs. The modest nature of this analysis did not have the extension to embrace the figures for the post-2003 period.

However, the INGER statement provides us a solid basis for believing that the new legal rules protecting IARCs collections have provided countries and other PGR contributors with some certainty regarding the custody and IP regime of the deposited materials, not only for the current collection but also for the future contributions.

## 2. ACCESS TO IARCs and INGER GERMPLASM COLLECTION (ASSESSMENT OF FAO's NEW RULES):

It is important to recall that IARCs, such as INGER, still possess a very valuable collection of elite germplasm developed throughout their lifetime. Even if countries are less likely to contribute with genetic materials, the need for legal certainty demanded some kind of response. Thus, FAO's ITPGRFA and SMTA rules aim to deal with this problem, so as to avoid any successive biopiracy event.

It is unclear how effective these measures will prove to be, though. This is because a thorny issue remains unsolved, that is, determining how different from the source-material a new variety needs to be. As some scholars have already pointed out, it will all depend on each patent's office criterion. This means that biopiracy is not a closed file yet.



### 3. NEW TRENDS IN AGRICULTURAL RESEARCH IN RICH DEVELOPING COUNTRIES GOVERNMENTS:

The persistent threat of biopiracy and the need to promote the creation of a national industry are some of the reasons why rich developing countries, such as Brazil and India, seem to have opted to create their own NARCs, and to promote bridges between government and private researchers, both with aims of building on their new varieties.

To achieve this, rich developing countries are channelling more resources to their own NARCs. For them, the current trend seem to be to invest their natural genetic resources and to provide funds to develop their own research and breeding. This does not appear to be good news for IARCs.

### 4. NEW COLLABORATIONS ON AGRICULTURAL RESEARCH:

The old paradigm of collaboration that ruled the Green Revolution era was a model in which governments and IARCs had a very close relationship, the former as providers of PGRs and the latter as researchers. However, this model has changed throughout the last decade and, as we have mentioned before, governments are teaming up with private entities. They are not the only ones.

IARCs and companies are also collaborating closely. The Monsanto and IRGSP example for developing research on the rice genome is eloquent. It would be interesting to know under which terms this patent, owned by Monsanto, will be accessible to be used for the purpose of fighting hunger.

In any case, these examples demonstrate the important role that collaboration has in developing new plant varieties. As we have seen, the objectives of every participant might differ one from another, though.

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