A CASE STUDY OF DEBATE ABOUT GENETIC MODIFIED SEEDS: A COMPARATIVE ANALYSIS OF ROMANIA AND REPUBLIC OF MOLDOVA

2nd part

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STUDIU DE CAZ CU PRIVIRE LA SEMINȚELE MODIFICATE GENETIC: O ANALIZĂ COMPARATIVĂ ÎNTRE ROMÂNIA ŞI REPUBLICA MOLDOVA. Partea a 2-a.

Rezumat. Această analiză implică legislația, instituțiile şi politicile cu privire la noile pachete tehnologice relevante utilizate în agricultura convențională de azi, fiind o problemă semnificativă pentru performanța efectivă a economiilor rurale în regiunea Moldovei. Unele domenii importante ale reglementărilor agrare tehnice şi ale gestionării politicii alimentare au fost indicate în prima parte, o atenție deosebită fiind acordată contextului protecției consumatorilor din Moldova, precum şi dezvoltării comerțului agroalimentar cu țările terțe în ceea ce privește semințele modificate genetic şi pachetele tehnologice asociate, în Moldova şi România. Acest articol încearcă să influențeze opiniile populației şi agendele politicienilor. Se urmărește o abordare etică şi agronomică bazată pe paradigma teoretică a agroecologiei. Drept consecință a abordării teoretice anterioare, cea de-a doua parte a articolului va elucida metodologia, dezbaterile despre rezultate şi concluziile.

Cuvinte-cheie: România, Moldova, GMO, porumb, soia, drept, agroecologie.

1. Material and methods: Delphi Analysis

The experiences in using the Delphi method in social sciences are wide and provide a broad background. This is a prospective technique to obtain subjective information. It target is to collect the opinions of experts by anonymous questionnaires, analyze them and resubmit in a new questionnaire, which contains a prior examination of the results of the first collected data, so they can change their opinion if they wish so. It can combine knowledge and experience of experts in various fields, tending towards a consensus of views in reaching decisions that unilaterally are not assumable.

The procedure is repeated in successive rounds, usually two, up to finding the convergence of responses on the occurrence of a series of events. The basic idea of this method is that knowledge "group" is better than that found proceeding from individual experts in areas where sufficient information is not available, and marked by its outstanding grades: anonymity, the "feedback" response "group" and the tendency towards consensus (Kaynak and Macaulay, 1984: 115) [1]. Its purpose is therefore to use the advantages of the methods "group" and reduce the negative effects (mainly psychological) of the interaction of group meetings or those made face to face.

The Delphi method has been chosen because it relies on the need to reason among the members of the expert's panel. These ideas can generate intense and qualified knowledge on a illegal issue, as it seems to be. Indeed this method can ensure a diversity of opinions that can be incorporated into the research process at a reduced cost. In our case, we must bear in mind that the subject under analysis has been little studied so far in farming conditions. So it was very important to have the maximum possible information and opinions to scope the analyzed phenomenon. The concept of experts includes anyone who can contribute with ideas, enriching the views of those who consider themselves specialists in a particular area.

1.1. Elaboration

Given the profound burden of technical and scientific language that has proceeded to form a panel of experts to obtain their perceptions on this matter, we have proceeded to create a Delphi study, inviting to the participation from regional and national experts. The process began with the definition of the concepts discussed and the selection of experts on agro-environmental legislation.

The first step in this research consisted of reviewing the operational objectives and questions of the thesis. It was particularly interested in the translation of problems defined for each question. This is still a simple literature review on the Delphi method. The next step was to identify experts and professionals who could be invited to participate in

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the consultation process. The sample size usually varies from 4 to 171 experts (Pulido, 2005: 118) [2], making it difficult to be guided by a set that sample the issue on *a priori* basis.

1.2. Implementation

In the case of the Romanian academics and professionals with no prior knowledge about this method a summary of the project and the questionnaire was offered, through e-mail. During the first round were sent 34 messages, with 31 people contacted in the first round, between 14th May and on April 15th, 2010. The responses to the survey included a total of 6 experts. In the second round were exchanged 6 messages between the 23th June and the 1 th of July, having in response 4 answers to the sending of the second survey.

The process was repeated in the Moldavian case, but with not sending of a summary of the project, to contrast the impact in the respondents. During the first round were sent 24 messages, with 24 people contacted between 14th May and on April 15th, 2010. The responses to the survey included a total of 3 experts. Due to the huge consensus and the lack of interest by the contacted experts the second part of the survey was stopped there, as proved as not representative for the survey.

The number of experts participating in a Delphi panel is usually between 10 and 70. A large number of participants make the results more reliable, but if they are very homogeneous, it is pointless to increase the number, because few more individuals can bring new ideas. And, as their number increases, it becomes more difficult for the analysis of the results. Finally, it is desirable that the way to contact prospective employees will be made in a way that motivates them to participate in the study process. I must admit that in many cases I did not have the confidence or telephone contacts to perform this monitoring. So the answers were scarce but sufficient to assume the real interest of the participants.

Based on the proven experience in the literature reviewed for this study, it was established that the group of experts that should participate in this Delphi analysis would be integrated by:

1. University professors in research related to risk prevention, environment, agricultural production and environmental law.
2. By qualified organizations managers in the fields of farm bureaus and agricultural associations.
3. Agricultural scientists and / or technical experts.

Table 1

Delphi analysis

LITERATURE REVIEW

Selection of experts invited to participate in Delphi

First Round

(Scoping)

Identification of project characteristics

Second round

(Detailed questionnaire)

Review of responses and consensus building

Final Report

Source: Own elaboration.

In any case, it was established as a condition "sine qua non" of the existence of a close link between the professional, institutional and / or research of the experts invited with the topic under research.

In the first case the round contained 4 college professors and 2 by qualified organizations technicians in the agricultural unions and corporate scientists. In the second case 1 answer came from university professors, 1 by qualified organizations in pest information offices and 1 were answered by agriculture unions and associations. Consequently, the criterion for the selection of experts was based on his knowledge and relationship with the subject matter. With most of them the contact was impersonal, clearly explaining the objectives of the study and why it was important to have their opinion. Also it was ensured the anonymity and confidentiality of responses.

From the questionnaires sent in the first round, 9 of them were completed. Then I proceed with a process that has homogenized the most of the responses received to subsequently perform the tabulation, the analysis of the results and their transcription in a final document.

The findings were forwarded to the experts, along with a second questionnaire, which contained only the responses received in the first round that had not reached a consensus level of less than 2 in an interquartile range.

Surely, it would have been possible to have more answers but given the temporal limits of this research it was proceeded to be closed in the first week of July 2014 in both cases. Moreover, it is evident the acceptable degree of consensus, that already guessed the results for both cases of the first round, ending the precipitation of the process. There are precedents for the Delphi analysis performed with two steps and that are sufficient to achieve a high degree of group consensus as it is shown that with each extra round the number of experts the degree of consensus reached in the previous round down get decreased.

2. Discussion

As previously written this Delphi analysis results derived from the First Round were sent to Moldavia and Romania experts and they obtained the following answers:

In the Moldavia case, the statistical treatment of the 10 items of the first round was easy, based on previous analysis. These short, for each of the questionnaire, the items discussed, and the values of statistical variables used for this analysis, showing the degree of consensus in each case. In the first round the results of the mean values were as follows. After the statistical processing the following results were obtained from the treatment of variables, by using the program G-Stat student. The first 5 questions in the questionnaire (item 1 to 5, being 1 as totally negative and 5 as totally positive) aimed to identify the perceptions about the opportunities, needs and gaps arising from the objectives of the health legislation.

The first question of the survey aimed to identify their opinion about genetically modified organisms (GMOs) and their linked associated pesticides in a positive, neutral or negative way, from their point of view. Their perception is positive and it shown high consensus (4, 1). The second question wonders about how effective is the leadership of their government to promote or avoid the introduction of this GMOs and their linked pesticides in their farming systems. The experts do not agree significantly about that statement and they do it with an absolute consensus (2, 0). Another question deals on how much do they feel that their country normative on PPPs and GMOs are well used by farmers. They agree that they do not do it well with a good consensus (1, 1).There is a high consensus but a low-neutral value given to (3, 1) how fair and suitable are the new European Union legislation regarding this PPPs and GMOs and if in general farmers feel satisfied with the GMOs and PPPs control by the extension services in Moldova, or if they feel dissatisfied with them. They do not feel that pesticides are well manageable with other technological packs by the country farmers, with a high consensus and a low negative perception (2, 0).The next question ask about how negative are or can be the impacts on the environment by the use of these inputs for agriculture. In this case the answer about the consensus and value are high (4, 1)**.** Regarding how fair is the price of these inputs for agriculture in Moldova the value stands low and the consensus seems high (2, 1). The agree by high consensus that regarding to farmers and producers` opinions the level of satisfaction on this issue is low (2, 0).

In the case of Moldova the experts were invited to describe their relationship with this topic and their personal opinion about the impacts and current and future effects of these new technological packs and their normative. They stated some remarkable sentences:

"This topic needs a deep study, since there are many farmers working with illegal seeds, which are spreading GMO without control in countries like mine, that avoid this seeds by law".

"Moldova should be GMO free country and normatives on PPPs should be adjusted to EU normative plus the PPPs tested and registered in EU should be allowed to be imported in Moldova".

"We have the legislation, but no practice to use it".

In the Romania case, the statistical treatment of the 10 items of the first round was based on previous analysis. The results show, for each of the questionnaire, the items discussed, and the values of statistical variables used for this analysis, showing the degree of consensus in each case. The mean values are:

Their opinion about new GMOs seeds and their linked pesticides are considered as neutral but with a low consensus (2.5, 4). Still their perception is not defined, with a high consensus, on how effective is the leadership of their government to promote or avoid the introduction of this GMOs and their linked pesticides in the agriculture of Romania (3, 0). The consensus is fair enough to stand that they feel that the normative on PPPs and GMOs are well used by farmers (4, 2). There is no consensus about how fair and suitable is the new European Union legislation regarding this PPPs and GMOs (2.5, 3).They feel satisfied with the GMOs and PPPs control by the extension services in their country (4, 2), but not so about how manageable is the use of these technological packs by Romania farmers (3.5, 2). There is not a clear agreement about how negative are or can be

the impacts on the environment of these inputs for agriculture in their country (2.5, 2) neither about how fair is the price of these inputs for agriculture (2.5, 2). Overall, regarding farmers and producers opinions, their level of satisfaction on this issue is high (4, 2).

The last question tried to get a description on the relationship of the experts with this topic and their personal opinion about the impacts and current/future effects of these new technological packs and their normative there. The answers are the following:

„Sunt cercetător și am participat la studii de impact pe acest subiect. Politicienii votează emotiv în funcție de voturi, consumatorii nu știu ce mănâncă (carne obținută din șroturi de soia OMG), fermierii sunt foarte încântați de reducerea costurilor, de utilizarea unor cantități mai mici de pesticide, de producții mai sigure și venituri mai mari".

"Researcher interested in this subject, not specialist. Sunt cadru didactic universitar și președinte al organizației de fermieri, iar cele două probleme (OMG-urile și pesticidele) fac obiectul studiului și practicii mele curente de mai bine de 15 ani. În urma documentării amănunțite și a studiului practic, consider ca OMG-urile sunt și trebuiesc folosite în ritm din ce în ce mai susținut în domeniul agricol, acestea fiind singurele capabile să asigure o dezvoltare constantă, mai ales atunci când vorbim de biocombustibili (biodizel și bioetanol). În altă ordine de idei, folosirea pesticidelor reclamă o abordare mult mai atentă, mai ales prin prisma faptului că fermierii trebuie să respecte întocmai cantitățile și concentrațiile prescrise pentru fiecare pesticid în funcție de specificul culturii etc. Efectul pesticidelor se poate resimți pe termen mediu și lung. De aceea consider că pentru pesticide este nevoie de un management integrat atât la nivel de fermă, cât și la nivel național, care să asigure atât controlul, cât și transparența consumurilor de pesticide pe diverse areale/zone sau la nivel național. Folosirea pesticidelor fără respectarea prescripțiilor tehnice privind cantitățile/unitate de suprafață, cât și concentrațiile folosite/unitate de volum, pot conduce în mod indubitabil la un impact semnificativ asupra mediului și conservării biodiversității" [3].

"In my country the national legislation permits only the testing of GMOs. According to the farmers opinion cultivation of transgenic maize and soybean could have a positive economic impact, but, the potential environmental impact still generates disputes between the decision makers from Agriculture Ministry and Environmental Ministry".

"Doing business in seed, plant protection chemical and agriculture machinery industries for more than 20 years. Expanding GMOs has two real objectives: profit-producing companies and to obtain global food market monopoly".

Given the apparent high consensus and low participation in the case of Moldova this Delphi analysis was just re-sent with those questions that did not obtain enough consensus in the first round and it was accompanied with some statements incorporated as questions, taken from the opinion of the experts from Romania, closing the opportunity to get more external information and the process of the questions - answer circuit. Their results were the following:

Their opinion about GMO seeds and their linked pesticides is positive (5, 1) and find enough consensus. Romania normative on PPPs and GMOs are well used by farmers (4, 1). They agree that the potential environmental impact generates disputes between the decision makers from the Agriculture Ministry and the Environmental Ministry (4, 1). The same situation arrives about how „consumatorii nu știu ce mănâncă (carne obținută din șroturi de soia OMG)" (5, 0) and „fermierii sunt foarte încântați de reducerea costurilor, de utilizarea unor cantități mai mici de pesticide, de producții mai sigure și venituri mai mari"(4, 1), „OMG-urile sunt și trebuiesc folosite în ritm din ce în ce mai susținut în domeniul agricol, acestea fiind singurele capabile să asigure o dezvoltare constantă, mai ales atunci când vorbim de biocombustibili (biodizel și bioetanol) (5, 1), „Fermierii trebuie să respecte întocmai cantitățile și concentrațiile prescrise pentru fiecare pesticid în funcție de specificul culturii etc. Folosirea pesticidelor fără respectarea prescripțiilor tehnice privind cantitățile/unitate de suprafață, cât și concentrațiile folosite/unitate de volum, pot conduce în mod indubitabil la un impact semnificativ asupra mediului și conservării biodiversității" (4, 0) [4].

3. Conclusions

Some conclusions can be obtained from this primary sources research. The Moldavian experts had a poor opinion about how effective is the leadership of their government to promote or avoid the introduction of this GMOs and their linked pesticides in their farming systems. The experts do not agree that their country normative on PPPs and GMOs are well used by local farmers. They agree that in general farmers do not feel satisfied with the GMOs and PPPs control by the extension services in Moldova. They do not feel that pesticides are well managed. The price of these inputs for agriculture in Moldova seems high and regarding to farmers and producers` opinions on the level of satisfaction on this issue is

low. It seems that still there are many farmers working with illegal seeds, which are spreading GMO without control. Moldova should be a GMO free country as the normative on PPPs should be adjusted to E.U. normative and registered in E.U. should be allowed to be imported in Moldova. Thus, unfortunately and *de facto* the situation seems similar to that one of Romania as they have the legislation, but no practice to use it.

In the Romania case the level of criticism and polarized opinion is quite different and more aligned in favor of GMO extension. They feel satisfied with the GMOs and PPPs control by the extension services in their country, but not so about how manageable is the use of these technological packs by Romania farmers. There is not a clear agreement about how negative are or can be the impacts on the environment of these inputs. Overall, and regarding farmers and producers opinions, their level of satisfaction on this issue is high. Even though the country national legislation permits only the testing of GMOs, according to the farmers opinion cultivation of transgenic maize and soybean could have a positive economic impact, but, the potential environmental impact still generates disputes between the decision makers from Agriculture Ministry and Environmental Ministry. They agree that the new seeds and genetically modified organisms and their linked pesticides are generally positive. Expanding GMOs has two real objectives: profit-producing companies and to obtain a global food market monopoly, and satisfying farmers, excited about reducing costs, using lower amounts of pesticides productions with safer outcomes and higher incomes. They agree that GMOs should be used in agriculture, as being the only capable commodities being able to provide a sustained development, especially about biofuels (bioethanol and Biodizel). In other way, pesticides need to be ruled under an integrated management at both farm and national level that ensure both control and transparency of pesticide consumption in different areas / zones or at nationwide. Using pesticides without prescriptions respecting the quantity / unit area and concentrations used / unit volume can arguably lead to a significant impact on the environment and biodiversity conservation.

There is a huge support about GMO seeds among the experts ´answers, but in fact Romania changed its legislation to avoid those GMO soya seeds and during these years it seems that the lack of implementation on their control shows a big paradox about the situation of those soya producers and for traditional corn farmers. The Romanian legislation on GMOs is very weak and far away from being implementing all existing EU-standards but in theory. It seems that the responsible authorities had no means and not much will to implement the existing laws, as there are no inspectors to make controls, not popular neither academic support and not a single certified laboratory used to do it.

There have been some research on the illegal planting of GMO Soya in Romania and the results proved that Romania has being invaded by GMOs without any control. Many fields are planted with uncertified seeds, which means that the farmer are saving and replanting seeds the next seasons, and season after season. This lead to a lack of traceability, a lack of information, and the possibility that the products processed out of soybeans cannot be labelled. The question is how to prevent seeds being saved and be kept without an economic exchange, and indeed how can a company protect the intellectual rights and the copyrights when shadow legal and not formal virtually rules impede it.

These double pressures to adopt and to reject GMO crops during the last decades and the motivations behind it, acts against proper controls and monitoring systems has been proven to be a problem when EU accession took place. The EU's requirements for monitoring and labelling traceability may not be achievable in fact, but just on paper, because of the lax systems and hidden support about GMO are currently in place.

From the agroecological approach the future of organic farming is already under threat from GMO crops. As the experiences with RR Soya have shown, a GMO approach means that the whole food chain can become a monopoly - from delivery of agricultural inputs (seeds, fertilisers, chemicals, machinery etc.), via the growing of plants up to the harvest, and throughout processing. Producers may find themselves obliged to use specific agro-chemicals to grow specific GMO seeds. They might also be crushed in an economic bottle neck by trans-national corporations increasing the price of their inputs and lowing the price of purchase of outputs, making harder the severe situation of new and old farmers.

These crops could threaten this unique environment of Romania and Moldavia, as growing GMO crops bring with it a lot of environmental risks associated with the intensive overuse of external inputs on farming, disrupting the renewal of the biotic resources of those natural ecosystems, the evolution of new 'super weeds' which are resistant to the same herbicides a GMO crops and the increased use of broad-spectrum herbicides, leading to loss of biodiversity and potential human risks.

Agriculture plays an important role in the economy of Romania and Moldavia. In its rush to 'modernize' agriculture, both countries should not only reject the use of genetic engineering in farming but also to control it, as if the shadow problem persist Romania could diminish it export markets for agricultural products in the EU and other areas, where consumers are demanding for non-GM food. Indeed, by adopting organic farming instead of genetic engineering, they would face a much more prosperous future, based on its abundant and fertile allocation of factors of production in their fertile agroecosystems.

Thus, if Romania intends to comply with its compromises with the E.U. by facts it has to begin to manage:

1. Uncontrolled dispersal into the environment and food chain.

2. A labelling system that requires traceability of all seeds or commodities that are GMOs.

3. The Government must provide support for organic farming, by stimulating the demand for organic food through education, public procurement policies and by providing economic incentives.

Following this comparison in Moldova the public opinion regarding GMO campaigned during years and many experts are aware of living in a country with the richest soils in the world and thus, many opportunities ought not be spoiled by his new perverse interests from biotechnological companies. Poor countries demand genetically modified agricultural products because of their available price, but agricultural producers from Moldova would make a wrong choice if they opt for the cultivation of transgenetic plants as the genetically modified products are not in demand on European markets and in the Russian Federation, the two main markets for its products, where for example, there were recently issued laws which foresee the indication on the label of the presence of GMO, in case they comprise more than 0.3% of the total mass of the product. Currently there are many genetically unmodified food products on the internal market, sold for the buyers at an accessible price. At the same time, these are mechanisms that might stop the development of genetically modified agricultural crops from this country, as Moldavian farmers still work on an ancient world attitude and old peasant rhythms, out of capitalist rush. While tending towards the integration into the European Union, Moldova have to take over the concepts promoted by the European community and reject perverse influences that can threaten their main source of richness, concerning the ability of next generations of Moldavian farmers to keep the fertility of their soils and their food and peasant cultural sovereignty.

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3. "I'm a researcher and participated in impact studies on this topic. Politicians vote according to emotionally votes, consumers do not know what they eat (meat obtained from GMO soy grits, farmers are very excited about reducing costs, using lower amounts of pesticides productions safer and higher incomes".

4. "Researcher interested in this subject, not a specialist. I am an university professor and chairman of the organization of farmers, and the two problems (GMOs and pesticides) are under my study and my current practical business by over 15 years. After documenting and having detailed and practical studies I believe that GMOs are and should be used in pace of increasingly supported in agriculture, this being the only capable role of providing a sustained development, especially when they can talk of biofuels (bioethanol and Biodizel). In other way, pesticides are becoming more a more under a careful approach, preventing that farmers that must strictly observe the prescribed quantities and concentrations for each pesticide according to the specific crop, etc.. The effects of pesticides can be felt in the medium and long term. Therefore consider that a pesticide needs an integrated management at both farm and national level that ensures both control and transparency of pesticide consumption in different areas / zones or at nationwide. Using pesticides without prescriptions respecting the quantity / unit area and concentrations used / unit volume can arguably lead to a significant impact on the environment and biodiversity conservation".

5. "Consumers do not know what they eat (meat obtained from GMO soy grits (5, 0) and farmers are very excited about reducing costs, using lower amounts of pesticides, safer production and higher incomes (4, 1), GMOs are and should be used in pace of increasingly supported in agriculture, this being the only capable of providing a sustained develop the trainees, especially when can talk of biofuels (bioethanol and Biodizel) (5, 1). Farmers must strictly observe the prescribed quantities and concentrations for each pesticide according to the specific culture, etc.. Using pesticides without prescriptions respecting the quantity / unit area and concentrations used / unit volume can arguably lead to a significant impact on the environment and biodiversity conservation (4, 0).