It is twenty years since the precautionary principle appeared on the normative scene, first for matters of environment and natural resources, then for questions of food safety and public health. It is fifteen years since GMOs were set on the public regulation agenda because of their potential risks for Health and Environment. Specific mechanisms of expertise and assessment have been set within the framework of authorisation procedures considering their cultivation. Research in Social Science has accompanied this public interest for risks, whether scientists have been puzzled by the arisen stakes of assessment and regulation, attracted by controversies and conflicts or approached in order to help public and private deciders to better understand society problems and reactions. Scientists from INRA or partners have contributed to these works. A selection of their problematic and results is presented in this file. These contributions have inspired me different thoughts for the future. Scientists, officials in charge of scientific policy and members of the civil society may find here ideas for propositions to be debated for the continuation of research.

1. What to do with the diversity of approaches?

Linked to GMOs, research on risks displays a wide range of matters, approaches and subjects. Some make use of hypothetico-deductive mono-disciplinary approaches, others mono-graphical empirical descriptions and others yet multi-disciplinary modelling. How do we transform the results of this diverse work into well-linked knowledge? Do scientists who have produced them have anything to say to each other about their hypotheses and respective methods?

Thus, three economical approaches have been proposed in this file: one, from Stefan Ambec, implies producers only sensitive to classical economical factors (variation of input price through tax); another one, from Bernard Ruffieux, studies consumer behaviour as a function of information about goods quality and, in the same time, quotes the gap existing between expressed opinions and behaviours; the third one, from François Salanié and Nicolas Treich, integrates the fact that consumer behaviour is influenced by beliefs and that some public actions can be shaped just to modify these beliefs and, in that way, regulate behaviours. Bringing these works together leads to ask certain questions: would producers’ beliefs and information have an influence on their behaviours, as well? Could their behaviours not differ from their opinions? Beyond that, from GMOs example, are we not led to reconsider the existing bounds between beliefs and information? For example, the Bayesian decision theory, in a risk situation, assumes that there is a permanent belief revision process from new information gained by experience. Yet, experimental economic works on consumption behaviour in the face of GMOs reveal a strong insensibility of beliefs regarding the contribution of objective information. Scientists give an explanation to this established fact: political hostile elements concerning GMOs. Is it compatible with the axiomatic of preferences attributed, by theory, to the economic agent?

2. Precautionary principle and scientific uncertainty

The object of the precautionary principle is to structure the action in a situation of scientific uncertainty surrounding collective risks. This context can give way to different research lines.

From shared uncertainty to settlement of stabilizing agreements

The problem can be tackled as a situation of shared uncertainty, and not as one of asymmetric information between the ones who know and those who do not know. It can be resolved by adopting conventions and rules which aim is to stabilize frameworks of action: their purpose is to make possible, because foreseeable in its social and legal consequences, technical and economic initiatives taken in spite of scientific uncertainty. It is what is done, for instance, by introducing an upper limit to civil liability in case of damages or by providing a mutual fund to cover possible damages, the existence of which is still uncertain. The precautionary principle sets down a principle of action without waiting for the state of scientific certainties. The answer through conventions tends to make the action possible in spite of uncertainty.

Uncertainty as a strategic option

Scientific uncertainty may be a strategic resource for economic actors (firms), social ones (NGO) or political ones (rulers) who exploit it for their own ends and respective purposes, to such extent that some brandished scientific uncertainties could be seen as the product of actors’ strategies tending to produce uncertainty. Active scientific controversies may, thus, lead to social controversies. What to do to resolve these and overcome blocked situations? Are there not forces and interests that bring to their indefinite extension?
The scientific contributions that have been gathered here identify two types of litmus tests: for Raphaël Larrère and Christophe Bonneuil, deliberative procedures such as “focus groups” and citizen conferences, or yet hybrid collective expertise associating scientists and laymen are the way to ensure a closer and fairer examination of the questions at stake. Bernard Ruffieux tacitly brings out a new track, that of experimental economy which structures selected controlled situations that are meticulously examined. One could see there, what Ruffieux does not suggest, the source of tests able to reveal the real individual consumers’ preferences in return for the supposed preferences attributed by different representatives. If this were the new direction, the economist would become a spokesperson of individual preferences to which he would give an objective expression. So the question is: can both tracks be coupled, in an interesting way, in a system that would be concerned, at the same time, by testing individual preferences and ensure the passage from individual preferences to collective preferences?

Uncertainty as an open field to differences in beliefs

By limiting the part of scientifically proved allegations, and therefore little questionable in the public area, uncertainty can be considered from the angle of differences in beliefs to which it gives way1 over the world. That is the work of François Salanié and Nicolas Treich, examining the effect, on the mechanisms of action, of differences in beliefs between consumers, producers and rulers.

Logically, configurations must be different, depending on the risks associated to private goods consumption, even if they are provided within the context of public services such as drinking-water supply – consumers have, then, alternative solutions to decide of the better option in accordance with their beliefs, for instance private systems of running water purification or purchase of bottles of water – or depending on collective risks which leave no space for individual choice, for what concerns actions of prevention at source, anyway.

For private risks, attached to public services, beliefs have an influence on consumptions and adjust exposition to estimated risk. Public deciders must take them into account, either to maintain electoral support by citizens or because beliefs influence simultaneously consumptions on which depend both collective production of risks and good running of social and economic life (for instance optimal working of community facilities.) With collective risks, even if all individual reactions are not avoided particularly in the context of a deontological ethic insensible to the performance of action, the individual action which is not co-ordinated in a collective organised context quickly comes against a problem type “prisoner’s dilemma” or “isolation problem”. The essential stake remains, then, to fix a collective framework allowing the co-ordination of decentralised consumptions. Surely, there would be good reasons to carry on with the exploration of this morphology of situations.

The specific answer shaped by the precautionary principle

1 However, one should not bet on the reversed proposal according to which the resolution of scientific uncertainty should be sufficient to erase the differences in beliefs.

The implementation of the precautionary principle requires an adjustment of the mission of scientific assessment but also a grading of the action by ranging it in the register of the provisional and of a narrow interaction with knowledge development. The assessment will have to apprehend situations of uncertainty in useful terms for managers, to proceed to a fine and multi-dimensional qualification of the scientific consistency of risk hypothesis. That should allow parties to overcome their differences, either by bringing closer attitudes towards scientific uncertainty, previously enlightened and qualified by experts, or by laying the foundations of an agreement on concrete uncertainty likely to be approved, even though, according to actors, it is for different reasons. It also is a matter of associating more actively to the assessment those whose defiance is important from the point of view of reaching objectives carried on by the community. The work aiming at an objective report of issues at stake that is done by the assessment in fact implies a confidence in the results and advice put forward. It is no small matter. Recent experience of controversial issues has revealed the difficulties met by experts, accustomed to scientifically stabilized worlds, at placing themselves in operating conditions in scientifically uncertain and debated worlds; it has also shown how procedures of public controversies could be transformed into a stubborn juxtaposition of stereotyped and closed talks on their premises, without producing anything else than fossilizations of positions and weariness of participants.

3. How shall responsibilities for action be distributed?

One of the key-questions in matter of collective risk management is sharing responsibilities for actions into three modes of distribution: (a) restrictive tutelary actions listing obligations and prescriptions to be fulfilled by everyone (firms, medical professions, etc.); (b) actions of framing or informing going along with a decentralisation to people of the task of choosing the actions to be taken; (c) direct transfer to everyone’s personal and legal liability sanctioned “ex post” by courts. This question does not only come up in case of scientific uncertain situations but comes up here with a specific acuteness.

Thus, Stephan Ambec presents the option between an input taxation, incentive approach which does not directly stipulate any behaviour, and a compulsory zoning in order to constitute refuge areas for populations of insects which could become resistant if the selective pressure were too strong and with no way out. There is a similar alternative between the prohibition of trading GMOs products and the authorisation of dealing matched with sufficient information conditions (labelling), solution which suits better according to Bernard Ruffieux. Finally, Laurence Boy interprets as a regression the fact that the Environmental Charter has accepted a definition of the precautionary principle which puts forward, within the limits of their fields of competence, the first-rate obligations of public authorities.

Would it not be useful to go on with the systematic clarification of the advantages and disadvantages of any of these forms of action, in the sphere of risks, by inducing specialists from different fields to bring their own light in order to avoid that everyone draws conclusions from a much too partial definition of the matter?
4. Is risk an intrinsic attribute of technology or of contextualised implementation of techniques?

The precautionary principle applies to uncertain risks in their existence and occurrence. When these risks are attached to technology, there is an alternative: are they intrinsically attributable to technology as such or extrinsically attributable to different contextualised applications of technology? The presentation by Raphaël Larrère calls to mind the idea of an “associated environment” inseparable from the genesis and spreading of innovation, which opens onto a totalizing interpretation of technological development. Therefore, in a certain way, GMO development would be ineluctably and genetically marked by capitalist inequalities, reinforcement of monopolies and globalization under the aegis of international finance. The presentation by Sylvie Bonny shows, on the contrary, the potentiality of this technology to bring us other fruits than those from the first GMO generation, if one should go back to more fundamental parts of knowledge, that is to say to the basic knowledge and know-how acquired and in formation, and if one would like to assign other finalities to their applications. What is it all about? Could one, scientifically, explore this question further since it is so crucial for political debate?

Each one of these hypotheses focuses attention on a different target from the point of view of collective mastery of risks: upward and near to the organisation of research and its financing in the first case, much further down to the stage of applications and valorisation, in the second case.

5. Could technological innovation be civilised and should it be?

GMOs personify, in a particular way, the human power able to transform the world. After presenting gene sequences as the key to life, molecular biologists and geneticists, thus, present themselves, in the eyes of the society, like the ones who want to fix these keys, even if they do it against their will. Could that be done without any society agreement? Should technological innovation stay wild and violent or could its civilisation be envisaged without making it lose its vital principle? How should concrete relations between scientists and society representatives be organised at different stages of research program implementation? Is there an unbearable offence to the freedom of research and to scientific independency or, on the contrary, is it the legitimate manifestation of a technical and scientific democracy?

6. How understand dynamics of research fields?

By leaning on the research field of GMOs impacts on ecosystems and health, the survey led by Christophe Bonneuil shows evidence that the development of research fields cannot be regarded as independent of the social, institutional and political context; one must talk of socio-scientific paths rather than of strict scientific paths. This clarification would contribute to well-position the problem of non-neutrality of scientific development. This study also permits to point out that fundamental research approaches and policy concerns do not necessarily meet, that their meeting is in fact rather exceptional.

At a time when public authorities try to stimulate the economic development by promoting, in a same action, through the idea of excellence areas, a scientific excellence often limited to the fundamental or academic nature of research and a closer articulation between research and users, it would be important they keep in mind tensions between the two goals. Here can be the source of strategic errors if policy-makers do not take into account the conflicts between various interests of knowledge and differences of objects and approaches.

7. Does the precautionary principle not lead to a partial “des-intricacy” of science and technology?

The precautionary principle is shown, by those who are hostile to it, as a brake for scientific research and technical development often considered as a whole. By the way, the concept of techno-science had been put forward to design this narrow intricacy of knowledge development, technical invention and economic development of research products. It appears that reality may be less homogeneous.

The research field of GMO impacts, as a matter of fact, offers us successive waves of studies which, with a knowledge object in view, have been precisely stimulated by measures of precaution aiming at better controlling techniques or new products diffusion. The precautionary principle stimulates more knowledge development than it hinders it. Meanwhile that implies to acknowledge the partial breaking-up of techno-scientific complex and simplistic nature of techno-science concept as a general model of contemporaneous scientific activity.

Further thoughts need to be given to it. Is it possible to split up, in a simple way, different fields or different types of research into two important parts that would be the integration of science to technological and economic strategies of the industrial world and the enlightening of society and rulers on society stakes and risks attached to technical developments? Up to what point is it a matter of knowledge of a different type, bringing up all the difficulties of inter-communication and inter-fertilization? Should we renounce to the idea of a same shared-knowledge?

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