institut du développement durable et des relations internationales – 6, rue du Général Clergerie – 75116 Paris – France – Tél. : 01 53 70 22 35 – iddri@iddri.org – www.iddri.org

idées
POUR LE DÉBAT

N° 10/2004 | GOUVERNANCE MONDIALE

Observation system and alert

Jean-Pierre Contzen (Institute of Advanced Studies, the United Nations University, Japan)

Jean-Pierre Contzen a présenté cette communication lors de la conférence « Gouvernance internationale de l'environnement » co-organisé par l'Iddri et l'UICN les 15 et 16 mars 2004 à Paris.
Ce texte n'engage que son auteur. En mettant ce document en ligne sur son site, l'Iddri a pour objectif de diffuser des travaux qu'il juge intéressants pour alimenter le débat.

DRAFT VERSION

Observation system and alert

Jean-Pierre Contzen
Institute of Advanced Studies, The United Nations University, Japan

December 2004

With the support of France's Ministry of Ecology and Sustainable Development

Institut du développement durable et des relations internationales
6, rue Général Clergerie
75116 Paris, France
Phone : 33 (0)1 53 70 22 35 - iddri@iddri.org

IDDRI (Institute for sustainable development and international relations) is a policy research institute based in Paris. It is supported by French research institutions, business, NGOs, as well as the French government. IDDRI has been created as a forum for debate, and a network, where stakeholders public administrations, the scientific community, NGOs, the private sector meet to define issues requiring new research, debate and to identify consensus and diverging opinions, thereby creating a common culture.

IDDRI works on major governance issues related to sustainable development, in collaboration with international research networks.

As part of the debate on international environmental governance, the IDDRI, is co-ordinating a series of studies commissioned to international experts. This series of studies looks at various facets of international environmental governance identified during the conference which IDDRI organised on this theme in March 2004 in Paris. The purpose of this exercise is to provide the working groups with some background information in the context of France's initiative to initiate discussions around the creation of a United Nations Environmental Organisation.

The series of reports will deal with the following themes:

- Issues raised by the international environmental governance system
- Mobilisation, diffusion and use of scientific expertise
- Observation system and alert
- Mechanisms to monitor member states' commitments
- Articulation between the various levels of government
- Role of the stake-holders
- Implication of a UNEO for the global architecture of the international environmental governance system
- Financing for environment and development

Project manager : Benoît Martimort-Asso – benoit.martimort-asso@iddri.org

Author

Jean-Pierre Contzen
Chairman
United Nations University / Institute of Advanced Studies (UNU/IAS)
International Organizations Center, 6F
Pacifico-Yokohama
1-1-1 Minato Mirai
Nishi-ku
Yokohama 220-0012
Japan
www.ias.unu.edu

The views expressed in this document are those of the authors

and do not necessarily reflect the views of the institution they to which belong.

Table of Contents

Introduction: the link between observation, alert and environmental governance

1. Environmental governance deals with complex adaptive systems subject to dynamic external forces exerted by political, economic, social actors or driven by nature itself. Strong stewardship is required at all levels, international, regional, national, local. The urbanization phenomenon is accelerating, 60% of the world population will live in cities in 2015 leading to more acute problems of air pollution, of clean water availability.

2. Some regions of the globe are experiencing specific damages, for instance the ozone hole over the Antarctic. At international level, our utilization of renewable natural resources exceeds already today by 20% the threshold of nature's equilibrium.

3. Greater rates of change than those experienced in the past exacerbate the gravity of the issues; the loss of biodiversity is deeper each year, the frequency of extreme weather events such as typhoons, tornadoes, floods, is increasing.

4. Trusting self-organization, accepting fatality are no answers to such situation; a global strategy of governance is required.

5. How can observation and alert contribute to the prevention of further environmental damage, to the mitigation of existing damage, to the reduction of environmental risk? How could it lead to better governance characterized by:

- Efficacy: does it create a real impact?
- Relevance: does it address the real problem?
- Transparency: is it correctly perceived by the civil society, does it guarantee legitimacy?
- Equity: are all actors involved treated on an equal base?
- Foresight: does it anticipate events?

6. Governance, whatever its field of application, requires owning the right ***assets*** composed of *rules, resources, competencies, knowledge and organizational capital.* Knowledge is based on observations, hence the importance of the latter for detaining such ***assets***. They correspond to the level of environmental assessment.

7. ***Assets*** are enhanced by ***skills. Skills*** are related to the management of change, i.e.:

- *Adapting to change*, e.g. introducing new practices in urban planning for taking into account increased frequency and magnitude of floods
- *Anticipating change*, giving greater attention to foresight and scenario planning, e.g. encouraging the use of clean fuels' technology
- *Driving change*, reframing the whole perception of the way of life, e.g. the adoption of the Montreal Convention banning CFCs

8. Skills are related to environmental management. Alert intervenes at this level.

9. Finally, the ***Capabilities*** constitute the framework in which ***Assets*** enriched by ***Skills*** can be exploited for making environmental governance successful. ***Capabilities*** are constituted of successive layers, *relations* between those carrying the authority and those subject to the threats, notably the civil society, *networks* for links between groups of actors and *regimes* establishing laws of the game; the Precautionary Principle is a recent example of the latter. ***Capabilities*** deal with environmental communication. They can feedback on the need for observation or the threshold of alert if the decision-makers, the civil society express new requirements.

Observation

General

10. Since the early ages of measurement, observations about the Earth and its environment have been collected and have been interpreted for the benefit of mankind. The 19th Century marked the start of organized systems of observation and exchange of data; it amplified during the 20th Century, especially when the apparition of scientific, and later operational, satellite systems dedicated to observing Earth gave a formidable impulse to the developments in this field. The first meteorology satellite, Explorer 7 dates from 1959 and ERTS A or Landsat 1, from July 1972; since then, space has played a prominent role in the quest of data. With the sophistication of technology, observations have increased enormously in number and in scope. At the beginning of the 21st Century, the amount of data made available through these observations is enormous and its transformation in useful information constitutes a real challenge as the variety and the complexity of the information to be processed are echoing the complex, variable, evolving nature of the environment.

11. One area of intense discussions relates to the standardisation of data and the interoperability of information systems. Without diminishing in any way their importance, it is nevertheless suggested that they are not essentially an environmental governance issue but rather a technical issue; they can be left to the care of the scientific community in close dialogue with information users, remembering that excessive standardization could lead to the loss of some useful specificity.

12. It is rather suggested that in terms of International Environmental Governance, the focus should be set on the following questions:

- Are we currently missing observational data or are we already overwhelmed by the flow of data, leading to too many data being unexploited?
- Are all observational data freely available to all interested parties?
- Who cares about the continuity of Earth observation systems?
- How could be organized the transformation of data in useful knowledge, leading into the alert part of the discussion to the question of their timely, relevant exploitation for governing the environment?

Lack or over-abundance of data?

13. More than 50 Earth-observing systems are in operation along with thousands of oceanic buoys and land-based data acquisition systems. Since about forty years, satellites have already accumulated a wealth of observations. It is clear that current systems, though comprehensive they may be, do not cover all the geographical regions of the globe (polar areas and oceans notably), and do not provide the comprehensive range of observations that the understanding our environment would require, in particular for what concerns terrestrial-oriented networks and surface-based atmospheric networks.

14. Considering the objectives of the Global Earth Observation System of Systems (GEOSS) established at the Washington Earth Observation Summit of July 2003 and analyzing the terms of the Draft GEOSS 10-Year Implementation Plan (1) in its environment-related areas i.e. disasters, climate, water, ecosystems, agriculture, biodiversity, it appears that the gaps in terms of observation concern mainly in-situ measurements (hydrology, glaciology, atmosphere) and relate more to furthering product development based on existing sensors than enhancing the measurement systems.

15. The most pressing issue in terms of data is constituted by the full exploitation of data available so far. Understanding the past evolution is critical for managing the present and shaping the future. In the theatrical play "La damnation de Freud" of Stengers, Nathan and Hounpaktin, the Senegalese Yoruba interrogates Sigmund Freud "How can you prescribe where you are going if you don't know where you are coming from?" This interrogation applies equally to Environmental Governance.

16. The main requirements in terms of observation should be summarized as follows:

- *Organizing the safe storage of all measured data over an extensive, if not indefinite, period of time; some early satellite data have been destroyed intentionally or by neglect, for lack of financial resources or lack of physical infrastructures*
- *Making sense of the most sophisticated information technologies for facilitating at any time the easy retrieval of the data when the need arises*
- *Reinforcing the analysis of existing data, giving priority to the most pressing requests*

17. How can such requirements be met? The structures part of the document will attempt to sketch some solutions.

Full Availability of Observation

18. In our Knowledge-based Society of the 21st Century, detaining information is a strong asset; it constitutes an element of power. Hence, one might wonder if all information pertaining to Earth observation could be made available fully to all those who would wish to use it.

19. National interests in economic fields such as agricultural or energy resources will continue to limit somewhat this availability. National or regional security and defence considerations are more important. All nations are committed to the use of outer space for peaceful purposes and for the benefit of all humanity but as the policy statement released during President Clinton's administration indicates" peaceful purposes allow defence and intelligence-related activities in pursuit of national security and other goals" (2).

20. Since the end of the Cold War, many barriers to the wide dissemination of observations acquired from space, sea and land, have been dismantled but obstacles remain, mostly due to new forms of security threats such as local conflicts and terrorists' activities that can lead to some restrictions over some geographical areas or ban the diffusion of some high resolution imagery from space. Fortunately, these obstacles do not affect too significantly the observations most essential for environmental governance, with perhaps the exception of high resolution imagery that might assist in urban management.

21. The recommendation that could be formulated in this respect is that all parties involved commit themselves to use their best available efforts in limiting to the strict minimum their barriers to the full and timely diffusion of earth observation data. In spite of the hopeful implementation of such recommendation, some restrictions will always exist and this fact should be taken into consideration when dealing with data availability.

Continuity of supply of observation

22. For any elaborate system of observation, users expect a continuity of supply as a reliable base for long-term scientific research and as a guarantee for the provision of an operational service.

23. In many cases where continuity of service is essential, such as in the Telecommunications area, the replenishment of infrastructures, be it in space (satellites), on sea (cables) or land (cable, microwave) and the operation of the networks is ensured through the profitability of the commercial services that are offered and in spite of a few systems that have failed financially and technically (Iridium), the offer is guaranteed and this leads in turn to a stability of the demand. The same scheme is expected in the future for services in the positioning and navigation fields.

24. In the Earth observation field, the situation is different. A part of the Earth observation services is operated on a commercial basis but in spite of extended attempts, the stage is not yet reached when a sufficient commercial profitability could alone ensure the perennial character of operational systems. The intervention of the public sector remains indispensable not only for the financial resources that it brings but also in view of the strategic character of Earth observation.

25. GEOSS aims at assembling the resources of various public actors for establishing a comprehensive operational network. These resources come from public organizations. For observing systems, WMO and its members will provide a substantial part, complemented by EU GMES and NASA A-Train programs as well programs from Argentina, Italy, Japan. United Nations specialized agencies, beyond WMO, i.e. FAO, UNESCO and UNEP as well as international scientific organizations i.e. IAG, IOC and ICSU will contribute the global observing systems that they promote i.e. GGOS, GOOS, GCOS, GTOS.

26. Other contributions will relate to modelling and data processing centres as well as data exchange and dissemination systems.

27. It does not appear realistic to consider that GEOSS will become a mechanism that centralizes the sources of funding for the comprehensive system of systems or impose binding contributions for extension or replenishment of the existing components. The bulk of assets will continue to come from the individual systems and the stability of the corresponding sources of funding should remain an important a preoccupation. While space observing systems appear to offer good prospects in this respect, in-situ land- and sea-based systems seem the most vulnerable.

28. Coordination mechanisms such as GEOSS and other more specialized groups such as the International Group of Funding Agencies for Global Change Research (IGFA) could not guarantee the continuity of observation but could certainly assist in its realization through better planning, minimizing overlaps, maximizing synergies, enhancing interoperability and by making the offer more attractive and more comprehensive for users in the environmental community, hence triggering more interest from the decision-makers and the civil society that in turn generates pressure on public authorities for further financing.

Transformation of data in useful knowledge: the added-value

29. In the field of Earth observation, applications are multiple and developing with time, the end users' communities are diffuse and dispersed. The chain from the measurement to its ultimate exploitation is complex but three essential levels can be identified: the level of the observing systems with various operators, the level of information processing and its transformation in deliverable products –the added value level - and the level of the scientific, industrial and operational users.

30. The added-value level is essential for supplying the right assets to the governance system. The brokerage between the operators and of the representatives of the users is crucial for favouring, within the frame of a successful environmental governance scheme, an efficient exploitation of the wealth of data, using the science community at all stages of the process.

31. This level is composed of many actors and their diversity should be maintained while some integration should be considered for bridging usefully the offer and the demand. Beyond GEOSS and GEMS, the Integrated Global Observing Strategy (IGOS) started as Type-II Partnership after the conclusion of the Johannesburg Summit in September 22 (3) is aimed at working in this direction.

32. It is at this level of coordination that the issues of data policies, open standards and intellectual property rights, validation of data and product quality, better archiving should be addressed.

33. *Many actors are present at the added-value level; this multiplicity is justified by the diversity of applications of earth observation and should not be discouraged. The advent of private operators could contribute to the ultimate sustainability of earth-observation systems. Coordination at regional and global level is required. Several initiatives have been launched, they should be encouraged as long as they complement each other and that it does not create over-centralization.*

Alert

34. Alert is an element of the ***skills*** required for governance. Inseparable companion of Observation, it is essential for environmental management.

35. Alert is a signal that warns of imminent danger. In the field of international environmental governance, alert has already been given. The danger is no longer imminent, it is well present. The alarm bell has already been ringing for some time in the fire-house but the fire-engines have been slow in taking the road or incapable of quenching the fire and some buildings have already been damaged beyond feasible repair.

36. The situation is different in other areas of human activity; as an example, some applications of nanotechnologies in the health field could constitute a threat for the human body and there the triggering of alert mechanisms corresponds to the full meaning of the term alert.

37. What does alert still mean in this rather uncomfortable situation of environmental degradation that is currently experienced? Three ways should be considered:

- Identifying precursors of critical evolutions so far not detected. They appear to be very few outstanding, most of the threats are already identified. Relations between climate change and health, or the impact of the introduction of new chemical or biological products in the environment, fall in this category. The identification of any early warning signal is crucial.
- Pinpointing deviations of already known trends that could indicate acceleration, deceleration or modification of the process in question and justify a change in the remedial plans or, on the contrary, bring a confirmation of their validity. Most climate change issues correspond to this type of alert. It applies also to local environmental issues such as the degradation of water quality or the pollution induced by waste dumps.
- Contributing to the compliance verification of Multilateral Environmental Agreements (MEAs). The monitoring responsibilities that are stipulated within MEAs vary widely, ranging from mandatory to free standing monitoring, from assigning responsibility for its conduct to relying on voluntary submissions without prescribing quality control or continuity in the observation. Compliance verification constitutes clearly an area where organizational improvements are required.
- Responding to preoccupations formulated by the citizens themselves. This last type constitutes the bottom-up component of any alert system and is essential for ensuring a large adhesion to any environmental governance system. The right-to-know of the civil society has to be satisfied and the current issue in this respect is the lack of credibility of the public authorities in this respect.

38. It should be noted that alert could serve not only for detecting threats; it could also be used for perceiving new opportunities that might emerge and that it would be regrettable not to exploit. In the rather bleak panorama of the evolution of our global environment, bright spots do exist nevertheless and should not be ignored.

39. Alert could serve several purposes; its objectives are generally well identified. The most pressing issues that need to be addressed are the weaknesses in the organization of its functioning and its lack credibility in public opinion. This is not related to knowledge availability; it is a question of structures that is analyzed in the next part of the document.

Structures

40. Structures relate both to ***assets*** when they constitute part of the organizational capital of the governance and to ***capabilities*** when they are part of the relations, networks and regimes that support governance. In the latter, they relate to environmental communication. In the present case, the issue is not the lack of structures but rather their multiplicity and their diversity, the interrogation about their legitimacy and the lack in equity towards all types of stakeholders. What approach can be used for putting some order in these structures?

- *Centralization vs. flexibility*. It does not appear desirable to regroup all the structures dealing with observation and alert in one single comprehensive structure configured as a star with one single focal point and satellite organizations linked individually to the centre. The network consisting of several nodes interlinked to each other appears more promising and the whole structure should be made of clusters of such networks largely interconnected. For reflecting adequately the diversity of the interests, the organization of these clusters of observation and alert networks should be based on at least two dimensions, namely:
    - Issues such as biodiversity, water conservation, desertification, oceanic circulation, etc. The action plan formulated for executing the Plan of Implementation of the World Summit on Sustainable Development could act as a guide for identifying the issues and setting-up the relevant clusters, even if the concept of sustainability is wider than the environmental one. Considering issues that are not strictly environmental but strongly related to it could be a plus, especially for alert purposes.
    - Regions for taking into account the geographical specificity of various areas of the globe

41. Overarching coordination mechanisms should ensure the coherence and the complementarities between the clusters of networks. GEOSS and IGOS have been mentioned already as striving in this direction and should be supported.

- *Legitimacy*. The lack of credibility detected in public opinion about environmental information raises the debate about legitimacy. As Daniel Bodansky argues "Legitimate authority simply means justified authority" (4). For environmental governance, justification relies heavily on scientific evidence rather on legal evidence. Such scientific evidence should be neutral with regard to the decisions to be taken, and should be perceived as such. Scientists should assist decision-makers, not substitute for them and should not attempt to orient their expert advice in a political direction or another. As William Leiss puts it "Science is only useful when true to itself" (5). To attain the required neutrality in the structures required for observation and alert, two conditions should be met:
    - Maintaining an arm's length relation between expert bodies and political decision-makers
    - Reinforcing the quality control within the scientific community itself through peer review.

42. The International Panel on Climate Change constitutes a recent model of what can be achieved in terms of legitimacy and its format should be replicated for other bodies of scientific expertise.

43. *Equity: engaging the disenfranchised.* Disenfranchisement relates to the marginalization of developing countries and civil society actors being deprived of the capability to participate and to influence agenda setting and decision making in international governance.

44. With regard to civil society, when it comes to observation and alert, the fight against marginalization should be conducted at the political level; it is difficult to envisage a direct association of the civil society in the observation and alert systems but wide dissemination of the results of the relevant activities within a policy of openness and transparency, attention given to enquiries of citizens' groups should satisfy the needs of a participatory process. In this field, the principle of subsidiarity should be exercised i.e. acting at

the lowest possible of government for ensuring proximity. If global environmental assessments are useful, reports devoted to the local state of the environment have even a greater value for the citizen. European regions such as Wallonia produce quite comprehensive sets of environmental indicators (6) that appear to serve the purpose.

45. For the engagement of the civil society in this particular aspect of environmental governance, proximity is the essential factor and efforts to make it effective should be conducted essentially at the local level.

46. Dealing with developing countries implies the resolution of a wider issue covering several aspects:

- The first one is the full availability of observation for all developing nations; this issue has been discussed earlier in terms of possible restrictions to dissemination. The international mechanisms put into place, notably GEOSS and IGOS should facilitate the accessibility to all concerned.
- The second one is the possibility to formulate specific requests for coping with their specific situations. Again, the international mechanisms just cited should assist in meeting such requests.
- The third one is linked to the specific development of observation networks in particular land- and sea-based in these countries. International assistance, technical and financial, is required. It implies not only installing or complementing networks of observation stations but also maintaining and replenishing them, ensuring the correct treatment of the observation, its quality and its compatibility with international databases.
- The fourth one concerns the more general question of adequate human resources for operating the observation and alert systems and for participating effectively in international meetings devoted to agenda setting and decision-making. Capacity-building is the key to meeting this requirement.

47. For the two first aspects of tackling developing countries' needs and aspirations, overarching coordination mechanisms such as GEOSS and IGOS constitute the best approach. For the two latter, multiple actions of assistance should be encouraged, multiple by their origin (bilateral or multilateral cooperation agreements, United Nations specialized agencies, scientific unions) and by their nature (training of Ph.Ds as well as technicians, supply of measuring equipment, establishment of a suitable Information and Communication Technologies infrastructures). The setting-up of regional centres could assist in assembling the necessary means and competencies and avoid wasteful duplication.

Conclusion

48. Whatever structure will be adopted eventually for international environmental governance, observation and alert constitute important contributions to its ultimate success. Implementing these two functions implies the handling of a complex, multi-faceted, multi-dimensional problem. Many initiatives do already exist for this purpose; coordinating their objectives and their actions, establishing adequate inter-linkages inside the observation and alert systems as well as with the other components of environmental governance constitutes the most important task. Most of the physical and intellectual material necessary for an efficient functioning does exist; putting together the constituting molecules to obtain a perfect crystal structure rather than an amorphous composite represents the real challenge. No effort should be spared for reaching this goal.

Bibliography

1. Draft GEOSS 10-Year Implementation Plan, Draft Reference Document GEO 202-1, November 2004
2. US National Space Policy statement, The White House, September 19, 1996
3. WSSD Integrated Global Observing Strategy (IGOS) Type-II Partnership, submission document updated February 1, 2003
4. The American Journal of International Law, 93, 596-624, 1999
5. " *Between Expertise and Bureaucracy: Risk Management trapped at the Science/Policy Interface* ", forthcoming in" Risky Business: Canada's Changing Science-Based Policy and Regulatory Regime ", Doern G. B. & Reed T. (eds), University of Toronto Press
6. Rapport sur l'état de l'environnement wallon. Tableau de bord de l'environnement wallon 2004. Ministère de la Région wallonne, Direction générale des Ressources naturelles et de l'Environnement, 2004