New Worldwide Ecological Challenges and their Impact on Forestry

Introduction

Prior to embarking on my topic, I would like to point out that for more than 30 years I have always thought of and practised ecology as a basic science both regarding the use and conservation of natural resources. Its importance is as great in terms of increasing biological productivity and striving at viable socio-economic development, as it is in terms of environmental protection, both aspects being closely intertwined.

The easy way out regarding the identification of new challenges would be to enumerate the three magical expressions which were the leitmotif of the Rio Summit in 1992 and which I will mention in their original English version (since there are too many synonyms in French): global change, biodiversity, sustainable development. These three expressions are blessed with dozens of definitions and can prove perfectly contradictory in their implications, depending on the scientific priorities or economic interests of the people using them. Their success appears to be directly proportional to their hazy contours and their evasive content. True, they are most often used by new environmental and developmental "instant experts" the likes of which are sprouting here and there, even at very high levels.

Now that we have experienced the debauchery of demagoguery and catastrophism, both of which have wreaked havoc recently and, more particularly, have poisoned the relationships between the countries of the North and those of the South, the first methodological challenge is to fight myths which abound everywhere, as computer viruses do, and to demystify the commonplace and the false truth, both of which impede the return to competent and professional processes.

Obviously, this criticism does not encompass foresters who, ever since their ancient roots (Magistrato dell'Acque in Venice, the politics of

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Colbert in France) have benefitted from a major asset which preadapts them to the new challenges: the long-term vision which is inherent to forest sciences.

Causes of the Crisis

Before painting a vision of the challenges, I would like to refer to the causes of the current crisis, using the word "crisis" in its etymological meaning of "passage from one state to another", which in itself is an existential wager for a society subjected to new forces of selection. I would limit myself to three major causes, quite aware that each is the starting point of a chain reaction:

- Exchange imbalances (natural or manufactured products, capital, industries, information) consequent to the globalisation of markets in the absence of adequate regulatory mechanisms, as well as the simultaneity of some of those exchanges. Not only is the gap between the Northern countries and most of the Southern ones increasing, but cracks appearing within each society or nation are pathways to marginalisation, segregation and structural unemployment.

- Too much demographic growth in most Southern countries (the opposite in a number of Northern countries) in tandem with added pressure on resources, as well as increased migration: from rural areas toward ever greater and alienating cities and suburbs within each country, and from one continent to another, even — with increasing frequency — from the South to the North, and from East to West (in Europe). In this latter case, one also witnesses marginalisation and segregation all the way to the resurgence of racist phenomena.

- Excessive use of energy and wastage of products in the North which goes hand in hand — in a number of Southern countries — with a lack of opportunities regarding viable development. This is not a plea to halt progress, far from it; poverty, at the world level, being the main cause of environmental degradation.

It is astonishing that the first two series of causes — macro-economic and demographic — were barely considered at the Rio Summit on environment and development; these were taboo topics at the intergovernmental meeting of minds. How can one hope to entertain discussions on sustainable development without dealing in depth with its underpinnings?

Conceptually and methodologically speaking, it is true that the causes mentioned above could come under the term "complexification", because of the broadening of scopes, increased interactions and the resulting connectivity between its various components. But, complex systems behave in non-linear ways, with thresholds, discontinuities, branching and surprises, thus greater unforeseeability. The management of the unforeseeable and the mastery over uncertainty are currently the most difficult challenges for our decision makers, who are not cut out for this task either by their training or by their outlook which prefers reassurance to innovation.

Consequence of the Crisis and Challenges for Foresters

The complexification crisis and the globalisation crisis overlap. In a recent article, I tried to sketch a conceptual and operational framework of the causes, emergent properties, signals, consequences, as well as of regulatory processes — therefore the challenges — of globalisation. In the more closely cropped context of this presentation, I will only refer to some of these aspects, particularly those that seem to be closer to the forester's heart.

In most Southern countries (mainly tropical and mountainous) the most visible impacts are: degradation of

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steppe and savanna soils, and more particularly of treed slopes, physical desertification, upheavals to which watersheds are subjected, reduced biological diversity (not so much of trees, but of the fauna and microbial flora associated with trees).

In the Northern countries, the most evident consequences, particularly in the current geopolitical and societal context, are: toxification of soils and dysfunction of ecosystems (because of acid rain for instance), the lack of garbage recycling, human desertification of the rural areas, abandonment of fertile lands due to economic imperatives (lands used as landfill or dense brush with high risks of fire).

The man-induced global weather changes that might crop up in 30-40 years will only aggravate the differences between countries, as winners and vanquished emerge.

Evidently, no single discipline or profession, nor an amalgam of all of them, can solve only one of these problems, without the active participation and involvement of all productive forces, local populations and politicians. However, it would be difficult to imagine a profession whose role could be greater than forestry in solving these problems. I have already alluded to the long-range vision which is inherent in the forest regeneration cycles. I would add that the forester has traditionally achieved a synthesis between his production function and that of conservation, that he has had to reconcile the biological and physico-chemical foundations with the components of economics and markets, the latter having been able to involve users and concerned populations at times.

But his current challenge has even greater bearing; he must evolve into some kind of planetary gardener, architect of spaces and territories, and guarantor of the health of ecosystems.

For instance, in order to slow tropical deforestation, it is imperative to propose new realistic development options. To this end, there must be a balanced mosaic of totally-protected primary forest, buffer areas under controlled use, plantations of fast-growing commercial species, agro-forestry spaces, even intensive agricultural spaces or pastures on more fertile soils.

In arid zones and wherever soils have great physico-chemical fragility, it is more a matter of reconstruction than restoration of ecosystems which have already vanished. More often than not, there will be the need for an alliance between the forester and the soil biologist regarding the domestication of microbes capable of ensuring the recycling of organic substances and the resurgence of biological fertility. Furthermore, plantations near villages aimed at providing a source of energy and a factor of stabilisation, as well as the introduction on a new strata of fodder shrub reaching a height between that of an *Acacia* and that of grasses, have demonstrated their usefulness in remodeling arid ecosystems.

In the temperate zone, beyond measures designed to ensure or to re-establish the health of ecosystems after chemical aggressions, it will be necessary to rethink the organisation and utilisation of the land in regions such as the European Community, where agricultural policies can cause dramatic rural upheavals. How does one switch from very intensive chemical agriculture to sustainable and viable ecosystems and still preserve a dynamic and involved rurality? Some elements of the solution are: extension of zones with an agro-silvo-pastoral calling, with agro-industries entrusted with the manufacture and marketing of products; accent on competitive quality rather than mega-quantity; open reforestation; green tourism. But the full concept of the ecotonal dynamics must be rethought creatively. It will also be necessary, as a good architect of nature, to devise new spatial structures and new interfaces.

And what about the new expansion of urban forestry in the city ecosystem where, that one should agree or not, the evolutionary destiny of the human race will unfold?

I will say unequivocally that regarding his role of gardener and architect of the planet, in the context of his work on ecosystem "domestication", I have no biases pro or con the tools that the forester has to use as agents of development to tackle the problems at hand: fast-growing species, use of exotic species, advanced genetic selection, significant help from options afforded by biotechnology, use of biodiversity.

Resistance and Solution Outlook

It goes without saying that this approach can but encounter significant opposition: impermeability of disciplines and corporatism of professions (at times even from foresters), the woefully inadequate training in most countries in terms of this mutation crisis, the archaic regulations of the academic career system, a psychology usually geared to the maintenance of a stability which proves to be outdated and resistant to flexibility and innovation, a dramatic lack of adaptation within institutions which were created and were developed under forces of selection which are not those that govern us now, forces which were more linear than forward-looking, less constraining and interactive than today's.

Only a new partnership with the most vibrant elements of society (work force, entrepreneurs, some non-governmental organisations, cultural and creative movers) can break the vicious circles, particularly in the choice of priorities and in decision making, which are so frequent, not only in public administration, but also in academia and research.

As to the more serious problem, the North-South gap and, more generally, the geopolitical fracture which stems from globalisation, here again it seems to me that the most viable solution will rest on the development of a partnership looking for concrete and precise measures of co-development. It will be particularly imperative to convince the Northern countries that relationships with the Southern ones must not rest on charity, guilt-riddance of ex-colonial powers (in some cases), or one-way aid, which has always proved to be inefficient or insufficient, but on a true complementarity. It is a wager on survival for the North, if it does not want to be swallowed in the middle term by the rising tide of Southern countries seeking the satisfaction of their basic needs, but also the maintenance of their own identities.