

## Editorial

An interesting true story came to my attention which I thought may have some relevance to R&D policies as well. Back in late 1940's Argentinian authorities seemingly decided to benefit from the fur trade and brought in some fifty pairs of beavers from Canada and let them proliferate in a large southern island. Over the past five decades the beaver population has grown to some half a million while the demand for fur has nearly disappeared. The beaver population grew unchecked and caused severe damage to the fast-growing forests of southern Argentina. Indeed, it is feared that the local human population may have to move and leave the whole island to beavers! In fact, it is feared that the beaver population may even migrate to mainland. Why is this story relevant to R&D as well? I think there are lessons to be learnt here.

Lesson number one: one should not try to copy what goes on in another geographical location without thinking of longer term consequences if things do not go quite the way one may have imagined at start. When the fur demand was high, beavers provided a good economic payoff to Canada where the beaver population was also kept in natural check by severe winters and slower growing forests. The food supply there was not as plentiful as in southern Argentina. This also applies to research policy; appropriate R&D areas have to be different for different regions of the globe. Overpopulation of researchers in one area can be detrimental to the well being of other areas. Indeed, it can also self-destroy overpopulated areas for lack of adequate resources resulting in unhealthy competition.

Lesson number two: total resources of all kinds are necessarily limited. If one area consumes too high a proportion of the finite resources, then other areas must suffer and even disappear in time. If bio-diversity in Nature is jeopardized, the effects can be catastrophic. Similarly, diversity in R&D areas is essential to the long term economic survival of a nation just as biodiversity is recognized to be critical for environmental health of the globe. Since all crystal balls are hazy, it is good to play it safe and not place all (or almost all) eggs in one basket. Basically, this means support a broader range of R&D fields. One can never tell which areas will disappear either because there is no intrinsic value in it or because it is so valuable that other parts of the world with more suitable conditions may dominate the field- one of the effects of globalization. Like resources, markets are also finite!

Lesson number three: always have a fallback position. This is basic research, which is independent of specific application areas, which may come and go in time. If students and researchers are educated well in fundamentals they are armed with the tools to take on new areas as they come. Recall that all the new discoveries and inventions in biomedicine, micro-electronics, nanosciences, advanced materials etc. were made by individuals whose training did not even mention these subject areas! I believe that universities should focus on education grounded in fundamentals and produce good researchers who can handle any new area that may emerge in time. Without solid foundation, a sky scraper will not for long although it will be impressive for a while.

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