

the priority of the Antarctic policy, and better integrate it into national security and strategic policy thinking. It should deepen engagement with the Antarctic treaty system and make better use of its compliance mechanisms. Open discussions are needed with like-minded states in anticipation of sovereignty and resource issues being revisited in 2048. The policy function of the Australian Antarctic Division must be relocated to Canberra and moved into the Attorney-General's Department. It should invest in Antarctic science, logistics and other capabilities including ski-equipped aircraft. Antarctica's strategic importance should be defined in national security policy statements, including the next

Defense White Paper, and how personnel from the national security community may contribute to Australia's Antarctic programme must be explored⁹.

Considering these facts, one can make out that international interest in Antarctica is not confined to science/research, but it has crossed its boundaries and can become the next territory of international dispute over the resources.

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Non-tragedy of the commons

The problem of the commons need not be a 'tragedy'. The theory proposed by Garrett Hardin in 1968 (ref. 1) – the tragedy of the commons – may no longer be as convincing and popular as it has been. According to Hardin, allowing users to manage common property resources, by appealing to their individual consciences, is not realistic. Some of his points of view are: '... the commons, if justifiable at all, is justifiable only under conditions of low-population density¹'. 'To couple the concept of freedom to breed with the belief that everyone born has an equal right to the commons is to lock the world into a tragic course of action¹'. To manage the commons, Hardin recommends mutual coercion, 'mutually agreed upon by the majority of the people affected¹', such as compulsory taxes.

This outlook was questioned by Elinor Ostrom², the first woman to receive The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel (in 2009) 'for her analysis of economic governance, especially the commons'³. A press release by The Royal Swedish Academy of Sciences states: 'Elinor Ostrom has demonstrated how common property can be successfully managed by user associations ... has challenged the conventional wisdom that common property is poorly managed and should be either regulated by central authorities or privatized ... She observes that re-

source users frequently develop sophisticated mechanisms for decision-making and rule enforcement to handle conflicts of interest, and she characterizes the rules that promote successful outcomes⁴.'

In the T. N. Khoshoo Memorial Lecture she delivered in Bangalore on 3 February 2012, Ostrom described a framework to identify variables that decide whether users would self-organize in order to achieve sustainable social-ecological systems (SES). In a related article, she notes that: '... we must learn how to dissect and harness complexity, rather than eliminate it from such systems ... this process is complicated, however, because entirely different frameworks, theories, and models are used by different disciplines to analyse their parts of the complex multilevel whole⁵' and that 'simple blueprint policies do not work.'⁵

Ostrom said that, to the question: 'when will the users of a common property resource self-organize?', Hardin had answered: 'Never!' Many policies were based on this conclusion by Hardin, and people assumed that governments must impose uniform solutions on all similar resources, e.g. forests. There were many failures and some successes. Ostrom indicated that people will self-organize when they perceive the benefits of self-organization to be greater than the costs.

Ostrom spoke to *Current Science* at the end of the T. N. Khoshoo awards function (see Box 1).

How does one decide when ownership by the stakeholders is better than governmental governance?

You want to be looking at how big the resource is. If it is giant, and there are thousands of people involved in it who don't know one another, then it is probably not going to be self-organized very effectively. But a 100 to 200 people, they have some common history, and they can get a knowledge base that is accurate – then indeed they have a strong interest. So it is not one of these simple things and there isn't just a single variable.

Why are there so few women Nobel laureates?

Well, I can't answer that! There are very few. When I entered academia in 1965, there were very few women in social sciences. You don't want to hear my long history, but I can tell you the problems in being a woman all the way. I think part of it is there were few academic women in economics or the social sciences. We are now making a change. I am focusing on the future rather than going over the past. I have had women PhD students working with me and am trying to help

Box 1. T. N. Khoshoo awards

Figure 1. Elinor Ostrom (centre) with Hemalata Pradhan (left) and Sandeep Tambe (right).

The T. N. Khoshoo Memorial Award⁶ was instituted in memory of the renowned environmental scientist T. N. Khoshoo. It recognizes excellence in the fields of environment, development and conservation. In its eighth year in 2011, the awards were presented to: (i) Hemalata Pradhan⁶, a botanical artist and conservationist, who highlights the importance of conserving biodiversity for sustainable development; and Sandeep Tambe⁶, who is involved in participatory management of common property resources in Sikkim (Figure 1).

The awards function, held at the National Institute of Advanced Studies, Bangalore on 3 February 2012, also included the presentation of the first T. N. Khoshoo Ecology and Environment Award for Schools (2011)⁶. These awards were initially instituted for Bangalore and Delhi schools, and will be morphed into the T. N. Khoshoo Earthian Trophy from 2012 (across India) and be a part of the Wipro earthian awards. The 2011 awardees were: K. K. English High School, Bangalore and Salwan Public School, New Delhi at the first place; and Sri Vani Education Centre, Bangalore and Father Agnel School, New Delhi at the second place.

The awards were presented by Elinor Ostrom.

make sure they move ahead in their careers.

What is your advice to women scientists?

Work hard and pick areas that you are very interested in. Let your interest drive you to do very good rigorous research.

Publish; don't just write it up and put it in personal notes, because if you don't publish you are not going to get promoted.

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