Box 1. Section 5: Patents
Article 27
Patentable subject matter

1. Subject to the provisions of paragraph 2 and 3 below, patents shall be available for any inventions, whether products or processes, in all field of technology, provided that they are new, involve an inventive step and are capable of industrial application[2]. Subject to paragraph 4 of Article 65, paragraph 8 of Article 70 and paragraph 3 of this article, patents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced.
2. Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordere public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by domestic law.
3. Members may also exclude from patentability:
   (a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals;
   (b) plants and animals other than microorganisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof. The provision of this sub-paragraph shall be reviewed four years after the entry into force of the Agreement Establishing the MTO.

looked as an investment, with expectations of monetary returns. Internationally, very few new technologies would be available free of cost, in future. The scientific community in the country should accept this as an opportunity to create wealth from innovative R&D for the nation, their employers and for themselves. However, this would need radical changes in the mind set of the researchers, management and funding of R&D and promotion norms.

The rich genetic resources are useful only if they can be exploited to create wealth. Their exploitation also needs other resources – trained man/woman power, adequate infrastructure, managerial skills, ability to innovate, take risks and market the new products. If we ourselves cannot exploit the genetic resources fully, we should share them with those who have the technologies on mutually beneficial terms, safeguarding our interests.

Prohibiting patents in biotechnology would kill all the initiatives of a small number of innovative scientists, willing to spend their time towards developing 'marketable' products. It would also deprive the country from the benefits of the new products and processes developed elsewhere, at least, for the period till the expiry of their patents which could be 15–20 years. Innovations in biotechnology should be rewarded as in other disciplines.

1. From Agreement on TRIPS. Final act embodying the results of the Uruguay round of multilateral trade negotiations, GATT Secretariat (UR-93-0246).
2. For the purpose of this Article, the terms 'inventive step' and 'capable of industrial application' may be deemed by a Member to be synonymous with the terms 'non-obvious' and 'useful' respectively.

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Agriculture in Loktak Lake, Manipur – What fate Sangai?

In 'Agriculture in floating fields on Loktak Lake, Manipur' (O. K. Singh, *Curr. Sci.*, 1997, **72**, 902–903), the author has not mentioned anything about its likely impact on the single, small, wild population of around 70 Sangai (Manipur brow-antlered deer, *Cervus eldi eldi*), one of the most endangered mammals in the world, inhabiting a part of Loktak Lake (Zoo Outreach Organization, Coimbatore).

The author seems appreciative of such cultivation and calls for technology and efforts to cultivate inundated places and water surfaces further. That will destory wild areas, wildlife and biodiversity further (as happened in Terai grasslands and mangroves). While there are only around 170 Sangai (including a total zoo population of around 90–100) in the entire world, should we still pamper humans numbering more than 500 crores globally? While 96–97% of India's land and resources are being used by people, the meagre 3–4% kept for wildlife are also under pressure. A nation and a people who cannot live with 96–97% of land and resources, what more will they gain by usurping the additional 3–4% (H. S. Panwar, pers. commun.)? Why such war of 'no victors but definite losers (wildlife and biodiversity)'?

Rice was being cultivated in parts of Loktak Lake even around 1960 (*J. Bombay Nat. Hist. Soc.*, 1960, **57**, 597–617). It is not mentioned whether more area was cultivated subsequently. Perhaps due to several deterrents to human use, Sangai could get a habitat there.

But if cultivation is extended further, what may happen to Sangai in future?

The author recommends extending such cultivation for better economy. But that is not without problems. The solution to India's food and economic problems is not increasing cultivation and technology, but efforts on a war-footing for immediate control and gradual reduction of human population and equitable distribution of resources. Enough of war on nature. We should restrict our own numbers and lifestyle so as to live sustainably by milking only milk and not blood too from the cow called nature.

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NEWS

SIRO numbers swell: 519 and counting

The number of non-commercial Scientific & Industrial Research Organizations (SIROs) in the country has swelled to 519. The Department of Scientific and Industrial Research (DSIR)'s September 1997 Directory of Recognized SIROs lists 37 SIROs in agricultural sciences, 159 in medical sciences, 188 in natural and applied sciences, 113 in social sciences, and 22 universities/colleges. Covered in this latest Directory are: (a) Associations, i.e. societies registered under the Societies Registration Act, 1860 or any such Act passed by the State Government, with the objective of conducting scientific and/or industrial research; (b) R&D Companies incorporated under section 25 of the Companies Act, 1956 and setup for engaging in R&D activities; (c) Institutions with adequate facilities to conduct scientific and/or industrial research and whose main objective is the conduct of scientific and/or industrial research; (d) Professional bodies whose objective is the conduct of scientific and/or industrial research; (e) Universities established or incorporated by/or under a Central or State Act and including institutions declared under section 3 of the University Grants Commission Act, (1956) and (f) Colleges, affiliated to universities, that carry-out scientific research in specific disciplines.

DSIR is the nodal government department for granting recognition to SIROs. Such recognition entitles SIROs to tax benefits under Section 35(1)(ii)(iii) of the Income Tax Act, 1961 and also Customs Duty exemption and waiver of Excise Duty.

RESEARCH NEWS

The different locked states of an allosteric membrane channel protein unlocked

S. K. Sikdar

Allosteric proteins ('allo' – meaning other) are proteins that have specific sites to which physiologically important molecules or ligands bind to regulate the activity of the protein, and these sites are different from the sites involved in catalytic activity. A ligand binds to a particular conformation of the protein and not to others. When a protein is a complex of subunits, and the subunits occur in clusters, with each subunit having a ligand-binding site, cooperative changes occur within the protein molecule in a complex fashion, such that binding of the first ligand makes the binding of the second ligand easier. One such protein is the oxygen-carrying haemoglobin and is used in text books of biophysical chemistry to explain how interaction of the protein with many ligands modulates its activity. An important theoretical model to explain how an allosteric protein like haemoglobin is regulated, is the MONOD-WYMAN-CHANGEUX (MWC) model[1]. In this model, a protein is considered to consist of n identical and independent protomers (in the original terminology), a protomer being a structural unit (subunit) which has a binding site for the ligand. A protomer can exist in two reversibly equilibrating conformational states, a ligand bound and an unbound state. The activity of the protein occurs due to concerted conformational changes in the protomers, and helps to explain the hyperbolic saturation curve for binding of a ligand to identical and independent binding sites on the protein. The MWC model does have limitations, however, and cannot fully explain all the experimental