India lays the cornerstone of biodiversity access and benefit sharing system

Parameswaran Prajeesh

The very first Internationally Recognized Certificate of Compliance (IRCC) has been issued by India on 1 October 2015, which is a major step towards making the Nagoya Protocol on access and benefit sharing operational. According to the Nagoya Protocol under Convention on Biological Diversity, all parties must recognize the biodiversity access permits with an IRCC as evidence of acquisition in accordance with applicable domestic law and rules. By this action, India had taken a giant leap and had left a mark in the history of biodiversity governance. Following this, until 24 April 2016 more IRCCs have been issued by India.

The first Internationally Recognized Certificate of Compliance (IRCC) issued by India to a researcher affiliated with the University of Kent, UK, gives her the opportunity to demonstrate that she has respected the access and benefit sharing (ABS) requirements under the Biological Diversity Act, 2002 of India, while conducting research and when using the ethnomedicinal knowledge of the Siddi community of Gujarat. Among the 196 parties of the Convention on Biological Diversity (CBD), India has topped in issuing the certificate. India is also leading in bringing various legislative, administrative and policy measures in biodiversity (Figure 1). Out of the 196 parties of the CBD, 171 have established the National Focal Points for ABS, 27 have formed Competent National Authorities, 43 have brought the legislative, administrative or policy measures on ABS and 12 have set up National Databases and Websites, all of which are footsteps for making the ABS system operational.

CBD and the Nagoya Protocol

The CBD was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development, the Rio Earth Summit and entered into force on 29 December 1993. The Convention is the only international instrument comprehensively addressing the sustainable use of biological diversity and which directs the parties to ensure ABS system. Its three major objectives are: (1) conservation of biological diversity; (2) sustainable use of its components, and (3) fair and equitable sharing of benefits arising from the utilization of genetic resources[1]. Article 15 of the CBD establishes the guidelines for access to genetic resources and ensuring benefit sharing which has to be followed by the contracting parties. The World Summit on Sustainable Development (Johannesburg, September 2002) had called for the negotiation of an international regime for the third objective. After years of negotiation, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD, was finally

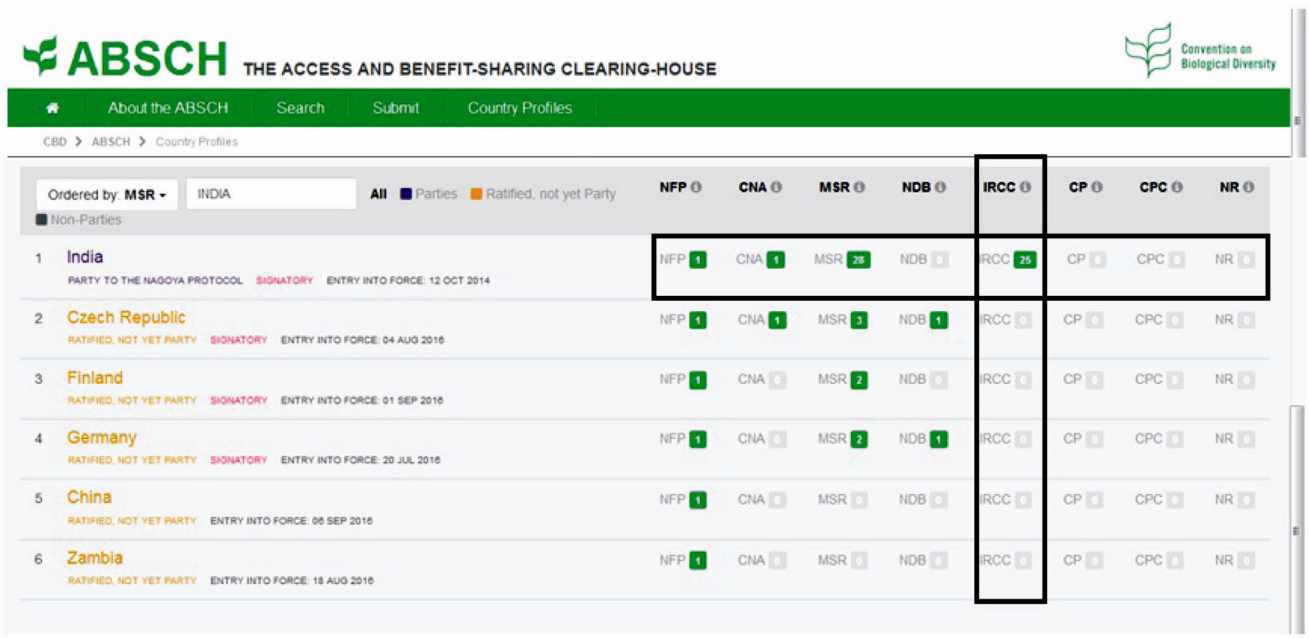

Figure 1. Webpage of ABS Clearing House, CBD: India tops in legislative, administrative and policy measures in biodiversity (MSR) and in Internationally Recognized Certificate of Compliance (IRCC). Source: https://absch.cbd.int/countries

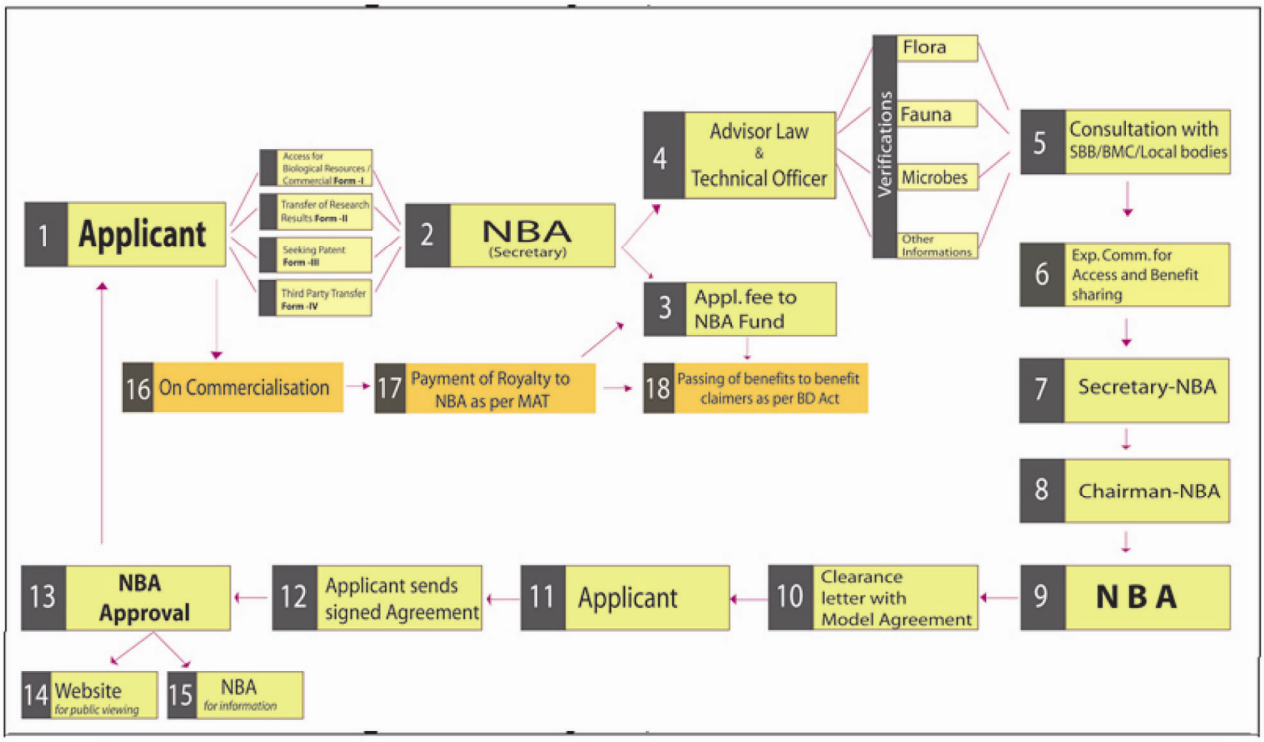

Figure 2. Schematic presentation of processing of applications under Biological Diversity Act, 2002 and Rules, 2004. Source: http://nbaindia.org/content/684/62/1/applicationprocess.html

adopted at the 10th Meeting of the CBD – Conference of the Parties (Nagoya, Japan, 2010) and entered into force on 12 October 2014. The Protocol significantly advances the objective of the CBD on the fair and equitable sharing of benefits arising from the utilization of genetic resources by providing greater legal certainty and transparency for both the providers and users of genetic resources. The Protocol also envisages creating incentives to conserve and sustainably use biodiversity, and further enhance the contribution of biodiversity to sustainable development and human well-being. The Protocol has 36 Articles in total, in which Articles 6 and 17 define the access to genetic resources and provide the provision of monitoring the utilization of genetic resources respectively. Describing the appropriate measures for monitoring, Article 17 demands an IRCC which serves as evidence that the genetic resource has been accessed in accordance with prior informed consent and that mutually agreed terms have been established, as required by the domestic access and benefit-sharing legislation or regulatory requirements of the said Party. To date, 73 Parties, including India have ratified the Nagoya Protocol[2].

The Biological Diversity Act, 2002 and The Biological Diversity Rules (2004) in India

Over 91,000 species of animals and 45,500 species of plants have been documented from 10 bio-geographic regions of India. Nearly 6500 native plants are still used prominently in indigenous healthcare systems. Thousands of locally adapted crop varieties, grown traditionally since ancient times, and nearly 140 native breeds of farm livestock, continue to thrive in diversified farming systems. The country is recognized as one of the 8 Vavilovian Centres of Origin and Diversity of Crop Plants, having more than 300 wild ancestors and close relatives of cultivated plants still growing and evolving under natural conditions. Seventeen high biodiversity-bearing (species richness and endemism) countries had formed a group of like-minded megadiverse countries (LMMCs), and in 2004, India was invited to chair this group for two years. During this period, India coordinated the development of common position of LMMCs, especially for negotiations of an international regime on ABS. It is significant that India has made its place in all the major international events related to environment and biodiversity conservation, and has ratified all the major biodiversity and environment-related global conventions. After being a signatory to the CBD in February 1994, and according to Article 6 of the Convention (calls upon all parties develop national biodiversity strategies and action plans), India had developed a strategy for biodiversity conservation at macro-level in 1999, submitted it to the CBD and enacted the Biological Diversity Act in 2002 followed by the Biological Diversity Rules in 2004 (ref. 3).

The National Biodiversity Authority (NBA), established in 2003, is an autonomous body under the Ministry of Environment, Forests and Climate Change, Government of India (GoI). It performs facilitative, regulatory and advisory function for the GoI on issues of conservation, sustainable use of biological resources, and fair and equitable sharing of benefits of use. The Biological Diversity Act, 2002 mandates implementation of the act through decentralized system with the NBA focusing on advising the Central Government on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising

Table 1. Details of Internationally Recognized Certificate of Compliance issued by India

Details of the permit or its equivalent	Person or entity to whom prior informed consent was granted	Type of use allowed by the permit or its equivalent
Accessing ethno-medicinal knowledge of the Siddi community from Gujarat for research.	Seema Solanki, University of Kent, Canterbury, UK	C
Approval for the invention 'A process for preparing storable insectisidal formulation using a combination of microbials' for obtaining IP Rights in India.	Directorate of Oilseeds Research, Hyderabad, India	Commercial
Accessing seven biological resources from Karnataka and Kerala for research.	C	C
Accessing nine biological resources from Karnataka and Kerala for research.	C	C
Accessing two biological resources from Tamil Nadu and Rajasthan for research.	C	C
Approval for the invention 'Ayurvedic medicinal tablet and capsules process and formulation' for obtaining IP Rights in India.	Nilesh Madhusudan Pagedar, D/6, Pragnya Nagar Scoiety, Gujarat, India	Commercial
Accessing the *Lepidoptera sphingidae* night butterflies from Karnataka, Odisha, Kerala, Andhra Pradesh, Gujarat, Himachal Pradesh, West Bengal, Arunachal Pradesh, Meghalaya, Mizoram, Rajasthan, Chhattisgarh, Uttar Pradesh and Madhya Pradesh for research.	Ekologike Centrum Orlov, o.p.s Sphingidae Museum, Thomas Melichar, Czech Republic, and Manjunatha, H. B., Department of Studies in Sericulture, University of Mysore, Karnataka, India	Non-commercial
Accessing the infected leaves, plant stalk and sheaths of *Zea mays* from Andhra Pradesh, Bihar, Karnataka and Telangana for identifying the pathogen races causing damage to pioneer hybrids.	C	C
Accessing the species of Formicidae, Coleoptera, Hemiptera, Anura and Apoda from Maharashtra for research.	Christopher John Thorpe-Dixon, Plymouth University, UK	Non-commercial
Approval for the invention 'Process for extraction of bio-active compounds exhibiting anticancer property from *Lentinus tuberregium*' for obtaining IP Rights in India.	V. Kaviyarasan, Centre for Advanced Studies in Botany, University of Madras, Chennai, India	Commercial
Approval for the invention 'Fruit containing confectionery' for obtaining IP Rights in India.	Ashok Prabhakar Gade, 201, Shani Peth, Maharashtra, India	Commercial
Approval for the invention 'A process for hyperproduction of catalase enzyme from novel extremophilic bacterium *Geobacillus extremocatsoochus* MTCC 5873 and strain thereof' for obtaining IP Rights in India.	Registrar, Punjabi University, Patiala, India	Commercial
Approval for the invention 'Process for the preparation of alcohol from damaged rice grains' for obtaining IP Rights in India.	C	C
Approval for the invention 'Macrofilaricidal activity of the fruit extract of *Trachyspermum ammi* ' for obtaining IP Rights in India.	Indian Council of Medical Research, Vector Control Research Centre, Puducherry, India	Commercial
Approval for the Invention 'Process for the preparation of syrup from *neera*, a sweet sap obtained from palm tree particularly *Phoenix sylvestris*' for obtaining IP Rights in India.	Balu Chopade Ananda, Vice-Chacellor, Dr Babasaheb Ambedakar Marathwada University, Aurangabad, India, and Suchitra Vishal Mokashi, Deenanath Mangeshkar Hospital, Pune, India	C
Accessing the *cry 2Ai* gene isolated from *Bacillus thuringiensis* for developing insect-resistant plants.	C	C
Approval for transferring the results of research on isolated *Bacillus thuringiensis* to M/s Bioseed Research India, Hyderabad for generation of insect-resistant crop plants.	C	C
Access and isolation of green algae and Cyanobacteria from sea water from Goa, Gujarat and Maharashtra for evaluation of their commercial potential.	C	C
Approval for the invention on enhancement of stigmasterol and hecogenin content in *in vitro* root cultures of *Chlorophytum borivilianum* through polyploidy for obtaining IP Rights in India.	C	C

(*Contd*)

Table 1. (*Contd*)

Details of the permit or its equivalent	Person or entity to whom prior informed consent was granted	Type of use allowed by the permit or its equivalent
Approval for the invention 'Processed dry prawns meat' for obtaining IP Rights in India, United States of America, Japan, Australia, Belgium, Canada, China, Denmark, Finland, France, United Kingdom, Germany, Ireland, Hong Kong, Italy, Malaysia, New Zealand, Norway, Portugal, Russia, Singapore, Switzerland, Sri Lanka, Taiwan, Thailand and Vietnam.	C	Commercial
Approval for the invention 'Processed dry yellow clams meat' for obtaining IP Rights in India; IP Rights will also be sought in the United States of America, Japan, Australia, Belgium, Canada, China, Denmark, Finland, France, United Kingdom, Germany, Ireland, Hong Kong, Italy, Malaysia, New Zealand, Norway, Portugal, Russia, Singapore, Switzerland, Srilanka, Taiwan, Thailand and Vietnam.	C	Commercial
Approval for the invention 'Herbal composition effective against *Rhabdovirus* and process of preparation thereof' for obtaining IP Rights in India.	C	C
Accessing filamentous fungus *Trichoderma harzianum Th4d* from Andhra Pradesh for commercial utilization.	Raghvendra Sharma, Dhampur BioOrganics Ltd, New Delhi, India	Commercial
Approval for the invention 'Extraction of vitamin E from plant matters' for obtaining IP rights in India and the United States of America.	C	C
Approval for the invention 'Garlic formulation and a process for preparing the same for treatment of diabetes' for obtaining IP Rights in India and the United States of America.	C	C

C, Confidential information. Source: https://absch.cbd.int/countries/IN

out of the utilization of biological resources; and advising the State Government in the selection of areas of biodiversity importance. NBA, with its Headquarters in Chennai, delivers its mandate through a structure that comprises the Authority, Secretariat, State Biodiversity Boards, local-level Biodiversity Management Committees and other expert committees[4].

The ABS process in India is rigorous and takes an 18-step path (Figure 2). It commences with a paid application to the Secretary of the NBA (Form I application to access of biological resources occurring in or obtained from India, and/or associated traditional knowledge for research, commercial utilization, biosurvey or bioutilization by a Non-Indian/Non-Resident Indian/Foreign entity or Indian entity having non-Indian participation in share capital or management). The application then goes to the Advisor (Law) and Technical Officers for further verification. On consultation with the appropriate State Biodiversity Board and the local Biodiversity Management Committee, it comes to the expert committee on ABS. Followed by the verification by the Secretary again, and the Chairman, it is placed in the Authority meeting. Afterwards, a clearance letter is issued by the NBA with a model agreement (Mutually Agreed Terms, MAT) to the applicant for his/her signature. On receipt of the duly signed agreement, the NBA approves the case and uploads the same on its website for public viewing. The applicant is bound to comply with the MTA and deposit royalty to the NBA fund (the benefit out of commercializing the studied part of biodiversity), which would be passed to the conservers (benefit-claimers)[5]. The total export value of biodiversity-based industries in India during the year 2010–11 was to the tune of INR 8800 crores. NBA had collected around INR 40 lakhs at that time as royalty. There are possibilities to tap the high potential with the increasing industrial contribution and the increasing number of ABS applications. NBA has also provided case studies of communities that have benefited from the system in cases such as the sea weeds from Tamil Nadu and neem leaves from Andhra Pradesh[6,7].

The Competent National Authorities (CNAs) of Parties of the CBD (NBA in the case of India) are bound to make available the ABS permits to the ABS Clearing House in the CBD Secretariat. From 2006 onwards, NBA has approved 77 cases[8] for access to biodiversity or associated knowledge in which IRCC has been issued for 25 cases. The very first IRCC (Ref. No: India/NBA/Appl/9/684) has been issued to Ms Seema Solanki, Research Scholar in Medical Anthropology and Ethnobiology at University of Kent, UK. She is granted access to study the ethnomedicinal knowledge of the Siddi community of Gujarat (permit valid from 27 March 2015 to 26 March 2018) according to the ABS requirements of the Biological Diversity Act, 2002 of India. Under the supervision of Anna Waldstein and Raj Puri, School of Anthropology and Conservation, University of Kent, Solanki is doing a comparative analysis of medical ethnobotany of

Siddis of India and tribes of Ethiopia, to trace the evolution of folk medicine of Afro-Indians. (The Siddis were brought from East Africa to India as slaves around 500–600 years ago[9].) According to the IRCC, 'the researcher shall not obtain or transfer any form of IPR based on the biological resources and/or associated knowledge accessed under this agreement in any manner without obtaining the prior approval of NBA under provisions of the Biological Diversity Act, 2002 and shall also submit a report to NBA on the outcome of the research work'[10].

Conclusion

India has taken a giant leap and left a mark in the history of biodiversity governance demonstrating to the rest of the world, the manner in which access to biodiversity can be regulated with assured monitoring for equitable sharing of benefits. By permitting a non-resident Indian to undertake research on biodiversity in India and by issuing an IRCC for ABS, the NBA has shown the results of 12 years of its dedicated work to bring in, the best of the biodiversity governance system. In a press release on 7 October 2015 (ref. 11), Braulio Ferreira de Souza Dias, Executive Secretary of the CBD had congratulated the GoI and has invited other countries to follow the example. Since the very first IRCC published in October 2015, 24 more certificates have been issued by India until April 2016 (Table 1). The only Parties other than India who have come up with this action are South Africa and Guatemala, with one IRCC each.

It is to be noted here that India had produced the celebrated ABS 'experimental model' in the 'pre-Biological Diversity Act era' through the case of the plant *Trichopus zeylanicus* used by the Kani tribal community of the Western Ghats and spearheaded by a team of scientists from the Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala (now Jawaharlal Nehru Tropical Botanic Garden and Research Institute). Later it was found that this experiment had its own limitations due to the absence of supporting legal and policy instruments at that point of time[12]. India has also published national ABS guidelines in 2014 (ref. 13), following the pioneering action from Madhya Pradesh State Biodiversity Board signing an MoU for ABS with Gram Mooligai Company Ltd (GMCL), Jabalpur (GMCL has won the India Biodiversity Award, 2016 for this action in the category 'Successful Mechanisms/Models for Access and Benefit Sharing')[14,15]. With the national guidelines and IRCCs, now the system is made operational. The big question to ask is how do the guidelines help communities and conservation[16]? Definitely we need to wait to see that the benefit sharing is realized in a fair and equitable way.

1. https://www.cbd.int/intro/default.shtml
2. https://www.cbd.int/abs/
3. National Biodiversity Action Plan, Ministry of Environment and Forests, Government of India, 2008, p. 78.
4. http://nbaindia.org/content/22/2/1/about-nba.html
5. http://nbaindia.org/content/684/62/1/application process.html
6. http://nbaindia.org/uploaded/pdf/ABS_Factsheets_1.pdf
7. http://nbaindia.org/uploaded/pdf/Fact%-20Sheets.pdf
8. http://nbaindia.org/content/683/61/1/approvals.html
9. https://www.kent.ac.uk/sac/current-students/research-students/anthropology/p-t/solanki_seema.html
10. https://absch.cbd.int/search/national-records/IRCC
11. https://www.cbd.int/doc/press/2015/pr-2015-10-07-abs-en.pdf
12. https://www.cbd.int/financial/bensharing/india-kanis.pdf
13. http://nbaindia.org/uploaded/pdf/Gazette_Notification_of_ABS_Guidlines.pdf
14. http://mpsbb.nic.in/AnnualReport/AR-201314.pdf
15. http://www.in.undp.org/content/india/en/home/presscenter/pressreleases/2016/05/22/biodiversity-awards-2016.html
16. Kohli, K. and Bhutani, S., *Econ. Polit. Wkly*, 2015, **31**, 19–22.

(All webpages last viewed on 24 June 2016.)

ACKNOWLEDGEMENTS. I thank Drs V. Arivudai Nambi and N. Anil Kumar (M. S. Swaminathan Research Foundation) for their guidance and support. I also thank the reviewers for useful suggestions to improve the manuscript.

Parameswaran Prajeesh is in the M. S. Swaminathan Research Foundation (Kuttanad Centre), Ramankary P. O., Alappuzha 689 595, India.
e-mail: prajeesh@mssrf.res.in