UNCTAD Expert Meeting on Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices

Geneva
30 October – 1 November 2000

Commercialisation of Indigenous Knowledge and Benefit Sharing

Prepared by

Dr. Suman Sahai

Gene Campaign, India

Consultant

COMMERCIALISATION OF INDIGENOUS KNOWLEDGE AND BENEFIT SHARING

Suman Sahai

1. The history and tradition of almost all countries has shown that patronage of the arts and culture by the wealthy was the principal reason why these survived and flourished. The Medici patronage in Italy, resulted in an explosive growth of the local arts, painting, sculpture, glassware in Murano, tapestries and weaving and cuisine, which influenced all of Europe. The famed zari and brocade weaves of Banaras, the Ikkat, Kanjeevaram, Chanderi, Chikan, to name only a few of the world famous, timeless traditions of weaving and embroidery in India, have survived to this day, because there continue to be patrons for these fabrics.

2. Of mangoes, the *Dassehri* of Malihabad, the *Ratnagir*i of the Konkan belt, the *Zardalu* of Andhra and the *Langra* of Banaras have remained popular favourites for hundreds of years, their arrival in the market as eagerly awaited today as it was 500 years ago. The reason that Indian Systems of Medicine like Ayurveda have survived for thousands of years is because they are used regularly by average Indians. Even after post-independent India adopted western style allopathic medicine as the preferred official system for health care, the patronage of millions of common Indians ensured that indigenous health care systems remained alive and important. In every branch, one of the most potent forces for keeping a skill or art alive is commercial interest in it.

3. The skills and knowledge base of traditional societies, which encompassed all fields of relevance to their lives, are under threat today. This is true of growing food, of healing of both men and animals, of clothing and ornamentation, constructing dwellings and establishing a code for society. This loss has acquired critical proportions in the essential sectors of food and health care and its detrimental impact is becoming increasingly visible. Genetic erosion in the field is threatening the long term sustainability of food production. Loss of indigenous knowledge about healing traditions is taking away from local communities their trusted, affordable, holistic health care system. At the same time, an exploding herbal industry, its appeal ranging from pharmaceuticals, nutraceuticals and health foods to cosmetics, toiletries and ethnic products, is exploiting the knowledge base of indigenous and local communities. The question is, what share do these communities get from all the profits that are made from commercialization of their skills. This is true of song and dance, of color and design, of weaving and painting and many other skills. The legendary Michael Jackson owes much of his phenomenal success to the use of African tribal music as does the Indian AR Rehman to the Adivasi music of Kerala and Tamil Nadu. But what returns to the communities?

4. This paper however will deal essentially with indigenous knowledge relating to bio-resources.

Agriculture

5. Indigenous skills in the field of agriculture are too well documented to be recounted in any detail here. Several organisations in India have been documenting the knowledge that farmers possess about seeds and farming practices including water and pest management. Some of the prominent NGOs doing this work are Gene Campaign, SRISTI and Beej Bachao Andolan.

6. Intensive agricultural practices have resulted in the loss of traditional varieties and land races. Although the green revolution increased the production of rice and wheat, it displaced older, well adapted varieties from the field. Because of the government procurement policy for wheat and rice, farmers tended to shift to the High Yielding Varieties (HYV), ignoring land races and other crops like millets. This has resulted in a loss of the germplasm itself and the skills that existed about managing it efficiently and profitably.

Indigenous Healing Traditions: The Indian Systems of Medicine (ISM).

7. In India the tradition of using plants for health care goes back several thousand years. Vedic texts going back to 3000 BC deal extensively with the medicinal properties of plants. Ayurveda and Siddha are perhaps the longest, continuous healing traditions in the world. In India, ISM exists at two levels, the classical system encompassing the well documented, codified systems like Ayurveda, Siddha, Unani which have textbooks, are taught in colleges which grant degrees and the practitioners of which are incorporated into the official health care system.

8. The other is the informal system of folk medicine, the ' Lok Parampara' which exists in communities, is passed orally from generation to generation, for which there are no books and little documentation and which is not part of the official system. These folk traditions are rich and diverse, the knowledge base complex and with the their ability to heal a wide range of ailments, these (often tribal) healers or vaidyas are the backbone of health care for 80 % of India.

9. The All India Coordinated Research Project on Ethno-botany has revealed the richness of folk medicine, held by tribal communities. The project recorded that these communities have knowledge of the use of over 9000 plant species. For healing alone, they use over 7500 species of plants. This does not include the number of animals, insects, lichens, fungus, minerals, soils etc. that they also use for human and veterinary health care.

10. Adivasi (Tribal) areas are the repositories of knowledge systems that are now seriously threatened because of waning interest in the younger generation. Stripped of its dignity, questioned by the obtuse official machinery and disregarded by a westward looking urban India, folk medicine will be lost and with that will be lost the health and veterinary security of rural India, unless something substantial and urgent is done to protect it and to help it stay alive.

Commercialization of ISM

11. Commercialisation of Ayurveda, the most dominant system of ISM, is about 100 years old. The oldest Ayurveda companies, which are the leading companies even today are Dabur in eastern India, Baidyanath in north India, Dodh Pappaswar in the west and the famed

Kotakkal (which spread to Sri Lanka) in the south. These groups were all established between 1890 and 1910. Prior to this, commercialisation of Ayurveda was decentralised, practised in a small and sustainable way by the physicians. It really was more service than commerce, the knowledge considered sacred and its practice imbued with spiritualism.

12. When trying to commercialize indigenous health care preparations for the modern market, one faces inherent contradictions. Unlike allopathic medicine, which attempts to treat a symptom or a disease, ISM treats the entire patient. The system is therefore complex and time consuming in its holistic form. This does not lend itself to large-scale production and trade and certainly not to the lifestyles of western style consumers. The early Ayurvedic industry therefore first selected those formulations for large-scale production, which had widely applicable properties rather than very specific ones.

13. The challenges of commercializing for the modern market are primarily (i) standardizing dosage and delivery and ii) increasing shelf life. Ayurveda prescribes formulations not in tablets and syrups but in several forms like teas, decoctions (kadhha), ash residues (bhasma) etc. Ayurvedic preparations are dispensed as fresh as possible to provide maximum efficacy. In the modern system, of inventories and retail, classically prepared Ayurvedic products lose their efficacy because of the long interval between manufacture and ultimate sale from a shop shelf.

14. That is the reason why there is a great focus on the part of companies to increase the shelf life of herbal products. The controversial patent on a Neem based pesticide taken out by WR Grace was in fact a process patent to stabilise the Neem emulsion and increase its shelf life. In Indian homes, Neem leaves would be boiled fresh and used straightaway.

The market for herbal products

15. The global market for herbal products is exploding. It is estimated to touch 5 trillion by 2020. Four out of ten people in the US are using what they call 'alternative medicine' , even when all the cost is not covered by medical insurance. Sale of herbal products was in the vicinity of 21 billion US $. The increase for pharma products in Japan, in recent years has tripled whereas for herbal products the growth in demand is over 15 fold. Similarly in the European Union, sales of herbal products rose from US 1.6 billion to 3.3 billion in1998. The market is huge and it is growing.

16. China and India are major sources of medicinal plants. Whereas China's sales of herbal products is in the range of Rs. 180 billion, India holds only 2.5% of the global market, selling roughly Rs.3 billion worth of products. This situation will have to change if herbal products are to become important enough to provide sufficient incentives to ensure the survival of traditional knowledge that supports it.

17. In India the last available figures peg the annual turnover of herbal products at Rs 23 billion. Of this, the domestic market of medicinal plants is about Rs. 3 billion. It is divided in the following way:

(a) Condiments, food additives 14 per cent.
(b) Herbal extracts 22 per cent.
(c) Essential oils, gums, resin 19 per cent.
(d) Crude drugs 45 per cent.

18. The export market for medicinal plants appears to be growing faster than the domestic market. The cosmetics industry and the branch of Aroma Therapy are important areas where Indian medicinal plants and their value added extracts/ essential oils etc. have a high, as yet untapped, market potential.

19. The main medicinal plants (and the plant part) exported from India are given below. All these are plants and plant parts the knowledge of use of which is directly derived from indigenous knowledge.

Medicinal plants exported from India

S. No.	Plants	Parts
1	Plantago ovata	Seed &husk
2	Cassia angustifolia	Leaf & pod
3	Rheum emodi	Rhizome
4	Inula acemosa	Rhizome
5	Rauwolfia serpentina	Roots
6	Hedychium Spicatum	Rhizome
7	Zingiber officinale	Rhizome
8	Colchicum luteum	Rhizome & seed
9	Valeriana wallichii	Rhizome
10	Acorus calamus	Rhizome
11	Adhatoda vasica	Whole plant
12	Juglan regia	Bark
13	Punica granatum	Flower, root, bark
14	Berberis aristata	Root
15	Juniperus communis	Fruit
16	J. macropoda	Fruit
17	Heracleum candicans	Rhizome
18	Picrorhiza kurroa	Root
19	Aconitum species	Root
20	Saussurea lappa	Rhizome
21	Swertia chiraita	Whole plant
22	Podophyllum emodi	Rhizome

Commercialization of Forest Produces.

20. In India local Adivasi communities have the exclusive rights of collecting non-timber forest produce (NTFP). This is in acknowledgement of their customary rights as conservors and holders of knowledge. These forest products (excluding timber) range from nuts, flowers, gums, resins, medicinal and aromatic plants to leaves and fibres, honey, wax etc. With the rising importance of herbal products, this sale of NTFP has become an important source of revenue and an incentive to conserve the resource base.

21. In Madhya Pradesh, a state with 35 per cent forest cover and a large Adivasi population, the collection and sale of forest produce has been particularly well organised. The system is transparent and fair and designed to benefit the community, as against the government. In recent years a new concept is being tried out in some areas in Madhya

Pradesh, called the Peoples' Protected Areas (PPA). These are selected locations where training in sustainable harvesting, forest and biodiversity conservation are linked to income generation for the Adivasis. Income from forest produce through the PPA is rising every year. In one single location, it was over Rs.6 million last year. An important forest produce found in Madhya Pradesh are Tendu leaves which are used for rolling 'bidis' (small cheroots). Tendu leaf collections have fetched the adivasis in Madhya Pradesh, Rs 2000 million in the year 2000 alone. This is equivalent to roughly US $ 45 million. With this range of benefits accruing to them, local communities acquire a strong interest in keeping alive their knowledge.

Commercialization in the new age: Virtual market place for IK

22. An interesting new development in commercializing Indigenous Knowledge is the use of the Internet, to reach a far larger market than could be dreamed of so far.

23. A recent posting from Shambala Botanicals / Xavier Exotic Herbs from Kathmandu announced the availablity of "Seventh Heaven" Kathmandu Temple Kiff (tm), "Seventh Heaven" Prosaka Tablets (tm) & "Seventh Heaven" Gentle Ferocity Tablets (tm) for "Blissful Regressions of Vexatious Depressions" and many other conditions!

24. These products, the net announced, are "an amalgamation of high concentrates of rare euphoric herbs" and portions of classical formulations from indigenous medicine like" Drachasha, Chavana Prash, Trikatu, Black Seed Herb, Capillaris herba, Angelica Root, Wild Dagga, Haritaki, Shatavari, Labdunum, Neroli, Unicorn Root, Papaver Rhoes, Dendrobian, Calea Zacalechichi, Rue, Amla, Salvia Divinorum, Crocus Sativa, Lotus and Gokshura. " Whatever the validity of these claims, its an interesting range of products! More interesting is the fact that the net is being used to reach global markets.

25. On a somewhat more restrained basis is the effort underway by fruit and vegetable sellers across India to unite on the net to advertise and sell their products. This initiative taken by a Bangalore based IT company plans to set up a network of kiosks at 36 Mandis (centres where agriculture produce are traded) so that local producers can reach far away urban consumers and get maximum prices for their products by eliminating the middleman.

26. The Indian Tobacco Company (ITC) which is linking its competencies in agriculture and information technology to create what they call the 'e- choupal' website has undertaken a similar project. Choupal in Hindi means a meeting place. E- choupal is essentially an electronic meeting place for sellers of agricultural produce. The ITC project includes a web-enablement program that will teach farmers IT skills and help rural communities set up e-hubs in villages that will help the farmers access information as also advertise their products.

27. Yet another project being developed by a group of people in Delhi, in which Gene Campaign is involved, is the creation of a web site which will have detailed information on the various aspects of indigenous knowledge. This will include cultural details like language, customs, music, marriage ceremonies etc. as also IK in fields like textiles, weaving and design, healing practices, vegetable dyes and metallurgy.
The information on the web assumes the characteristics of a database, which will help to commercialize IK and provide tangible and non-tangible benefits to the creators and holders of this knowledge.

28. An entry fee can be leveled for access to this site. As is the custom for databases but apart from such benefits, there are symbolic, non-tangible benefits that such an exercise can bring. Some of these are the acknowledgement of their skills, the validation of their identity as creators and holders of sophisticated knowledge systems and the recognition of their ownership of these knowledge systems.

29. This database may have archival value for research and education and for libraries. Cultural knowledge is constantly sought by universities and institutions teaching subjects like anthropology, folklore, history and social sciences. The Sikhs have already set up a Khalsa web site which puts out information on the Sikh history and their religious and cultural practices.

30. Through a web like this, Adivasis can sell their knowledge in fields like textiles, weaving and design, healing practices, vegetable dyes and metallurgy as also art forms and music. Crafts persons in Gujarat have already begun using the net to sell their handicrafts. The 'tie and dye ' tradition of textiles is a particular success story from Gujarat. Practitioners of this traditional dyeing form of silk and cotton fabric have been posting their designs on the net and linking with international buyers.

31. The net could do away with many of the hurdles and bottlenecks that local communities have faced in marketing their produce but there is a need for caution also, at least in the first few year till they master the medium. Intermediate enabling organisations like NGOs or others like in the example above can save the communities from exploitation by unscrupulous elements.

The dangers of commercialization

32. Whereas commercialization of herbal products and ensuing financial gains will definitely prove to be a powerful incentive to communities to retain this knowledge base, extreme care need to be taken to ensure that over-exploitation does not lead to permanently destroying the resource base. There have been glaring examples of this which should sound alarm signals for us. The interest in the Himalayan Yew (Taxus baccata) as a source of the anti-cancer drug Taxol has lead to a devastation of the Yew forests in Himachal Pradesh and other hill regions.

33. Kava (Piper methysticum), a plant endemic to the South Pacific has been traditionally used to alleviate stress and anxiety in the region. It is supposed to have other medicinal uses, like for skin ailments and for asthma and tuberculosis. The recent commercialization of kava highlights many of the potential benefits and risks involved in the marketing of species 'new' to international consumers. The entry of kava into western markets has led to an explosion in demand for kava products. This has placed unsustainable pressure on supply sources geared only to serve local use. Although local farmers are benefiting from price increases, the types of commercial relationships they arrange with international buyers might not be to their long-term advantage. The unregulated access to kava is resulting in the collection of immature kava, thus jeopardising the quality of the medicinal product and depleting the resource base. There are other examples of commercialization leading to over-exploitation.

Making commercialization sustainable.

34. In order to ensure long term gains and prevent over-harvesting, sustainability will have to be built in at several levels.

- *Conservation*. Although in situ conservation is the best form of conservation, we will have to undertake a consolidated approach with insitu and ex situ conservation in the form of Protected Areas, Sacred Groves and Gene Banks
- *Generating Awareness* about the importance and need for sustainable use
- *Changing policy for collections* so that these are with the consent and participation of communities and accountable to national agencies like the Biodiversity Authorities.
- *Training in sustainable harvesting.* People who collect material from the wild should be trained to collect the plant parts needed in a way that the plant remains viable after the collection and can continue to grow. Unless the part required is the root, leaves, fruits, flowers and bark and gums and resins can be collected so as not to destroy the plant.
- *Value addition.* Local communities should be trained to do simple first and second degree processing to add value. Cleaning, sorting and selecting the material, sun or shade drying, cutting and powdering are examples of the simple procedures that will add value to the product and increase incomes from the same volume of collection. This will decrease the dependence of communities on large volumes in order to earn a reasonable amount.
- *Cultivation of medicinal plants.* There should be a policy that for large scale commercial use, as engaged in by the industry, both for domestic use as also for export, medicinal and aromatic plants as well as other commercially important plants, should be only from cultivated sources, not natural collections. An aggressive strategy involving NGOs, universities and research institutes should assist the industry to develop agro-technology packets for medicinal plants of interest. The industry should be required to invest in this development since they are the principal beneficiaries. Natural collections should be allowed only for local communities and traditional healers and for research, documentation and archival purposes.
- *A clear -cut IPR policy.* India will have to have clear cut policy on Intellectual Property Rights with respect to herbal products and their trade. The IPR policy will have to contain elements of transparency, sustainability, benefit sharing and legal protection.
- *Monitoring* the health of natural populations and ecosystems and the status of frequently used species is important to check. This monitoring can be done through Panchayati Raj institutions, State and National Biodiversity Boards, NGOs and students.

Using biotechnology for conservation

35. Biotechnology opens up new ways of assisting conservation. It can be useful in the assessment of monitoring, specially the status of the active oil or alkaloid granting the medicinal property and as a method to analyse new genes for therapeutic use.
DNA techniques (like single copy, interspersed repeats, minisatellites and microsatellites) can be used to identify populations or individuals with desirable traits, similarity between genotypes and relatedness among taxa. The last approach is being tried to identify which other plant families have the same properties as Taxus baccata, so that new sources for Taxol can be identified and the pressure taken off Taxus baccata.

36. DNA technology can also be used to assess collections in order to identify gaps, determine which genotypes are of high priority for conservation and to avoid redundancy in

collections in gene banks, a not inconsiderable issue considering the cost of such facilities. Recognizing the importance of conserving medicinal plants, specially from habitats under threat, the Indian government has recently established a network of three national gene banks dedicated to medicinal and aromatic plants. This network of ex situ and in situ conservation strategies has four components: field bank, seed bank, in vitro bank and a cryobank which preserves frozen material.

State support for commercialization of IK

37. In India, governments at the national and state level have provided incentives and infra-structural support for the production and marketing of products derived from IK. The Central Cottage Industries, a showcase of textiles and handicrafts from all regions of India is a highly popular place for domestic buyers and tourists and exports large volumes of high quality products. There are handicraft and folklore outlets of every single state located in Delhi. These State Emporia, like the Central Cottage Industries Emporium, are active hubs for the selling of traditional arts and crafts.

38. New initiatives are being taken to incorporate indigenous skills, designs and motifs into products for the international market. A new initiative supported by the UNDP has led to a whole new range of carpet designs based on India's 5000 year cultural heritage. Based on Indian architecture, textiles, jewelry, folk art and painting, these carpets are woven with designs based on the folk art of regions. These include the Mandanas of Rajasthan, Warlis and Rangolis of Maharashtra, Kolam of South India, Alpona and Aripan of Bengal and Bihar and the Chowk purna of Uttar Pradesh.

39. The textile, carpet and handloom sectors are reviving the art of vegetable dyes on a large scale. Using plants and minerals for dyeing has a long and continuous tradition in India. This tradition became marginalised after the advent of chemical dyes but it never disappeared since it continued to be used in the handloom sector as also in handicrafts, specially those like the Kalamkari paintings of Andhra Pradesh and the Picchwai paintings of Nathdwara. Vegetable dyes are enjoying a revival. In fact, after the ban on the use of Azo dyes for fear of their being carcinogenic, international policy should seriously think if a worldwide ban on chemical dyes and establish the use of vegetable dyes in its place.

40. The Khadi Gramodyog Bhawans, which are a network of sales outlets across India, are run by the Khadi Village Industries Commission (KVIC). Khadi is the handspun cotton adopted by Mahatma Gandhi as the symbol of India's determination to be independent and self-reliant. The KVIC sells handspun cotton, silk and woolen materials and all manners of products produced in the villages of India. These include honey collected by Adivasis, sandalwood oil, Agarbattis (incense sticks) made from the fragrant Agar wood of the North East, wild silk, objects made from lac collected from the forest and hundreds of kinds of craft objects. The KVIC perhaps more even than the national and state handicraft emporia, is a demonstration of India's commitment to preserving its indigenous knowledge base by providing markets for it in the country and outside.

What can be done to increase commercialization and the range of benefits?

1. Standardization and quality control.

41. Herbal products and medicines can command better prices in international markets if the portions and formulations are standardised and quality of the components is ensured.
As against the fresh preparations dispensed in classical Ayurveda or the fresh preparations of biopesticides, the urban market will require products to have a longer shelf life. The patent taken out by WR Grace, subsequently challenged, on a Neem based biopesticide was to increase the shelf life of the product so it could reatin its viability for a longer period.
Value addition in the form of better processing and slick packaging can increase the reach and durability of the product as also increase incomes for the communities.
Another good strategy for increasing the commercial scope of products is to analyse their relevance for current health concerns. For example, traditional products, which are known to suppress appetite and reduce weight, could be marketed successfully as 'weight loss' formulations. Phytolaca is one such plant known in homeopathy. The importance of aromatic oils and herbal teas as stress busters are beginning to find urban clients in this grossly stressed out world. In today's health conscious and herbal sensitized climate, this branch of knowledge which provides natural substitutes for chemical products, has a great future if it is marketed scientifically and with assured quality.

2. Create new markets and market niches

42. Indigenous knowledge in different societies has a potential range of products that lend themselves for a different kind of marketing and therefore of better incomes for the holders of that knowledge.

43. Take vegetable dyes. India could revive its ancient tradition to provide a natural substitute for chemical dyes. This possibility comes into sharp focus after the ban imposed on the Azo group of textile dyes since they were thought to be potentially carcinogenic. This is the kind of opportunity that should be exploited to create a new market for an indigenous product or skill. There are some efforts underway to revive vegetable dyes in a serious way. Some agencies have prepared a list of dye bearing plants as known in indigenous tradition and the UP Handloom Corporation is making efforts to extract and market pigments derived from vegetable dye sources.

44. Vegetable dyes could solve the problem of rising allergies to chemical food additives. Already, natural plant based colors are replacing chemical coloring agents in foods. Two examples, the red color of Bixa orellana seeds and the yellow colored carotene of marigold flowers are used in the dairy and poultry business on a large scale. In the former, to color the, in the latter, to produce eggs with yellow yolks

45. Mahua and Feni for urban connoisseurs. There is a traditional Mexican drink called Tequila made from the juice of the blue Agave cactus. It has become a popular 'in' drink in recent years specially with the young party crowd. Tequila provides an inspiration to market similar indigenous products from our own region. Mahua, a tree found in Indian forests, specially in the eastern region is in many ways, the mainstay of Adivasi livelihoods. Its flowers are dried and eaten in times of scarcity, its seeds provide a high grade edible oil and the juice of the fleshy flowers is fermented and distilled to provide a flavorful alcohol. Similarly in Goa, the pulpy fruit from which the cashew nut hangs is the source of the

popular Feni, a drink scarcely known outside Goa and the Konkan belt of western India. If Mahua and Feni could be marketed in slick packaging, both domestically and globally, they could translate into big money for local communities.

46. Herbal contraceptives. An area which is relatively unexplored, is the indigenous knowledge about plants and plant products that have contraceptive properties. Indigenous knowledge is particularly rich in dealing with maternal and child health care, handling stages of puberty, pregnancies, lactation and menopause.

47. Indigenous societies from India to the South Pacific have known how to prevent pregnancies with the use of certain foods and plant extracts. There is tremendous commercial potential here for a safe and reliable herbal contraceptive, once such products have been standardized.

3. Apply modern designs to traditional materials and crafts.

48. There is a sophisticated repertoire of skills, designs and knowledge of materials within communities. These are used to make objects of utility and decoration for daily use adapted to the lifestyles and dwellings of rural and Adivasi people. If these skills and materials could be meshed with modern design, then products made from these could reach a large national and international market. A case in point are the baskets woven in Zimbabwe and Rwanda which have found appreciative western audiences and sell for good money.

49. In India, bamboo, palm leaf, wheat stalk, reeds and other plants are used to make several objects including furniture. 'Moonj', a rope woven from a certain grass of that name is used to weave Charpais (beds) and Machias which are low stools used by the women for cooking and household work. Another reed called 'senta' is popular for making high stools and full backed chairs. These materials and craft skills can be designed to create utility objects for the home and modern furniture for a vast middle class.

The economic value of indigenous knowledge and Benefit Sharing

50. The herbal products market, which is based on IK, is expected to reach US $ 5 trillion by 2020. The amount that communities across the world receive as their share of the benefits must reflect the reality of this staggering sum.

51. Today, despite the rising commercialization of genetic resources, the benefits to communities from international markets is negligible. Twigs of a tree called Tetu (Oroxylum indicum) are traded in India at Rs. 9/ kg (about US 20 cents/ kg). Its extracts on the international market fetch Rs. 500,000/ kg (US$15,000/ kg). This is rank exploitation.

Formula for benefit sharing in pharma

52. According to the figures put out by the international pharma industry, it costs them between 500 to 600 million dollars to put a new drug out on the market. This is the foundation of their claim for stringent IPR. When a company pirates a product based on TK and converts it into a medicine, it has 'acquired' a product, which is worth a few hundred million dollars.

53. Take the American patent taken on Phyllanthus amara, a plant known in India and some other parts of Asia, to have curative and regenerative properties for the liver. A liver medication based on that or any of the many other medicinal plants with their IK that have been stolen from developing countries, would be worth hundreds of million dollars. Suppose we set aside 40 to 50 million $, even 100 million $, for standardising for the western market and packaging etc., we are still talking about a product worth something like 400 to 500 million $ which has been taken from communities. This should form the basis for calculating benefit sharing in the pharma sector. If the community's share were to be calculated at 5 % of $ 500 million, that works out to 25 million US $ as a flat rate. In addition to this should accrue a percentage of the annual profits

Formula for benefit sharing in agriculture.

54. In the agriculture sector, proprietary seed sales from seeds bred using farmer varieties will not generate that kind of revenue so benefit sharing accruing to farmers in this case will be calculated on more modest profits. Sometimes when crops are used for making high end commercial products, then share of benefits owed to the farming community will have to be calculated differently than when seeds are used for growing standard crops like rice and wheat or maize.

55. Some years ago, the musk melon crop in California was afflicted by a fungal blight and was on the verge of being wiped out. Also threatened was the huge down stream processing industry based on musk melons. Almost all the melon germplasm of California comes from India so when the fungus attacked, resistant varieties were taken from India and the musk melon crop along with its down stream industry was saved. A profit worth millions was made on the basis of resistant varieties from India. Benefit sharing with the farming community in India should be done not on the basis of a resistant melon crop but on all the profits made downstream as well.

56. In the recent development of transgenic crop varieties, the most well known of which is the vitamin enriched 'golden rice', benefit sharing will have to be calculated on yet a different scale than for the usual High Yielding Varieties (HYV). Golden rice has resulted from a rice variety into which pre-vitamin genes have been brought in from daffodils.

57. After its development in the lab, the Life Science Corporation Astra Zeneca has acquired the complete rights over golden rice for commercialisation in the developed world. Zeneca rightly believes that there is a large market for golden rice among health conscious western consumers. Its strategy is to market this rice in the affluent north as a nutritionally enhanced food with tremendous health benefits. The volume of profits from a nutraceutical product like this would probably be closer to that of the pharma industry than the seed industry and the benefit sharing arrangement should reflect this. A share of profits must accrue to the farming community from where the rice was taken which was ultimately converted into golden rice.

58. Other aspects of benefit sharing both for the herbal drug sector and the agriculture sector should include transfer of technology. For example products like resistant melon varieties and golden rice should be made available to countries where the parent or source varieties originated, without any IPR binding.

Benefit sharing: an Indian example

Arogyapacha and the Kanis

59. During an ethno-botanical expedition in the tribal region of the Western Ghats in the state of Kerala, a team of scientists encountered the Kani practice of eating seeds of the wild plant *Trichopus zeylanicus*, when they were tired. This gave them energy. The plant locally called 'Arogyapacha', has been used by the Kani tribe for hundreds of years to help them through periods of physical exertion.

60. Arogyapacha was investigated and finally, a scientifically validated and standardized drug based on the Kani knowledge of 'Arogyapacha' was developed. The drug called 'Jeevani' was released for commercial production in 1995. While transferring the technology for production of the drug to a pharmaceutical firm, TBGRI agreed to share the licence fee on a 50:50 basis. In addition to this, 2 per cent of royalty from sales will go to the tribal community This model of benefit sharing is perhaps, the only one of its kind where instead of being exploited, the tribal community has got a fair share of the benefits derived from using their knowledge.

61. The Kanis have since then been helped to register a Trust. This trust is fully owned and managed by the 'Kani' tribe. About 60% of the Kani families of Kerala are now members of this trust. In February 1999 the amount due to them (Rs. 6.5 lakhs) was transferred to the Trust. Now 50 per cent of the royalty received every year from the company will also be transferred to the Trust. As per the rules of the Trust, the licence fee and royalties received on account of the drug 'Jeevani' will be in the form of the fixed asset of the Trust and only the interest accrued from this amount can be used by the Kanis for welfare activities. This model was developed over period of about 12 years starting from 1987 to 1999 always in full consultation with the Kani tribe.

Other kinds of benefit sharing

Database access.

63. Communities should be beneficiaries of revenues collected from databases containing IK. The Indian government has started a compilation called the Traditional Knowledge Digital Library, which contains public domain information about important medicinal plants. Similar databases will come up on the basis of biodiversity registers that are documenting the availability and status of bioresources. Databases containing information on indigenous knowledge of Adivasi communities, of the kind that Gene Campaign has been documenting, will also need to be set up. All such databases should levy an access fee after proper execution of prior informed consent and material transfer agreements. Part of this access fee should be paid into a Fund for communities.

Bioprospecting and Research fee.

64. Companies who wish to have a license to explore India's bioresource base for commercially exploitable products, will be required to pay a prospecting fee which should also go into the Community Fund. Similarly, when research programs are expected to yield commercially interesting results either in the form of financial gain or new technologies, communities should be beneficiaries.

Milestone payments.

65. This idea is taken from the Costa Rican law on IK. It requires prospectors to pay a fee for every 'milestone' reached during the research. This is to ensure a benefit to communities if their knowledge has been used, even if the product does not reach the market or the users are not able to commercialize the results.

Gene bank access.

66. Genetic material of crop plants, rare varieties, medicinal plants and other economically important plants are stored in the Gene Bank located in Delhi. This material is held in trust for the Indian people, specially the communities who have contributed the bulk of the material. An access fee should be levied on users who take this material for commercialisation. Research material should be exempt.

67. This aspect has acquired greater significance now that India will be enacting a Plant Variety Protection and Farmers Rights act. Under this, breeders of new plant varieties (using genetic material from public sources like the gene bank) will get a breeders right and be entitled to make profits. They must be required to pay for germplasm accessed whether they succeed in getting a new variety commercially established or not.

Non monetary benefits.

68. It is important to understand that both monetary as also non-monetary benefits are important. Recognition, awards and bestowing public honour on the holders of knowledge and material is in many cases even more important than the monetary gain.

Benefit sharing with national and international users.

69. There has been a discussion on benefit sharing when international users access bio-resources and indigenous knowledge. This is also reflected in the draft Biodiversity Act. However it is equally important to lay down conditions of use for Indian individuals and companies. Here a distinction will have to be made between different kinds of users. In my view, whereas traditional healers and practitioners like 'Vaids' and 'Hakims' should continue to exercise their traditional rights, those engaging in large scale commercialisation should be required to pay a part of their profits to the community.

70. Take companies like Dabur, Baidyanath and newer entrants like Maharishi Ayurveda and Hamdard as all the other companies belonging to the Ayurvedic Drug Manufacturers Association (ADMA) who have a turnover of millions of rupees. These people should certainly be required to enter into benefit sharing arrangements. Shahnaz Hussain, a leading Ayurvedic cosmetics firm which has a large domestic and export market and others like it, should be required to pay back to communities at least some part of the money they have made using their knowledge.

Who should receive the benefits?

71. There are many proponents of rewarding individuals and individual communities for the use of IK. This approach has also been implemented in India with the Kani tribe of

Kerala. I do not favour this approach but plead instead for a national level or even regional level Fund which should collect revenues on behalf of communities. Exceptions can be made where individuals are clearly identified with an innovation or some special knowledge. This receptacle could be termed the Community Gene Fund or the Community Knowledge Fund, the (CKF). This money collectively would naturally only be accessed by communities.

72. Knowledge accumulated and conveyed over the years has been done collectively and individual innovators are impossible to identify. Also, there are large knowledge overlaps between and among communities. People acquainted with similar flora will develop similar knowledge of use. In addition, exchange of knowledge and ideas has been going on for so long that it will be difficult, except in rare instances, to isolate a particular knowledge base. Nor is this desirable.

73. The conditions for accessing money from the CKF can be based on the Research Fund system used by universities and research institutions to provide research grants. Briefly, the researcher makes an application, which is peer reviewed and if the research project is good, money will be granted, from the Research Fund. Grants will be weighted in favour of communities, which have a particularly good conservation record or are rich in the IK they hold.

74. This model would see communities accessing the CKF for funds which could be wanted for anything from conservation of a habitat, digging a bore-well, building a link road or setting up a primary school for girls. I do not believe that the use of the money should be restricted to conservation. This is money earned by communities and they should be free to spend it in any way they want. In any case, it is highly likely that those communities which have a good record of conservation, will invest money in it further. Apart from that, earning from bioresources will automatically create a vested interest in its conservation.

Implementing benefit sharing.

75. Returns to the community of commercial exploitation, are very poor in India. This no different elsewhere. What is needed is a strong and clear cut national policy and strictly monitored collection protocols. The private sector should be motivated and encouraged to bridge the vast disparities in benefits. If that does not work, it may be necessary to impose sanctions.

76. In order to ensure that local communities continue to have access to natural resources required by them, the private sector must be curtailed in its extraction. *Sabai* and *Bhabar* grass is collected by communities and used for making ropes and twine to weave their beds. Similarly bamboo is collected for constructing houses and for making ladders and baskets. These resources are also used by paper mills as raw material. Proportional sharing of resources must be laid down in policy so that the industry is not the principal beneficiary and the communities suffer deprivation.

77. National legislation and international negotiations will be necessary to ensure that communities are able to derive benefits. The Indian Act on Geographical Indication derives from Articles 22,23,24 of WTO/ TRIPS. This asks for the recognition of traditional Indian products like Basmati rice, Darjeeling tea, Shahi litchis, Dasheri mangoes etc. If these conditions are accepted internationally, it provides markets for communities that have traditionally grown these varieties.

International action that should be taken

- Implement sincerely the relevant provisions of the international commitments like the ILO Convention, the IUPGR, the UNESCO/WIPO Guidelines for Protection of Folklore, the UN Draft Declaration on the Rights of Indigenous Peoples, and the CBD. The dispute issues are well known.

- Remove Article 27.3.b from TRIPS. To start with, retract the demand for patents on life forms.

- Do not remove the flexibility of countries to draft their own sui generis legislation for plant varieties by now insisting on compliance with UPOV.

- Apply Article 29 of TRIPS, which requires disclosure in the case of patent applications, to genetic resources and traditional knowledge used in inventions for which IPRs are claimed.

- In the CBD, give primacy to conservation since that is what will conserve the basis of IK and continue to provide livelihoods and value addition opportunities to communities.

- In the CBD, link Articles 8(j), 15 and 16, as also 20 and 21 in all discussions relating to *access* to bioresources.

- Use all possible national measures to strengthen the Biosafety Protocol to prevent contamination of genetic resources, till science can demonstrate safety of GM foods.

- Enhance the scope of Article 23 of TRIPs to strengthen protection of geographical indications for goods other than wine and spirits, such as Darjeeling tea.

- Ensure that any agreement on databases like the proposed Database Treaty (which will govern databases like the Indian TKDL) recognises the ownership of communities and includes provisions for PIC, MTA and benefit sharing when granting access.

Gene Campaign's work on securing benefits for local communities.

78. Collecting and characterizing traditional varieties and land races of rice, millets and pulses from rain-fed, flood prone and marginal lands in the states of Uttar Pradesh, Madhya Pradesh and Bihar. These varieties are being characterised, multiplied and conserved in farmer gene banks, which have a medium term viability of 5 to 7 years. Farmers of traditional varieties face difficulties finding seed since these are not available in the formal system. These gene and seed banks will provide a seed source for farmers.

79. Mapping the location of wild relatives of crop plants in the upper Western Ghats (Maharashtra). This region along with the northeast, is an important centre of genetic diversity, recognised as one of the 12 Megadiversity centres of the world. The work is being done with the help of local communities . The plan is to identify regions where these wild relatives are found as 'Gene Reserves' and flag them for first degree conservation.

80. Developing agro-technologies for commercially important medicinal and aromatic plants so as to establish the basis for sustainable commercialization. Establishing herbal gardens and nurseries for use by traditional healers. This work is being done in the Adivasi belt of South Bihar and Northern Madhya Pradesh.

81. Negotiating buy -back arrangements with the herbal drug industry. This is being done for Java citronella, Palmarosa, Vetiver, Senna angustifolia and Acorus species.

82. In the project in South Bihar, training has started in first degree processing of forest produce, to add value and increase incomes from forest produce.

83. In the project in Madhya Pradesh, the medicinal plant garden (with over a 125 medicinal and aromatic plants) is providing raw material to communities for making powders for fevers and diarrhoea, as also soap for ezcema. Women have been trained in the processing of plant parts to retain maximum efficacy.

84. These products are sold to a local hospital run by missionaries. Gene Campaign has also been instrumental in strengthening the herbal health department in this hospital.

85. A significant contribution made by Gene Campaign through its large scale advocacy work is bringing about changes in policies on bio-resources, which secure the interests of farming and local communities. These include

- A strong Farmers Right in the 'Plant Variety Protection and Farmers' Rights Act'. This not only allows the farmer to retain seed from his harvest of a Breeder's variety for the next season but goes beyond that. This is the only sui generis legislation (draft) in the world, which grants farmers the right to sell seed even of protected varieties, provided it is not branded and is in generic form.

  To enable a share of benefits to be derived from new varieties, there are provisions for a National gene Fund into which breeders will have to pay revenues for using farmer varieties. The legislation requires full disclosure of source and origin of varieties and complete passport data from breeders. Penalty for non-disclosure is a heavy fine and /or a jail term.

- CoFaB as an alternative to UPOV. Gene Campaign has lobbied against India joining UPOV because the UPOV system is not suited for developing countries. We do not have big seed companies in essential seed sectors and our major seed producers are farmers and farmers cooperatives. UPOV laws are formulated by countries, which are industrial, not agricultural economies. In developing countries, farmers play a significant role as breeders of new varieties.

  Gene Campaign and CEAD have drafted an alternative treaty to UPOV called the **Convention of Farmers and Breeders, CoFaB** for short. CoFaB seeks to secure the following goals:

  * Provide reliable, good quality seeds to the small and large farmer
  * Maintain genetic diversity in the field
  * Provide for breeders of new varieties to have protection for their varieties in the market, without prejudice to public interest.

* Acknowledge the enormous contribution of farmers to the identification, maintenance and refinement of germplasm
* Acknowledge the role of farmers as creators of land races and traditional varieties, which form the foundation of agriculture and modern plant breeding,
* Emphasise that the countries of the tropics are germplasm owning countries and the primary source of agricultural varieties
* Develop a system wherein farmers and breeders have recognition and rights accruing from their respective contribution to the creation of new varieties

- Providing a strong, participatory structure for regulating policy on biodiversity. Men and women of the farming and local community along with experts and officials will constitute the National Biodiversity Authority as also the State and Panchayat level Authorities.

- A national and international campaign for the protection of Indian rights over Basmati rice. Lobbying for the national legislation on Geographical Indication to protect traditional products like Basmati rice, Darjeeling tea, fruits like special varieties of mangoes and litchis.

- Lobbying to keep the Indian Systems of Medicine (ISM) out of the purview of patents by having them excluded from the Patent Amendment Act.

- Lobbying that millets and what are called 'coarse grains' is part of the government's procurement policy. At present the government buys only rice and wheat as part of its procurement. This procured grain is used in the Public Distribution System (PDS) which provides subsidised food to the poor. It also constitutes part of the Buffer Stock that India maintains as a hedge against food shortage in a bad year. Non- wheat and rice grains are far more nutritious and better suited to local diets and food habits. We are lobbying for the inclusion of these cereals since an assured market through government procurement will reverse the trend of genetic erosion in these varieties and help to conserve them.

- Documenting IK about biological material, specially folk medicine in four Adivasi populations. These include the Mundas and Oraons of Bihar, the Bhils of Madhya Pradesh and the Tharus of Uttar Pradesh. The study on the northeastern hill tribes has started recently.

- Based on the knowledge collected from the communities, Gene Campaign has prepared health manuals for human and veterinary diseases so that communities can benefit from their own skills. This became necessary because of the rapid rate of erosion of IK in the younger generation.

- Awareness generation and re-establishing pride in IK. When we started working with Adivasis, their attitude towards IK was that this was a useless body of knowledge devoid of commercial interest. The awareness program told them of the current importance of IK, of national and international developments, the interest of the international pharma industry in herbal products, biopiracy and the possibility of earning money from their knowledge and resources. Today, these

communities are motivated to some extent to conserve medicinal plants and have acquired at least some sense of pride that what they possess is valuable.

The practical result of our awareness work has been increased incomes for some forest produce. One specific example is that of Cassia tora, a wild plants the seeds of which the Adivasis collect and sell to the local grain merchant who often doubles as the buyer of forest produce. The price paid for Cassia tora was 50 paise per kg. Or Rs. 50 for 100 kg. We told the Adivasis that Cassia was going to Bombay to be sold for a lot of money and they should demand more or not sell the produce. They did that. It was possible since the seed is not perishable and can be held back. Finally we negotiated a rate of Rs 2.50 per kg, a five-fold increase! Awareness that their forest produce is greatly in demand and sells for far more than what they get for it locally has brought about an awareness that they can demand higher prices.

- Documenting forest diversity. We have documented the genetic diversity of Indian trees. This report on forest diversity makes available an inventory, which has theoretical and practical applications. The commercial and non-commercial uses of Indian tree species have been identified. Based on their economic importance, separate lists of genera and species that are sources of timber, food, fodder, medicine, natural dyes, oils, fibre, resins etc are provided. These lists also contain the names of those species that have potential but are not yet commercially exploited. In addition, this report identifies the conservation and research status of the species. This inventory of tree diversity will be helpful in assessing the range of special characteristics that can be used for sustainable income generation from forest resources.

Dr. Suman Sahai
Gene Campaign
J- 235/ A Sainik Farms
Khanpur
New Delhi 110062
Phone : 0091-11-6517248
Fax 6969716
E-mail: genecamp@vsnl.com