

Intellectual Property Rights and Traditional Knowledge

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Ancient India's S&T Contributions

- ❖ Plastic Surgery (Susrutha)
- ❖ Physiology, Anaotomy, Pharmacology (Charaka)
- ❖ Ayurveda
- ❖ Yoga (Kung Fu, a derivation of Yoga, was taught to the Chinese by an Indian Bhuddist Monk known as Bodhidharma)
- ❖ High Quality metallurgy—think of rust-free Ashoka's Iron Pillar, Harappan bronze figurines
- ❖ The value of pi was first calculated by Budhayana, and he explained the concept of what is known as the Pythagorean Theorem. He discovered this in the 6th century long before the European mathematicians.
- ❖ Chess (Shataranj or AshtaPada) was invented in India

Ancient India's S&T Contributions

- ❖ Place value system (100 BC) and the concept of zero, on which ultimately rests the binary code which has given us all software
- ❖ The technique of algorithm used in computer science today.
- ❖ The earliest recorded use of copperware in India has been around 3000 B.C. the findings at Mohenjo-Daro and Harappa, bear this out
- ❖ The earliest documented observation of smelting of metals in India is by Greek Historians in the 4th Century BC
- ❖ The art of Navigation was born in the river Sindh 6000 years ago. The very word Navigation is derived from the Sanskrit word *Navgatih*. The word navy is also derived from Sanskrit '*Nou*'.

In Remembrance of Ancient Indian Science

Aryabhata I (476-560AD): Aryabhatiya: ganitapada, golapada, kalakriyapada, gitikapada (time): Heliocentric, motions of solar system, eclipses, Pi as irrational/fractional, indeterminate equations, mensuration, trigonometry, finding cube root etc

Aryabhata II (920-1000AD): Mahasiddhanta (18 Ch); mathematical astronomy (12 Ch); geometry, geography & algebra (6 Ch)

Bhaskara I (600-680AD): Aryabhata bhashya; Pi fractional

Bhaskara II (1114-1185AD): Leelavathi, mathematical astronomy, circumference of earth, distance to moon, etc

In Remembrance of Ancient Indian Science

Brahmagupta: Mathematician, geometry

**Charaka (300BC): Famous physician, pathology,
anatomy, pharmacology, diagnostics;
Charakasamhita: Ayurveda**

**Sushruta (600BC-1000AD): Surgeon par excellence,
Sushruta-samhita: Ayurveda, kayatantra,
salyatantra, salakyatantra, salyachikitsa, kayachikitsa**

**Varahamihira (505-582AD): Famous astrologer,
Brihatsamhita; Panchasiddhantika: astronomy**

In Remembrance of Ancient Indian Science

**A number of books were written by eminent scholars—
both Indian and western—on**

Science and Technology in Ancient India

Vedic Science

**Meaning of the Traditions followed by various cultural
groups in India**



India: The Next Knowledge Superpower

- ❖ Destination India (second only to China, ahead of US)
- ❖ Strong basic research base/Industrial/Intellectual capital
 - Software, Hardware, Communication Technology, Publishing, Music, Films, Industrial Expansion/Acquisitions, CEOs of MNCs, Business Process Outsourcing
- ❖ India is now the back office of many banks and MNCs
- ❖ Over 125 firms from Fortune's list outsource their services from India
- ❖ Over the past five years alone, more than 300 IT and science-based firms have located R&D labs in India
- ❖ Indian patents filed (376+244) in US are comparable to China (597) & Russia (173)
- ❖ IITs, IIMs, IISc, ISB, IIITs, NITs...
- ❖ Education, Research, PhDs, ...
 - ❖ > 12 million S&T graduates, 2 mil PGs, 0.1 mil PhDs
- ❖ Ninth in global R&D spending (\$26.9 bn as per PPP)
- ❖ Rising private R&D spending (75-80% by Govt)
- ❖ Rising filings of patents, trademarks, copyright applications and publications (~14 million)

Traditional Knowledge

Very vital for a Community

- Provides relief or cure to many common ailments
- Protection from natural hazards
- Improper documentation, lack of IP information
- Mostly passed on thru generations by word of mouth

For example

- The four Vedas
- Ayurveda, Unani, Sidha systems of Medicine
- Cures for jaundice & diabetes control, normal & dry coughs, asthma, headache & colds, exima, burns, mumps, infertility, abortion, bone fractures, diarrhea, fever, itches, snake bites, and so on

Traditional Knowledge

- ❖ Traditional knowledge (TK), indigenous knowledge (IK), traditional environmental knowledge (TEK) and local knowledge generally refer to the matured long-standing traditions and practices of certain regional, indigenous, or local communities.
- ❖ Traditional knowledge also encompasses the wisdom, knowledge, and teachings of these communities.
- ❖ Traditional knowledge has been orally passed for generations from person to person. Some forms of traditional knowledge are expressed through stories, legends, folklore, rituals, songs, and even laws.
- ❖ Traditional knowledge is not recognized as "knowledge" by all who study it since it includes beliefs, values and practices.

Traditional Knowledge Digital Library

- Traditional Knowledge (TK) Digital Library is a knowledge repository of the traditional knowledge.
- Aim is to protect the ancient and TK of the country from exploitation such as bio-piracy and unethical patents
- Transferring 5,000 years of ancient texts onto a digital database in Hindi, English and eventually German, French, Spanish and Japanese
- TKDL is a collaborative project between CSIR (NISCAIR), Ministry of S&T and Department of *AYUSH*, Ministry of Health and Family Welfare
- A team of Ayurveda, Unani, Siddha & Yoga experts, patent examiners, IT experts, scientists etc are involved in creation of TKDL for Indian Systems of Medicine. This project was started in 2001-02.
- Of the ~ 5,000 patents granted the US PTO on various medical plants by the year 2000, some 80% were based on plants of Indian origin.

Status of TKDL

Discipline	Target (No. of Formulations)	Achieved
Ayurveda	59000	59000
Unani	77000	51000
Siddha	10000	-
Yoga	1500	-
Total	14,7500	11,0000

- At present, TKDL contains 11.0 million pages (A4 size) information in five international languages.
- The data relating to only 7,000 formulations each in Unani and Siddha, and 1,500 postures in yoga remained to be included and the entire process was expected to be completed by December 2008

(As on January 2006)



Traditional Knowledge Digital Library

- About TKDL
- FAQ
- TKRC
- Bio-Piracy
- Addresses & Contacts
- Feedback
- Contact us
- Related sites
- Total hits:



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Traditional Knowledge

TK encompasses

Community Knowledge

Cultural Heritage

Folklore

Traditional Medicines

Biodiversity



Cultural Heritage

- ❖ **Cultural heritage of nation includes:**
 - **Folklore**
 - **Ethnographic material**
 - **Pharmacopoeia products**
 - **Traditional medicines & psychotherapy**
 - **Historic monuments**
 - **Architectural works**
 - **Monumental sculptures & paintings**
 - **Inscriptions**
 - **Cave dwellings**
 - **Heritage of indigenous people**
 - **Literary & artistic works**
 - **Technical & ecological knowledge**
 - **Photographs, videotapes, audiotapes, etc.**

Folklore

❖ Productions consisting of characteristics elements of the traditional artistic heritage of a community:

- Folk tales
- Poetry & riddles
- Songs & music
- Dances
- Plays
- Rituals
- Sculpture
- Costumes
- Jewelry, etc

Traditional Medicines

- ❖ The Traditional medicine is largely based on medicinal plants, indigenous to those countries where system has been in vogue for several centuries.
- ❖ Traditional medicines include practices such as
 - Patanjali yoga cures
 - Herbal medicines & Beauty creams
 - Ayurvedic medicines
 - Unani medicines—Zinda tilismath, Pharuqi tooth powder
 - Spinal manipulations
 - Siddha medicines
 - Kerala Steam Massage (Kottakkal) Medicines
- ❖ Also other medical knowledge and practices all over the globe like Acupuncture, Traditional Chinese Medicine, South African Muti, Yoruba Ifá

Biodiversity

- ❖ India is one of the 12 mega biodiversity countries
- ❖ Only 2.4% of land area with 7-8% of species recorded from 65-70% of land survey (excluding: Himalayan regions A&N Islands)
- ❖ 47,000 Plants and 81,000 Species of animals
- ❖ Biodiversity Act 2002 (Bill 2000)

International Treaties on IPRs

Paris Convention (1883) 105 Member Countries; Industrial Property

Berne Convention (1886) for the Protection of Literary & Artistic Works

Brussels Convention Relating to the Distribution of Program Carrying Signals Transmitted by Satellite

Geneva Convention for the Protection of Producers of Phonograms against Unauthorized Duplication of Their Phonograms (1950s)

Rome Convention (1961) for the Protection of Performers, Producers of Phonograms & Broadcasting Organizations

Universal Copyright Convention (1952); Unesco; 59 Ratified; 36 Yet to Ratify; To Bring USA Into The © Ambit

World Intellectual Property Organisation (1967); for Patents; 175 Member Countries

WIPO Performances and Phonograms Treaty (WPPT)- 1996

WIPO Copyright Treaty (WCT)-1996

Intellectual Property Rights

Madrid Agreement: Trademarks

Hague Agreement: Industrial Designs

Washington Treaty: Layout Designs (ICs)

Lisbon Treaty: Geographical Indications (Alphonso Mangoes, Malabar Pepper, Kolhapur Chappals)

TRADE-RELATEDS IPRs

TRIPS Agreement is a turning point in the history of IPRs^{8th} Meeting of GATT, Establishment of WTO, 144 members (from 01 Jan 1996)

TRIPS Provides for Uniform Minimum Standard for Protection of IPR Transnational Agreements for Developing/Least Developed Countries and for Disputes Settlement Body

WIPO, WTO and IPRs

- ❖ Trips provides minimum standards of protection for IPRS, WTO members can grant a higher level of protection under Nation's Laws so India can deny grant of patents on life forms (except micro organisms), but cannot object US granting patent on plants or other life forms. However the patents will be confined to US only & not in India.
- ❖ If the criteria for patentability like novelty, non-obviousness and usefulness are not followed, we can contest it.

Eg: Wound healing properties of Turmeric- US
Fungicide properties – EU

WIPO, WTO and IPRs

- ❖ **Conventional IPR forms (©, P, TMs) are inadequate to protect TK as they are designed to protect individual property TK is informal; takes a lot of time to develop**
- ❖ **TK is mostly orally or transferred over generations or confined to texts in Vernacular Languages**
- ❖ **More than one community may hold TK in parallel**
- ❖ **The novelty and innovation conditions are not satisfied**

Yoga Piracy

- ❖ The Yoga piracy refers to the practice of claiming patents and/or copyrights on yoga postures and techniques found in ancient treatises originating within India by persons residing in foreign countries.
- ❖ Yoga Piracy often center around fitness instructors of non-Indian origin who claim patents and copyrights on asanas (yoga poses), pranayama techniques and sequences, the most notable example being the case of Bikram Yoga in the United States.
- ❖ Yoga fitness industry in the United States is as high as \$3 billion annually.
- ❖ An expatriate Indian yoga teacher claimed copyright on a sequence of 36 yoga asanas or postures (US)

Yoga Piracy

- ❖ The Government of India has initiated the documentation of 1,500 yoga asana or postures from the ancient Yoga Sutras of Patanjali to present times.
- ❖ Storing them in the TKDL to be made available to patent offices worldwide, 30 million database pages have been compiled by the Indian Commerce Ministry and DST/MST.
- ❖ Fifteen of the most prominent yoga schools in India are involved, including the Iyengar Institute and Kaivalyadham, run by Nitin Unkule.
- ❖ Morarji Desai Nat'l Inst of Yoga is networking local, national and international yoga institutions

Traditional Medicines

- ❖ The traditional medicines (indigenous medicine or folk medicine) describe medical knowledge systems, which are developed over centuries within various societies before the era of modern medicine
- ❖ Think of the medicinal properties of garlic, onion, neem leaves and branches, karela, pepper, ginger (fresh and dry), methi, clove oil, dhania and ofcourse, turmeric and neem for common cures
- ❖ The many leaves and roots of plants being used by tribals in the nooks and corners in the country

Traditional Medicines

- ❖ In India, the government became involved in traditional drug production when the Central Drug Research Institute recently patented two new drugs from ancient Ayurvedic formulas.
 - ❖ The first is a mixture of black pepper, long pepper, and ginger that allows for the dosage of the antibiotic Rifampicin to be halved in the treatment of tuberculosis and other mycobacterial infections.
 - ❖ The other is a memory tonic produced from the traditional plant called Brahmi.
- ❖ Overseas patenting of turmeric and products of the Neem tree caused controversy in India and other nations.

Traditional Medicines

Some ayurvedic products, mainly herbs, are used for healing many common and critical ailments.

- ❖ Turmeric and its derivative curcumin appears to have beneficial properties.
- ❖ Derivatives of snake venom have various therapeutic properties.
- ❖ Many plants used as *rasayana* medications are potent antioxidants.
- ❖ Neem appears to have beneficial pharmacological properties.
- ❖ Cardamom and cinnamon stimulate digestive enzymes that break down polymeric macro molecules in the human body.

Traditional Medicines

- ❖ *Terminalia arjuna* is useful in alleviating the pain of angina pectoris, in treating heart failure, coronary artery disease, and may also be useful in treating hypercholesterolemia.
- ❖ *Azadirachta indica* is believed to have immunopotentiating abilities and is used often as an anti-infective. It has been found to enhance the production of IL-2 and increase immunity in human volunteers by boosting lymphocyte and T-cell count in three weeks.
- ❖ Both black pepper and long pepper find application in Ayurvedic medicine in conjunction with ginger to form *trikatu*—a traditional mixture. *Trikatu* has been suggested to increase appetite, promote the secretion of digestive juices, and cure certain gastric disorders—particularly Achlorhydria and Hypochlorhydria.

Patent on Neem

- ❖ The neem tree (*Azadirachta indica*) originates from the Indian subcontinent. It has multiple uses, such as agriculture as an insect and pest repellent, in human and veterinary medicine, toiletries and cosmetics.
- ❖ Largest number of patents is in USA (54) followed by Japan (35), Australia (23), India (14).
- ❖ In India more than 53 patent applications are pending for either gazette notification or opposition since 1995. If granted India will have the largest number of patents in neem.

Patent on Neem

- ❖ Organization wise patents ownership indicates largest number owned by Certis - W.R. Grace (49) followed by Rohm & Haas (36), CSIR-India (14), Trifolio (9), Bayer (8) and EID Parry (6).
- ❖ Majority of Patents are for crop protection applications (63%), health care (13%), industrial (5%), veterinary care (5%), cosmetics (6%) and others (8%).

Patent on Neem

- ❖ **Neem Patent revoked by European Patent Office:** The challenge to the patent had been made at the Munich office of the EPO by three groups: the EU Parliament's Green Party, Dr. Vandana Shiva of the India based Research Foundation for Science, Technology and Ecology, and the International Federation of Organic Agriculture Movements.
- ❖ **The European Patent Office (EPO) revoked in its entirety Patent number 436257, which had been granted to the United States of America and the multinational corporation W.R. Grace for a fungicide derived from seeds of the Neem tree.**

Patent on Turmeric (Haldi)

- ❖ In the mid-1990s, this product became the subject of a patent dispute with important ramifications for international trade law.
- ❖ A U.S. patent on turmeric was awarded to Suman K Das and Harihar P Cohly of University of Mississippi Medical Center in 1995, specifically for the "use of turmeric in wound healing." This patent also granted them the exclusive right to sell and distribute turmeric.
- ❖ Two years later, a complaint was filed by India's CSIR and challenged the novelty of the University's "discovery," and the U.S. patent office investigated the validity of this patent.
- ❖ In India, turmeric has been used medicinally for thousands of years, concerns grew about the economically and socially damaging impact of this legal "biopiracy."

Patent on Turmeric (Haldi)

- ❖ In 1997, the patent was revoked. But for two years the patent on turmeric had stood, although the process was non-novel and had in fact been traditionally practiced in India for thousands of years
- ❖ Eventually proven by ancient Sanskrit writings that documented turmeric's extensive and varied use throughout India's history.
- ❖ Many developing countries are concerned that the globalization of IPR under the WTO's TRIPs agreement, and the negative consequences it has for traditional indigenous knowledge and biodiversity.

Patent on Basmati Rice

- ❖ Literally translated as "queen of fragrance," It has been grown in the foothills of the Himalayas.
- ❖ In Sept.1997, a Texas company called RiceTec won a patent (US Patent No. 5,663,484) on "basmati rice lines and grains." The patent secures lines of basmati and basmati-like rice and ways of analyzing that rice.
- ❖ RiceTec, Liechtenstein, faced international outrage over allegations of biopiracy. It had also caused a brief diplomatic crisis between India and US. India threatening to take the matter to WTO as a violation of TRIPS which led to could have resulted in a major embarrassment for the US.
- ❖ Both voluntarily and due to review decisions by the US Patent Office, RiceTec has lost most of the claims of the patent, This was a huge victory for Indian farmers who could have faced enormous economic losses from the patent.

Successful case of Hoodia Cactus

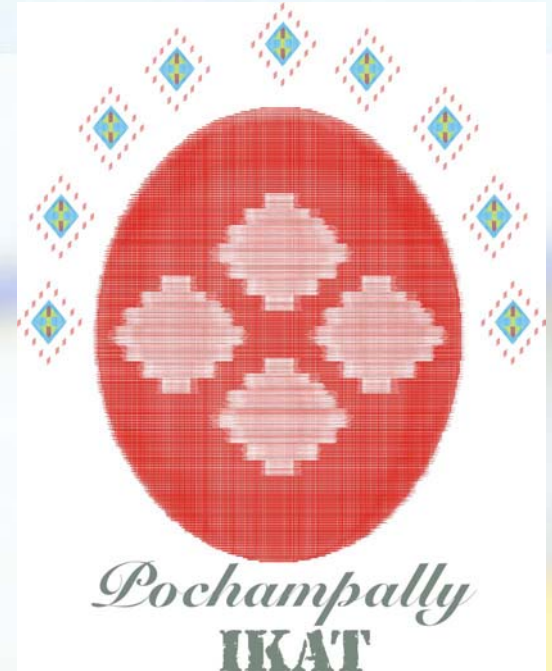
- ❖ For thousands of years, African tribesmen use to eat Hoodia cactus to stave of hunger and thirst on long hunting trip
- ❖ South African Council of Scientific and Industrial Research (SACSI) patented Hoodia's appetite-suppressing element (P57) and hence, its potential cure the obesity in 1995.
- ❖ In 1997, they licensed P57 to British Biotech Company, Phytopharm
- ❖ In 1998 Pfizer acquired the right to develop and market P57 as a potential slimming drug and cure for obesity from Phytopharm for \$32 million
- ❖ The San People launched legal action against the SACSI a pharma company on the grounds of bio-piracy.
- ❖ In March 2002 landmark decision came in favor of San People in terms of a share of any future royalty.

Geographical Indications

- Geographical Indications are designations, expressions or signs which indicate that a product originates from a country, region or a locality
- They cover Agricultural and Industrial Goods but there are discussions to include services
- GIs include Quality Functions
- A Trademark emphasizes the producer or a manufacturer of a product whereas a GI highlights the geographical origin of a good and the characteristics derived from it
- The GI Act, 1999 is administered by the Controller General of Patents, Designs & Trademarks who is also the Registrar of GIs
- The GI Registry is at Chennai

Geographical Indications

- The First GI to be Registered: The Pochampally IKAT
- GIs under consideration (2006)
Chanderi; Niligiri Tea; Goa Fenny; Mysore Silk;
Kancheepuram Sarees



Uniqueness of Pochampally Ikat

- **Pochampally Ikat consists of fabric :**
Made by a process of tying and dyeing the yarn prior to weaving
Mainly cotton or silk or a combination of both Originating from the geographical region of agenda & Warangal districts in the state of AP
- **Having single, combined or double Ikat in several illustrations ranging from :**
The use of diamond or chowka, diagonal or square grids in which geometrical, floral figurative motifs are woven
Striped or shevaron forms & other abstract variations



GI Application Details in India

Darjeeling (word & logo), Pochampally Ikat, Salem Fabric, Payyannur Pavithra Ring, Chanderi Saris, Solarpur Chaddar, Solarpur Terry Towel, Mysore Silk, Kota Doria, Basmati Rice, Kancheepuram Silk, Bhavani Jamakkalam, Navara Rice, Mysore Agarbathi (word & logo), Kullu Shawl Bidar, Madurai Sungudi, Kondapally Toys, Channapatna Toys and Dolls, Mysore Rosewood Inlay, Kangra Tea, Coimbatore Wet Grinder, Mysore Sandalwood Oil (word & logo), Mysore Sandal Soap (word & logo), Kasturi Embroidery – Karnataka, Mysore Traditional Paintings, Coorg Orange, Mysore Betel Leaf, Nanjanagud Banana, Palakkadan Matta Rice, etc

36 Items were listed for GI Registry at the end of 2005

Traditional Knowledge (TK) Protection & Promotion

Traditional knowledge protection needs are:

- ❖ **Preserve and conserve traditional knowledge**
- ❖ **Prevent the unauthorized use of traditional knowledge**
- ❖ **Enable communities to continue using traditional knowledge in the context of their traditional life style**
- ❖ **Encourage the conservation and sustainable use of biodiversity**
- ❖ **Encourage traditional knowledge-based innovation**
- ❖ **Increase awareness of the value of traditional knowledge**
- ❖ **Promote social justice and equity**
- ❖ **Recognize traditional customary laws and practices**

Loss of Traditional Knowledge

Traditional knowledge loss concern:

- ❖ Destruction of ecosystem in search for expanded agricultural lands
- ❖ Deforestation associated with harvesting of timber and other forest products
- ❖ Over emphasis on oral traditions
- ❖ Lack of documentation and appropriation of traditional knowledge with no regards for knowledge holders

Suggestions

- ❖ Documentation of TK—TKDL
- ❖ Development of sui generis system
- ❖ Registration & Innovation Patent System

Proper Documentation would help prevent piracy

- ❖ As Proof to Contest Patents, GIs, etc
- ❖ Deciding who/which community holds legal right

It may facilitate piracy as secrets are open

Indian Perspective

- ❖ **Village-wise Community Biodiversity Registers (CBRs)**
- ❖ **People's Biodiversity Registers (eg. Kerla, Karnataka, Maharashtra)**
- ❖ **Plant Biodiversity Registers in more than 10 states with the help of IISc.**
- ❖ **One Research Foundation of Science, Technology & Ecology (RFSTE) in 1999 initiated Jaiv Panchayat (Living Democracy) register 292 sites/villages in the Country**
- ❖ **Honey Bee Network has world's largest database on grassroot innovations**

Indian Perspective

- ❖ **Ahmedabad's SRISTI (Society for Research and Initiatives for Sustainable Technologies & Institutions)**
- ❖ **The Kalpavriksh & Beej Bachao Andolan of Garhwal (Save the 10,000 seeds campaign)**



Indian IPR Acts

The Copyright Act (Amended in 1983, 1984, 1992, 1994 & 1997)	1957
The Copyright Rules	1958
International Copyright Order	1999
Information Technology (IT) Act	2000
Geographical Indication of Goods (Registration and Protection) Act (Protect Basmati rice, Darjeeling tea, and such other goods that are native to India)	2002
Patents (Amendment) Act	2002
Communication Convergence Act	2002
Trademark's Bill and Designs Bill	2002
Protection of Plant Varieties and Formers' Rights Act	2002
E-Commerce Act	2002

Can we Network Knowledge?

Tacit Knowledge

Social Networks, Blogs, Discussion Forums,
Special Interest Groups

Explicit Knowledge

Library Networks, Internet, WWW, Open Access
Journals, ODLs, PLoS, Open Access Central,
PubMed Central, DOAJ, Open Educational
Resources, Open Courseware, DOAR, DOER, etc

Necessity of a Knowledge Grid

The Government and its associated organizations are the largest producers of socio-economic and statistical information. Former President of India Dr Abdul Kalam has urged for creation a “Knowledge Management Grid” with a Central Digital Library Data Center equipped with a comprehensive Virtual Digital Library and Knowledge Management System into which all the participating organizations are connected with broadband along with Internet connectivity.

**Education Grid of IIT, Kerala
IIT Grid**

The background features a close-up of a yellow pencil with a sharpened lead tip, resting on a sheet of white lined paper. The image is overlaid with large, semi-transparent geometric shapes: a light green triangle in the top right, a light blue triangle in the top left, and a large orange triangle in the bottom left. The text is centered in the white space between these shapes.

**THANKS FOR YOUR
PATIENT HEARING
ANY QUESTIONS?**