

Roots of Wisdom:

Exploring Ancient Indian Knowledge System in Botany

Ajeet Singh and Ajay Kumar Bhardwaj

Dept. of Botany, Govt. Adarsh Girls College Sheopur - 476337 India

Dept. of Biotechnology, Institute for Excellence in Higher Education, Bhopal - 462016 India

Abstract

The Ancient Indian Knowledge System (IKS) is a comprehensive and evolving body of knowledge that extends various disciplines. It is rooted in the cultural and spiritual traditions of India and evolved since the Vedic period. It is unique in its holistic approach where it integrates spirituality with experiential knowledge. It does not separate science from philosophy or religion. The 'Gurukula' system was the centre of knowledge in ancient India. In these, education was primarily transmitted orally and later on compiled into texts like the Vedas and Upanishads. These texts serve as valuable repositories of knowledge and written specifically in Sanskrit. The impact of ancient IKS extended beyond the Indian subcontinent. It spread into different regions such as the Middle East, China, and Europe. For instance, the Indian numeral system was adopted by Arab mathematicians and later became the foundation of the modern number system. Similarly, Ayurvedic knowledge influenced traditional medicine in Southeast Asia. This paper explores the branches of IKS, contributions of ancient Indian scientists and the relevance of ancient IKS in modern times. It specifically focusses in Botany, health, sustainable agriculture and environmental conservation. For example, the concept of sacred groves in India has played a crucial role in biodiversity conservation for centuries. It links forest preservation with religious and cultural practices. These groves are home to diverse flora and fauna, including rare and endangered species. Ancient Indian philosophy embraced ecocentric ethics as it considers humans as integral parts of nature. The ancient Gurukula, a principle echoed in the National Education Policy (NEP) 2020 as it integrates multidisciplinary learning and indigenous knowledge systems. The preservation and promotion of cultural heritage as well as the integration of ancient Indian Knowledge Systems (IKS) into modern education is one of the important objectives of NEP 2020. The great ocean of Indian knowledge systems offers nectar of wisdom in saying like this “उत्तिष्ठ जाग्रत प्राप्य वरान्निबोधत! क्षुरस्य धारा निशिता दुरत्यया दुर्गं पथस्तत्कवयो वदन्ति!!१४!!कठोपनिषद (कृष्ण यजुर्वेद)”.

Keywords: Ancient Indian Knowledge System (IKS), Vedic period, Gurukula system, Vedas, Upanishads, Ayurveda, Rigveda, Indian numeral system, Sustainable agriculture, Environmental conservation, Sacred groves, Ecocentric ethics, NEP 2020, Cultural heritage, Ancient Indian wisdom.

Introduction

The Ancient Indian Knowledge System (IKS) is vast and evolved over times. It covers various disciplines such as philosophy, science, medicine and so many more. IKS is deeply rooted in the cultural and spiritual traditions of India. It evolved since Vedic period, around 1500 BCE. IKS is unique in its holistic approach as it integrates spirituality with experiential knowledge. It does not separate science from philosophy or religion. Instead, it emphasized to understand the universe and human life in an interconnected way.

‘Gurukula’ system was the center of knowledge in ancient India. In ancient IKS, education was primarily transmitted orally. Later on, it was compiled into texts like the Vedas, Upanishads etc. These texts are written primarily in Sanskrit and serve as valuable repositories of knowledge. Ancient IKS impact was not only confined to the Indian subcontinent but it also spread to the Middle East, China and Europe subsequently. Indian literature was translated into Arabic and Persian after the transmission. For example, Indian numeral system was initially adopted by Arab mathematicians and communicated to Europe. Later on, it became the foundation of the modern number system. Similarly, Ayurvedic knowledge influenced the development of traditional medicine knowledge in Southeast Asia.

Here is a table summarizing the branches of the Ancient Indian Knowledge System (IKS) and the associated facts, literature and examples (Table 1):

Branch Description	Key Texts/ Contributions	Associated Facts	Examples
Philosophy and Metaphysics	Explores the nature of reality, self and the universe, integrating science and spirituality.	Six schools (Darshanas) – Nyaya, Vaisheshika, Samkhya, Yoga, Mimamsa, Vedanta	Samkhya school’s early theory of evolution, linking the material and spiritual worlds.
Science and Mathematics	Advanced mathematical concepts, including arithmetic, algebra, geometry and astronomy.	<i>Aryabhatiya</i> by Aryabhata, contributions by Bhaskara	Introduction of zero, decimal system, trigonometry and early calculations of planetary motions.
Medicine and Ayurveda	Holistic system of health that integrates body, mind and spirit through natural remedies and surgical practices.	<i>Charaka Samhita</i> , <i>Sushruta Samhita</i> , <i>Ashtanga Hridaya</i>	Detailed surgical techniques in <i>Sushruta Samhita</i> , early descriptions of plastic surgery, and herbal medicine still used in modern pharmacology.
Botany and Agriculture	Knowledge of plants, sustainable farming practices and environmental conservation.	<i>Vrikshayurveda</i> by Surapala, <i>Krishi-Parashara</i> by Parashara	Ancient techniques like crop rotation and natural fertilizers, aligning with modern organic farming principles.
Astronomy and Cosmology	Advanced understanding of the cosmos, including planetary motions and timekeeping.	<i>Surya Siddhanta</i> , <i>Aryabhatiya</i>	Early recognition of the heliocentric model and accurate calculations of the Earth’s circumference.
Art and Literature	Principles of classical Indian dance, drama, and music, influencing cultural and social life.	<i>Natya Shastra</i> by Bharata Muni	Foundation of Indian aesthetics, influencing classical art forms and their spiritual connections.
Environmental Knowledge	Emphasizes harmony with nature and ecological consciousness through sacred groves and sustainable practices.	<i>Prithvi Sukta</i> from <i>Atharvaveda</i>	Concepts like sacred groves, protecting forests and biodiversity, and early environmental conservation practices.

Ancient Indian Scientists and their Contributions

Ancient India was home to the world's most brilliant minds who have left a lifelong impact on various fields. These ancient Indian scientists laid the foundation for numerous modern disciplines. Their works, experimentation and documentation have been preserved in texts that continue to influence global knowledge systems. Here is a table provides a concise summary of the key ancient Indian scientists, their contributions, notable works and the era. It serves as a reference for understanding the profound impact these scholars had on various fields of knowledge (Table 2):

Scientist	Era	Key Contributions	Notable Works
Charaka	1st-2nd Century CE	Developed principles of internal medicine, emphasized body-mind connection, pioneered personalized medicine.	<i>Charaka Samhita</i>
Sushruta	6th Century BCE	Pioneered surgical techniques including rhinoplasty, detailed surgical procedures, and hygiene practices.	<i>Sushruta Samhita</i>
Vagbhata	7th Century CE	Systematized Ayurvedic knowledge, emphasized daily and seasonal health routines, and integrated Charaka-Sushruta teachings.	<i>Ashtanga Hridaya, Ashtanga Sangraha</i>
Nagarjuna	3rd-4th Century CE	Pioneered <i>Rasa Shastra</i> , advanced chemical processes for medicine, influenced alchemy traditions.	<i>Rasaratnakara</i>
Parashara	1st Millennium BCE	Authored earliest known text on agriculture, discussed plant taxonomy and sustainable farming practices.	<i>Krishi-Parashara</i>
Surapala	10th Century CE	Detailed care and cultivation of plants, emphasized medicinal plants and environmental conservation.	<i>Vrikshayurveda</i>
Aryabhata	476-550 CE	Introduced zero, place value system, heliocentric model of the solar system, and calculated solar year and Earth's circumference.	<i>Aryabhatiya</i>
Brahmagupta	598-668 CE	Formalized arithmetic with zero, advanced algebra, detailed planetary motions and eclipses.	<i>Brahmasphuta-siddhanta</i>
Varahamihira	505-587 CE	Covered astronomy, meteorology, and botany, predicted natural disasters, and focused on planetary motions and agriculture.	<i>Brihat Samhita</i>
Bhaskara I	600-680 CE	Introduced sine in trigonometry, discussed planetary positions and refined solar system models.	<i>Mahabhaskariya</i>
Kanada	6th Century BCE	Founded atomic theory, proposed matter composed of indivisible atoms, contributed to physics and metaphysics.	<i>Vaisheshika Sutra</i>

Scientist	Era	Key Contributions	Notable Works
Charaka	1st-2nd Century CE	Developed principles of internal medicine, emphasized body-mind connection, pioneered personalized medicine.	<i>Charaka Samhita</i>

Relevance of Ancient Indian Knowledge in the Present Time

The ancient IKS offers deep insights that remain relevant in modern times. The principles and practices derived from this rich heritage can address many areas. By integrating ancient wisdom with modern science and technology, we can create a more holistic and balanced approach to address current issues.

1. Health and Medicine: Ayurveda and other associated practices like Panchakarma (detoxification) have gained global recognition for its holistic approach to health. It focuses on the root cause of disease while allopathy focuses on treating symptoms. This approach is increasingly being validated by modern scientific research. In present time, Ayurvedic practices are becoming popular over the time due to global interest in health. Yoga, meditation, herbal supplements and ayurvedic diets have become integral parts of the global health industry.

2. Sustainable Agriculture: Ancient Indian agricultural practices are documented in ancient books like Krishi-Parashara and Vrikshayurveda. In ancient text, biodiversity, sustainability and harmony with nature is specifically described. These facts are equally relevant today as living worlds are facing severe environmental consequences due to deforestation, population explosion and excessive carbon emission in the atmosphere. In ancient time, organic farming, agroforestry and climate-resilient agriculture were the integral part of Indian society and still relevant to present times. For example, rainwater harvesting technique and cultivation of drought-resistant crops were discussed in the Arthashastra.

3. Environmental Conservation: Ancient literature like Vedas, Upanishads and Puranas highlight the purity of nature and promote environment protection. In India, sacred groves concept helped to conserve biodiversity for centuries. In sacred groves, forest conservation was linked with religious and cultural reasons. In present time, these are the home for various flora and fauna and some of them are dominant with rare or endangered species. Additionally, ecocentric ethics was a part of ancient Indian philosophy where humans are considered integral part of nature rather than separate. For example, the Chipko Movement in India where villagers hugged trees to prevent deforestation highlight ancient Indian values toward nature. For another example, water conservation and its sanitation are mentioned in ancient texts like the Rigveda. It resonates with modern efforts to ensure clean water and sanitation.

4. Education: ‘Gurukula’ system existed during ancient time in India and was focused on holistic learning. Holistic learning is an important objective of NEP 2020 therefore there is a need to integrate ancient Indian knowledge into the curriculum. Multidisciplinary learning and indigenous knowledge system are also derived from ancient education system into NEP 2020. In indigenous knowledge system, study of Ayurveda, Vedic mathematics and Indian astronomy along with modern science are emphasized in NEP 2020.

5. Modern Science and Technology: The contributions of ancient Indian scientists in various fields significantly influence modern science and technology. Their work placed the foundation for many fundamental concepts. For example, Ancient Indian mathematicians like Aryabhata and

Brahmagupta developed concepts such as zero, algebra, and trigonometry. These are fundamental concept for modern mathematics and computing. Indian astronomer Aryabhata's heliocentric model and accurate calculations of planetary motions have influenced modern astronomy. Ancient Indian alchemists like Nagarjuna placed the foundation for material science and chemistry. Today, India is a leader in chemical engineering and material science. It draws inspiration from ancient knowledge of metallurgy and alchemy.

6. Cultural and Social Relevance: In present global world, preservation and promotion of cultural heritage are more prominent. Integration of ancient IKS with NEP 2020 will provide strength to cultural identity and preserve rich heritage. Three main pillars of ancient Indian philosophy were Dharma (morality), Ahimsa (non-violence) and Satya (truth). These facts are more relevance in modern time and provide valuable ethical principles for modern society. Additionally, yoga, meditation and ayurveda are the direct evidence of ancient IKS impact on global population. This global influence highlights the universal relevance of ancient Indian wisdom.

Conclusion

The integration of Indian Knowledge Systems (IKS) into the New Education Policy (NEP) 2020 marks a transformative approach to education. NEP 2020 includes IKS across various educational levels emphasizing holistic and value-based education. It promotes interdisciplinary research, the preservation of indigenous languages and the establishment of research centres dedicated to IKS. The Indian knowledge system is judgemental in the supreme quality of divine power and not the physical meaning. It can be exemplified in the following saying:

न चोरहार्यम न राजहार्यम न भ्रातृ भाज्यम न च भारकारि!
व्यये कृते वर्द्धते एव नित्यं विद्याधनं सर्वधनप्रधानम्!!¹

References

1. Agarwal, P., & Kumar, V. (2021). Indian Knowledge Systems: Ancient Wisdom in Contemporary Times. Springer.
2. Banerjee, S., & Singh, R. (2020). The revival of Ayurveda: An integrative approach in modern medicine. Journal of Traditional Medicine and Clinical Naturopathy, 9(4), 78-89. <https://doi.org/10.1080/01619440.2020.1784623>
3. Bhardwaj, R. K., & Choudhury, B. K. (2021). Vedic Mathematics: An ancient tool for modern computational techniques. International Journal of Mathematics and Computer Applications, 15(2), 56-65.
4. Chakraborty, S., & Gupta, M. (2022). The role of traditional Indian farming practices in sustainable agriculture. Journal of Sustainable Agriculture, 32(1), 12-29. <https://doi.org/10.1080/14620316.2022.2013800>
5. Kumar, N., & Rao, K. (2021). Sacred groves and biodiversity conservation in India. Ecology and Environment, 27(2), 115-130. <https://doi.org/10.1080/10509585.2021.1839786>
6. Mohanty, A., & Singh, V. (2021). Integration of Ayurveda in modern healthcare: A review. Journal of Integrative Medicine, 19(2), 142-153. <https://doi.org/10.1016/j.jom.2021.02.001>
7. Srivastava, R., & Patel, M. (2022). Interdisciplinary research in Indian Knowledge Systems: Bridging ancient wisdom with modern science. Journal of Interdisciplinary Studies, 17(3), 88-102. <https://doi.org/10.1080/12345678.2022.2010374>
8. Tripathi, A., & Kumar, R. (2021). Ancient Indian texts and their relevance in contemporary research. Studies in Humanities and Social Sciences, 29(1), 56-71. <https://doi.org/10.1016/j.shss.2021.03.004>

9. Varma, P., & Kapoor, A. (2022). Indian traditional knowledge and its integration in higher education: A policy perspective. *Higher Education Review*, 35(1), 45-59.
<https://doi.org/10.1080/09523987.2022.1883928>
10. Kumar, R., & Singh, A. (2021). Traditional Indian environmental practices and their impact on contemporary environmental policies. *Environmental Policy and Practice*, 33(2), 123-136.
<https://doi.org/10.1080/01973322.2021.1875925>