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INDIAN KNOWLEDGE SYSTEM: UNDERSTANDING THE ANCIENT PAST AND EXPLORING PRESENT RELEVANCE

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ABSTRACT

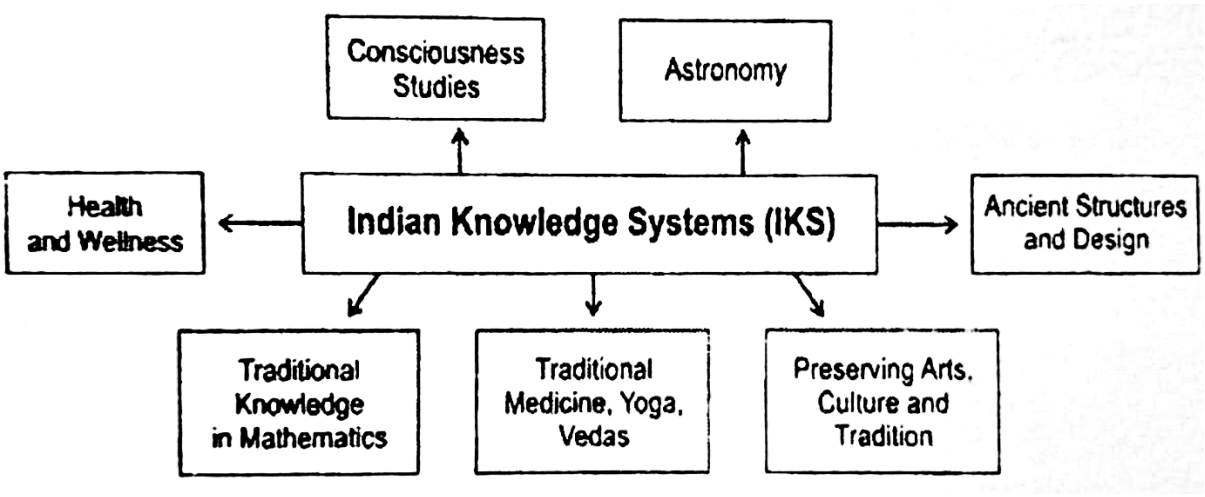
Indian Knowledge System (IKS) refers to the wisdom, knowledge system and practices that had been developed, sustained and evolved in India for millennia. IKS represents a diverse corpus of intellectual traditions which comprises of philosophy, science, medicine, mathematics, arts and architectures. These system of traditional knowledge had been deeply rooted in ancient India's Past with important texts such as the Vedas, Vedangas, and Shastras. It was in ancient India that the major philosophical schools were developed. It comprised of the Samkhya, Yoga, Nyaya, Vaishesika, Mimansa, and Vedanta which together and collectively explores the principles of metaphysics, logic, epistemology, and reality. Ancient India also made significant contribution in science and technology such as in the field of mathematics and astronomy. Indigenous scholars like Aryabhata, Brahmagupta had developed numerical systems, algebra and also astronomical calculations. Ancient texts such as Charaka Samhita and Sushruta Samhita also contributed to Ayurveda through comprehensive system of medicinal practices and surgery. Ancient India also contributed to linguistic science through Panini's Ashtadhyayi which lay foundation to systematic grammar. Further, in the field of architecture, art and performance, ancient India had been guided by treatises like Vastu Shastra and Natya Shastra. The present work is a humble attempt to highlight the importance of IKS and its relevance in contemporary times.

***KEYWORDS**: IKS, Philosophy, Vedas, Vedangas, Shastras, Ayurveda, Astronomy, Linguistics*

INTRODUCTION

Indian Knowledge System (IKS) represents vast and diverse corpus of knowledge traditions that had been evolving and sustaining in India for millenia (Bordoloi, 2024, p.1). From the ancient texts such as the Vedas, Vedangas, and various shastras, IKS encompasses a holistic and interdisciplinary intellectual tradition in the field of philosophy, science and technology, medicine, mathematics, art and architecture, etc. Each of the discipline had contributed to the development and understanding of human life. These ancient Indian Knowledge System had been passing down through generation via oral tradition and also in a wide range of ancient texts, scriptures, and practices (Ibid.).

Fig 1: Diagrammatic representation of the broad components of Indian Knowledge System (Bordoloi, 2024)



The central theme of the Indian Knowledge system is the notion that knowledge is not just a means of intellectual pursuit but it is also a way of life (Mahadevan, et.al., 2023). The ancient Indian knowledge was not limited to abstract ideas and theories but were significantly a practical approach. The knowledge system was aimed at developing the physical, mental, and spiritual well-being of the individual person and the society at large. In addition to the philosophical and spiritual aspects of IKS, it also represents practical application in health care such as Ayurveda and Yoga. In the realm of science and technology, IKS embodies mathematics, astronomy, metallurgy, architecture, and the like. Ancient Indian civilisation is also renowned all over the world for the invention of zero, the invention of the decimal system in numbering which has helped in advance mathematical calculations. In the field of astronomy, the heliocentric models and advance planetary calculations were all gifts of India to the world. In medical science, the earliest form of surgery was recorded in ancient texts Sushruta

Samhita and Ayurveda which is an ancient health care practice. The large corpus of literary texts such as the Vedas, Upanishads, Puranas and Shastras were storehouse of ancient wisdom and knowledge traditions.

Thescope of ancient Indian Knowledge System can be broadly organised into:

1. **Philosophical Foundations:**IKS explores the fundamental nature of existence, consciousness and the Universe. The core doctrines include Samkhya, Yoga, Nyaya, Vaisheshika, Mimamsa, Vedanta (Sharma, 2005, p.276). Each of these philosophies corresponds to principle of metaphysics, logic, epistemology, and the concept of reality.
2. **Science and Technology in Ancient India:** Ancient Indian Knowledge System explores innovation in Mathematics, astronomy, metallurgy, and engineering (Ibid., p. 310).
3. **Health and Well- being:** It corresponds to the holistic health practice system in ancient India where the mind and the body are balanced. It includes Ayurveda, Yoga, and surgical practice in Sushruta Samhita.
4. **Arts, Architecture, and Aesthetics:** Classical music, dance, sculpture, painting, and drama. Ancient texts such as Vastu Shastra, Natya Shastra corresponds to these knowledge traditions.
5. **Language and Linguistics:** It includes the study of grammar, phonetics, and the structure of language with an emphasis on Sanskrit and other classical languages. Key texts include Panini's Ashtadhyayi.

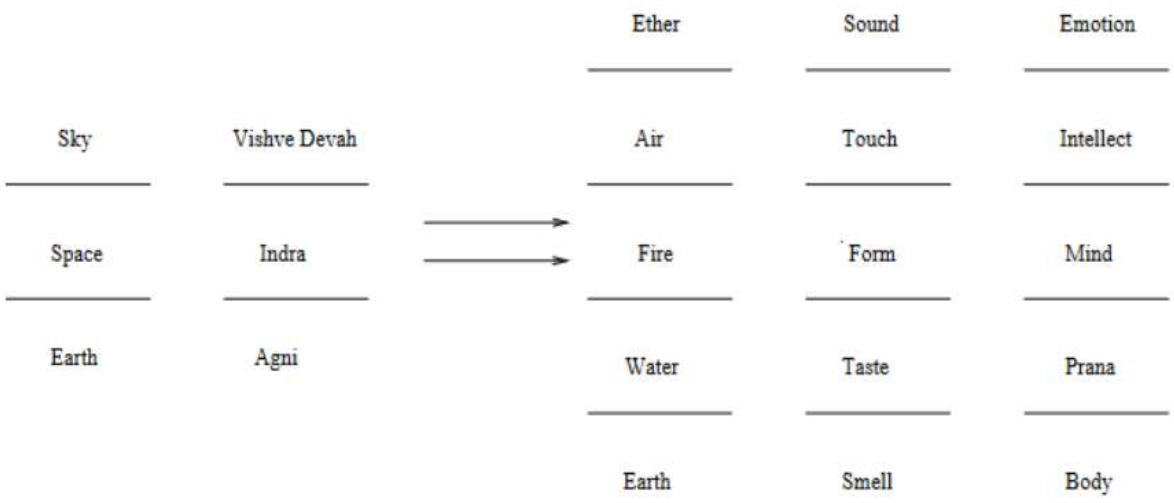
VEDAS AND VEDANGAS: THE CORE OF INDIAN KNOWLEDGE SYSTEM

Vedas come from the root vid literal meaning is 'to know' or knowledge (Singh, 2009, p.17; Srivastava & Srivastava, 2023. P. 896).The Vedas comprised the Rig Veda, Yajur Veda, Sama Veda, and Atharva Veda. Each of the Veda has four parts the Samhita, Brahmana, Aranyaka, and Upanishad. The Vedas constituted the core of the Indian Knowledge system andthe source of eternal knowledge. They are considered to embody the eternal, self-existence truth which had been realised by the rishis (seers) in a state of meditation or which have been revealed to them by the Gods (Singh, 2009). Scholar such as Mahadevan (2023) had highlighted that the Vedas primary function is to provide knowledge of the nature and various aspect of the universe, the role of humans and the path to spiritual liberation. These components of the Vedas are viewed as storehouse of ancient wisdom and knowledge that spans a wide array of domains form ritualistic practice, ethical code of conduct, philosophy and metaphysics. The Vedic rituals, hymns, and philosophical discussions reflect a vision of reality where humans must align themselves with the natural and cosmic order. According to the Vedas, the human body is made up of five core elements namely, Ether (Sky), Air, Fire, Water and Earth.

Interestingly, these core elements are related to the celestial Gods. These elements of nature correspond to the five senses of the human body. They are smell, taste, touch, sound and form. These further relates to the

human psychological needs such as emotions, intellect, mind and body (Subhash, 2005).The composition of the Vedas had been dated to 1500-1000 BCE (Singh, 2009), p. 18). The Upavedas which literally translates to sub-Veda or applied knowledge refers to the auxiliary discipline derived from the Vedas. These texts consist of science, arts, medicine, and ethical code of conducts. The four primary Upavedas are Ayurveda (medicine), Dhanurveda (Warfare), Gandharvaveda (arts), and Sthapatyaveda/Vastu Shastra (architecture). The Upavedas unlike the spiritually enrich texts such as the Sruti of the Vedasfocus on the worldy science, skills and technical knowledge.

Fig 2: The relation of the elements with the human body according to the Vedas (Srivastava & Srivastava, 2023)



The Vedangas (limbs of the Vedas) which are a supplementary texts aids in the proper recitation, use and understanding of the Vedas. The components of the Vedangas includePhonetics (shiksha), metre (chhanda), grammar (vyakarana), etymology (nirukta), ritual (kalpa), and astronomy (jyotisha). The period of their composition is assigned to 600-200 BCE (Singh, 2009, p. 18).Scholars such as Mahadevan discusses how these six components of the Vedangas function to preserved the accuracy, integrity and the proper understanding of the Vedic texts (Bordoloi, 2024, p. 56).

The component of the Vedangas;

1. **Shiksa:** It represents the phonetics which aids in the pronunciation of various Vedic mantras. It is an important component for maintaining cosmic order.

2. **Kalpa:** This limb of the Vedas comprised the study of the rituals including sacrifices which are prescribed by the Vedas. The Kalpa Sutras form the foundation of Vedic rituals, and their efficient execution is believed to maintain universal harmony.
3. **Vyakarana:** Grammar occupies an important role for correctly interpreting the language of the Vedas. Without the deep understanding of the grammar, one cannot fully comprehend the spiritual and philosophical aspects of the Vedas.
4. **Nirukta:**Etymology is another limb of the Vedas. It aids decoding the layered concepts of the Vedic words. It allows to decode the deeper, often hiddensignificant meaning of the Vedic words.
5. **Chandas:** It is considered that the meter and rhythm of the Vedic hymns are of paramount importance. The rhythmic pattern or sequence of the Vedas are believed to have metaphysical effects which have a direct impact on the spiritual world.
6. **Jyotisha:**This last limb of the Vedas deals on astronomy and astrology. It not only concerned with celestial phenomena but also has ritualistic significance and the auspicious timing of events. The position of the stars and the planets have a direct correlation with the success of the Vedic rites and rituals (Bordoloi, 2024, p. 57).

The Vedas and Vedangas provide a holistic framework of knowledge that guides the spiritual practices. It also underscores a broader system of education, ethics, and science in ancient India. Scholar such as Mahadevan (2023) and many others have argued that these disciplines have a deep interconnection with the Indian Knowledge System where spiritual wisdom is vividly connected with practical applications. The Vedas have influenced not only in understanding the spiritual realm but also appreciating ancient wisdom that shaped modern knowledge system and practices. Vedas are today increasingly recognised globally for their comprehensive insights into the field of physics, mathematics, logic, and other areas of knowledges (Subhash, 2005).

PHILOSOPHICAL FOUNDATIONS OF IKS

At the centre of Indian Knowledge System lies the core philosophical foundation. In ancient India, life of an individual was conceptualised into four goals. These four goals of life were dharma, artha, kama, and moksha (Singh, 2009; Sharma, 2005, p. 276).Dharma symbolised moral order or ethical code of conduct, artha symbolised material or economic well-being, kama symbolised desire or sensual pleasure, and moksha symbolised liberation from the cycle of birth and death. These fourfold goals in an individual life structured both personal and social life providing ethical and practical guidance. In ancient Indian society, moksha or liberation from the cycle of birth and death became the core components of philosophical inquiry. This ultimately led to the evolution of six

prominent schools of thought. These schools of philosophical thought comprised of Samkhya, Yoga, Nyaya, Vaisheshika, Mimansa, and Vedanta (Sharma, 2005; Bordoloi, 2024; Yadav, 2024).

1. **Samkhya:** One of theforemost philosophical traditions was the Samkhya school of thought (Biswas & Prakash, 2022, p. 289). It was the most systematic philosophical tradition representing a dualistic fundamental reality comprising of prakriti (nature or matter) and purusha (spirit or consciousness) (Sharma, 2005, p. 276). The universe evolved through interaction of these two fundamental principles without the need for a divine creator. In the beginning the school provides a rational and materialistic interpretation of the world. Interestingly, later developments incorporated spiritual aspect also. In the Samkhya school of thought, liberation is attained through true knowledge and freeing the individual self from material entanglement.According to scholars such as Biswas & Prakash (2022), the Samkhya philosophy also incorporates modern ecological thought thereby representing the worldview where humans were not masters of nature or environment but a constituent of it and ethical self-restraint is the only goal to environmental sustainability.
2. **Yoga:**Yogais animportant component of the Indian Knowledge System (IKS). It combined physical, mental, and spiritual aspects of the human body for the overall wellbeing of the individual. The Yoga Sutra of Patanjali outlined the core components of Yoga and its holistic approach that integrated body, breath, mind, and discipline (Tiwari, 2023). The practice of Yoga through its different physical postures (asanas), controlled breathing exercise (pranayama), meditation (dhyana), and ethical practice (anusasana) provided holistic path to development of body strength, balance, inner stillness and self-realisation. The practice of Yoga also lies in the control of pleasure, the senses and bodily organs (Sharma, 2005, p. 277). The ultimate goal of Yoga is to balance the mind and body and realised true nature of the self. The philosophy of the Yoga highlights the experiential dimension where knowledge is realised through physical practice and not merely through theoretical aspects.
3. **Nyaya:** The Nyaya philosophy represents the logical and epistemological tradition in ancient Indian philosophy. The primary objective is to acquire valid knowledge (pramana) which is characterised by perception, inference, comparison, and testimony.

   The Nyaya philosophy developed an efficient method of reasoning and argumentation. It has contributed immensely in the development of logic in ancient India (Sharma, 2005, p. 277).According to Nyaya philosophy, correct or right knowledge to liberation can be obtained from rigorous analysis and critical inquiry. The emphasis laid down by the Nyaya philosophy on rationality and systematic thought reflects scientific temper of the Indian philosophical system.

4. **Vaisheshika:** It deals with metaphysics and the nature of reality. This philosophical school compliments the earlier Nyaya philosophy. The corephilosophy of the Vaisheshika school was that the universe is composed of fundamental particle called paramanu. Parmanu or atom is the small particle known to man. This concept is relevant to the later discovery atomic theory. This school sees reality into distinct elements comprising of substance, quality, motion, and universe. It highlights detailed approach to the understanding of the material world. This philosophical school had contributed in the advancement of science and technology in ancient India.
5. **Mimamsa:**The philosophical schools represent the art of reasoning and interpretation. It was predominantly engaged with the interpretation of the Vedas and ritual rites. The school emphasised that the ancient Indian texts such as the Vedas is infallible and had eternal truths. It also emphasized on correct ritual actions to achieved the desired goals in life which included liberation form the cycle of birth and death.The Mimamsa philosophical school placed less importance on metaphysic and emphasised more on practical engagement with the Vedic texts and its interpretations. This approach helps in fostering Brahmanical society in ancient India.
6. **Vedanta:** This philosophical school largely relied on the teachings of the Upanishads. Vedanta literally means the end of Vedas (Sharma, 2005, p. 278). The Vedanta philosophical school describes the relationship between Brahma (reality) and atman (self). It underscores that the two brahma and atma are real and everything else was unreal (maya). In the words of Shankara the world is an illusion (maya) and true knowledge (jnana) can be attained through the understanding of the self. According to Ramanuja the path to salvation was though devotion (bhakti). The Vedanta philosophical school integrates metaphysical inquiry with spiritual practice. It offers a comprehensive vision of reality and human existence.

Apart from the six philosophical schools mentioned above which largely represents spiritualistic and idealistic systems, the Charvaka or Lokayata philosophical school underscores a materialistic outlook in life. This school challenged the dominant authority of Vedas. It denied the presences of an afterlife and emphasised on the direct perception as the most authentic source of knowledge. The Charvaka school emphasised on the material world and human experience.

ANCIENT INDIA IN SCIENCE AND TECHNOLOGY

Ancient Indian Knowledge System were also known for their contribution in the field of science and technology. Great advancements were made in the discipline such as mathematics, astronomy, and metallurgy (Bordoloi, 2024, p. 105). From the ancient texts of the Vedas which contained not only the ritual aspects but also explored the mechanics of sound and energy, to the Sulba Sutras which laid the foundation of geometry and mathematics,

ancient India scientific contributions were vast and immense. It is ancient India that have invented the concept of zero and the decimal system in mathematics. These inventions have revolutionised mathematics and the future of global computing that we see today.Ancient Indian scholars such as Aryabhata, Brahmagupta, and Bhaskara have pioneered in the field of algebra, trigonometry, and calculus long before its appearance in other civilizations. In the field of astronomy, ancient Indian civilization went beyond the observation of the celestial movements. Important ancient Indian scholars such as Aryabhata and Nilakantha Somayaji had studied and understand the dynamics of planetary system, calculation of the eclipse with remarkable precisions and also have contributed theories regarding the rotation of the Earth.Astronomy is not to be confused with astrology, which assumes that people's destiny and human affairs in general are correlated to the apparent positions of astronomical objects in the sky.Although the two fields share a common origin, they are quite different. Astronomers embrace the scientific method, while astrologers do not (Hartley, 1998, p. 12).Ancient Indian texts which contributed immensely in the field of astronomy were Aryabhatiya and Surya Siddhanta. They became reference point for future global astronomical studies. In the science of metallurgy, ancient India showcase a symbol of technological brilliance. The Iron Pillar of Delhi, resists corrosion event after centuries. It had stood the test of time and showcased a perfect blend of science and artistry. Also, ancient India had the knowledge of advanced Zinc extraction technique form its ores. These technological breakthroughs had led to large scale trade and commerce in the globally.

Some lists of ancient India's scientific achievements and global contributions:

1. **The Binary Numerical System:** Ancient Indian scholarPingala introduced the concept of binary numbers in his work Chandahuastra. The use of long and short syllable is remarkably similar to todays Moore's code, which laid the groundwork for binary language in the modern global computing.
2. **Zero- The Gift of Infinity:** The invention of zeroby Aryabhata had enabled advanced calculations and representation of large numbers. According to A.L Basham, the world owes a great deal to ancient India in the field of mathematics.
3. **Atomic Theory:** Acharya Kanad discovered the existence of tiny indivisible particle or Anu. These can be said of the atom which is the smallest particle long before the coming of John Dalton atomic theory.
4. **Heliocentric Theory and Astronomy:**Heliocentric model proposed that the Earth rotates on its axis and the revolves round the Sun. This theory had been coined by ancient Indian scholar Aryabhata. Similarly, Nilakantha Somayaji also proposed advanced planetary theories that predated Copernicus models.
5. **Concept of Gravity:**Ancient Indian mathematicians like Varahamihira and Brahmagupta had conceptualised gravitational force long before its discovery by Newton. These Indian scholars had

proposed that unseen forces govern the motion of celestial objects like the Sun, planets, etc and kept objects grounded on the Earth.

6. **Science of metallurgy:** Metalworking in ancient India showcase technological innovation, scientific knowledge, and artistic ingenuity. The construction of Iron Pillar of Delhi had stood the test of time.

HISTORY OF TRADITIONAL MEDICINE IN ANCIENT INDIA

The ancient Indian physicians studied anatomy. They devised methods to diagnose diseases and prescribed medicines for their cure. In the earliest texts of Arthava Veda, there was evidence of medical practice but this was replete with magical charms and rituals and could not be established true scientific lines (R.S. Sharma, 2012). Various ancient Indian texts, such as Rig Veda (1700-11—BCE), Yajur Veda (1400- 1000 BCE), and Atharva Veda (1200 BCE) had highlighted on the traditional medicinal and healing practices. In addition, the Atharva Veda also contained many charms and rituals to ward of negative or evil forces and it also recommended amulets to defend from such negative forces. Later, the manuscripts such as "Charaka Samhita" (990 BCE), "Sushruta Samhita" (660 BCE), and "Dhanwantari Nighantu" (1800 CE), where the use of plants and poly herbal formulations was emphasized and widely practiced (Kumar B, 2007).

Ayurveda: Ayurveda literally symbolised "the Science of Life" where 'ayur' means life and 'Veda' means knowledge. Ayurveda as ancient medical health care practice allows for harmony of the body and mind and the understanding of the illness (Prasad, 2002). At the foremost, its origin can be traced to Vedic corpus which comprised of the Rig Veda and Atharva Veda. The practice associated with the science of Ayurveda had been codified in ancient India around 2500- 500 BCE (Mukherjee, 2017). In Ayurveda, the treatment of patient was holistic comprising of the whole body and mind rather than just targeting the disease or illness. It also advocates awareness of healthy lifestyle, preventive measures, and also quality of life (Singh, 2008); Mukherjee, 2017).

In Ayurveda, the human body is composed of seven fundamental tissues. It comprised of Dhatus or Rasa, Rakta, Mamsa, Meda, Asthi, Majja, and Shukra. The function of these tissues was influence by five key elements of nature which comprised of earth, water, fire, air, and ether. It is also governed by three functional energies or dohas comprising of vata, pitta and kapha. It was believed that diseases or illness arouse form the chaos and imbalance of the elements mentioned above with the doshas or functional energies. The treatment was usually personalised and holistic (Lad, 2002; Mukherjee, 2006).

The functional perspective of the science of Ayurveda is predominantly derived from Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya. The Charaka Samhita of Acharya Charaka primarily focuses on internal medicine, management of individual lifestyle and also ethical code of conduct. The Sushruta Samhita of Acharya

Sushruta deals with surgery and its associated techniques and anatomy. Sushruta was also called as "Father of Surgery." The Ashtanga Hridaya of Vagbhata which refined and integrated the teaching of Charaka and Sushruta. These ancient Indian texts had preserved the traditional medical knowledge of observation, practice, and codifications. They collectively formed the foundation of Ayurveda.

The practice of Ayurveda integrates pharmacological treatment with that of preventive measures. The pharmacological components comprised of poly-herbal formulations using extracts from plants, minerals, and animal products. The preventive components of Ayurveda consist of daily practice (dinacharya) and seasonal practice (ritucharya), dietary practice, physical exercise such as yoga, and meditation. In addition to the above practice, another approach in Ayurveda known as Panchakarma therapies detoxifies and rejuvenates the body and mind. Another approach of Ayurveda is on personalised medicine where treatment comprised of prakriti (individual constitution), climatic factor, lifestyle and seasons. These practices are reflected in modern medical science as precision health care.

The Ayurvedic medicine of ancient India were numerous and some of popular herbal medicine includes ashwahangha (Withania somnifera), triphala, tulsi (Ocimum sanctum), guduchi (Tinospora cordifolia), and neem (Azadirachia indica). These herbal plants were known for their immunomodulatory, anti-inflammatory, and also adaptogenic properties. Today, these plant medicines are considered as an important Ayurvedic intervention in the treatment of oncology, diabetes, hepatic treatment, and mental health.

Ayurveda which is an important component of the Indian Knowledge System has its relevance today due to its adaptive role, philosophical underpinnings, and ecological concerns. The science of Ayurveda advocates sustainable use of medicinal plants, biodiversity conservation and holistic approach to human-nature dynamics. These approach in health care practice in ancient India is particularly relevant today where we face ecological and healthcare challenges. The Indian Knowledge system of Ayurveda is not a relic of the past but today it is a solution to the modern health care practice, and public health policy.

CONCLUSION

In conclusion, the Indian Knowledge System represents a holistic understanding of the ancient India's Past. It seamlessly integrates different intellectual disciplines such as philosophy, science and technology, and ethical conducts into one singular entity thereby transforming the overall human body and mind. In addition to these, ancient Indian civilisation made significant strides in the field of mathematics, medicine, astronomy, and linguistics which reminds us of the sophisticated and rational intellectual traditions. Further, the Indian Knowledge System or traditional Knowledge System have a significant role to play in areas of sustainability,

ethical practice, and spiritual realisation in the contemporary modern era. Thus, the realisation and revival of Indian knowledge System can help in providing a balanced and sustainable framework for modern developmentcontributing not only to national progress but also to global well-being.

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