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AYURVEDA: A WAY OF SUSTAINABILITY

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ABSTRACT

Ayurveda is not only a treatment regime as considered in general but it gives us a way of life with sustainable health by moderating our life styles to. Ayurveda have a lot of saying for ecological sustainability. In an era where devastating impact of Pharmaceutical Industries, Cosmetic and even processed food to routine oral hygiene are being observed, Ayurveda have a promising alternatives. This article is to explore the way of life, alternatives Ayurveda have, and way of sustainability Ayurveda provides to the world.

INTRODUCTION

As per article (2) of convention text of Convention on Biodiversity, Biological diversity means the variability among living organism from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystem.[1]

India is one of the recognised megadiverse country of world, situated in tri-junction of Afro-tropical, Indo-Malayan and Paleo-Arctic realm, having wide array of ecosystems and habitats. India geographical extent is limited to mere 2.4% of the geographical area of the world, but harbours nearly 8% of the globally known floral and faunal species.[2] The mother Earth, as described in traditional Indian School of thinking is an active and inter-dependent mechanism of millions of living and non-living organism, and ideally a closed system like a family whose members are assigned to perform their duties in a coherent manner, and imprint of the action of each and every member inter alia works as feeder in the chain of relation. In broad terms the whole earth is a closed system at first instance taking insolation from the god(star) Sun, and radiating the energy back after maintaining heat budget of the whole

system, which drive the whole mechanism on the earth. The traditional Indian school of thinking further extends this definition to the non living organism, like Jain School of Indian thinking clearly stipulates that a level of consciousness is present everywhere, in stratified manner.

History of Indian sub-continent is very rich, not only in terms of the human history, but in terms of geological as well as biological history. In simple terms if anyone chose to travel from Bengaluru to Jammu by road, just a distance of 2700kms, we will traverse more than 3 billions of Earth's history.[3] In fact southern plateau of Indian subcontinent is a part of ancient Gondwana land, i.e. southern part of the pangaean super continent, formed somewhere about 3 billion years ago, while northern part is very new formation and result of plate tectonic activity between two major plates of Earth. The study of Keonjhar paleosols (Ancient soil formation) reveals that this quartzy soil layer was formed somewhere before 3 billion years ago and provides important chemical evidence of the processes that took place on Earth as oxygen was making its first appearance.[4] Around this times a new type of organism called 'aerobes' emerged, and exploitation of oxygen began first for the breath of life. The movement of Indian plates towards Eurasian plates, and formation of Himalayas gives unique feature to the Indian subcontinent in terms of the ecological & biological diversity.

Since start of the colonial era, Indian biological resources is gone through a phase of super exploitation as knitting of traditional and sound relationship of interdependence between human habitat and local biological resources has been destructed in planned way. The diverse forests have been uprooted and nursery plantation has been done for fulfilling the demands of timber. Now a day, a number of fauna and flora is at the edge of extinction. And now, Species have been disappearing at 50-100 times the natural rate, and this is predicted to rise dramatically. Based on current trends, an estimated 34,000 plant and 5,200 animal species – including one in eight of the world's bird species – face extinction.[5] While the loss of individual species catches our attention, it is the fragmentation, degradation, and outright loss of forests, wetlands, coral reefs, and other ecosystems that poses the gravest threat to biological diversity.

Now it's time to think about the same in terms of the following texts "despite all our technological advances we are completely dependent on healthy and vibrant ecosystems for our water, food, medicines, clothes, fuel, shelter and energy, just to name a few". During the

time of pandemic United Nation, declare the theme of IDB, 2020 as "Our Solutions are in nature", which emphasises hope, solidarity and the importance of working together at all levels to build a future of life in harmony with nature.

Ayurveda as an ancient regime of health, knit the human wellbeing prospectively with the wellbeing of the nature as a whole. The basic principle and approach of the Ayurveda is to make a systematic coherence between the tridosha of human body as well as natural world. The various concepts described in Ayurvedic classical text, as well as inherited from traditional knowledge give us opportunities for panoramic views of our ancient thinkers and researchers. The concept like Desha, various types of vegetations and quality thereof, soils and there inter-relations with the fauna & flora, even the ritucharya, and dincharya prescribed for human wellbeing is clearly aimed to establish a coherence between human body and mechanism of the outer world. Now, in the ongoing Para we are going to discuss some of the important concepts as described in classical Ayurvedic text in terms of modern concept, where ever is feasible, and what Ayurveda can give to the world apart from exclusive medicinal values.

Concept of Desha and modern climatic region according to thornthwaite

Charak samhita in kalpsthanam described the three main and broader categorisation of the Desha.

1. Jangal Desha (Mostly arid/semi arid region):- According to the Charak main characteristics of the Jangal desha is there open and clear sky, visualisation of mirage on the surface, and dry, rough and sandy appearance of the soil surfaces.
2. Anup Desha (Humid/pre humid region):- The rivers originated from this country are flows to the ocean, presence of the fresh wind is the main characteristics of this desha. This is super rich desha in terms of the biological diversity.
3. Jangal Sadharan Desha (Dry sub humid/humid region):- Mixture of the above types, having aridity as prime elements.
4. Anup Sadharan Desha: Mixture of the above types, having humidity as prime elements.

In modern terminology the concept of Desha could be interlinked with the climatic region of the India. India climatic division has been made on several approaches and models. But one which suited more for the above is climatic categorization based on the Thornthwaite classification, which used the Aridity Index in the above classification.

$$AI = \frac{PE-AE}{PE} * 100$$

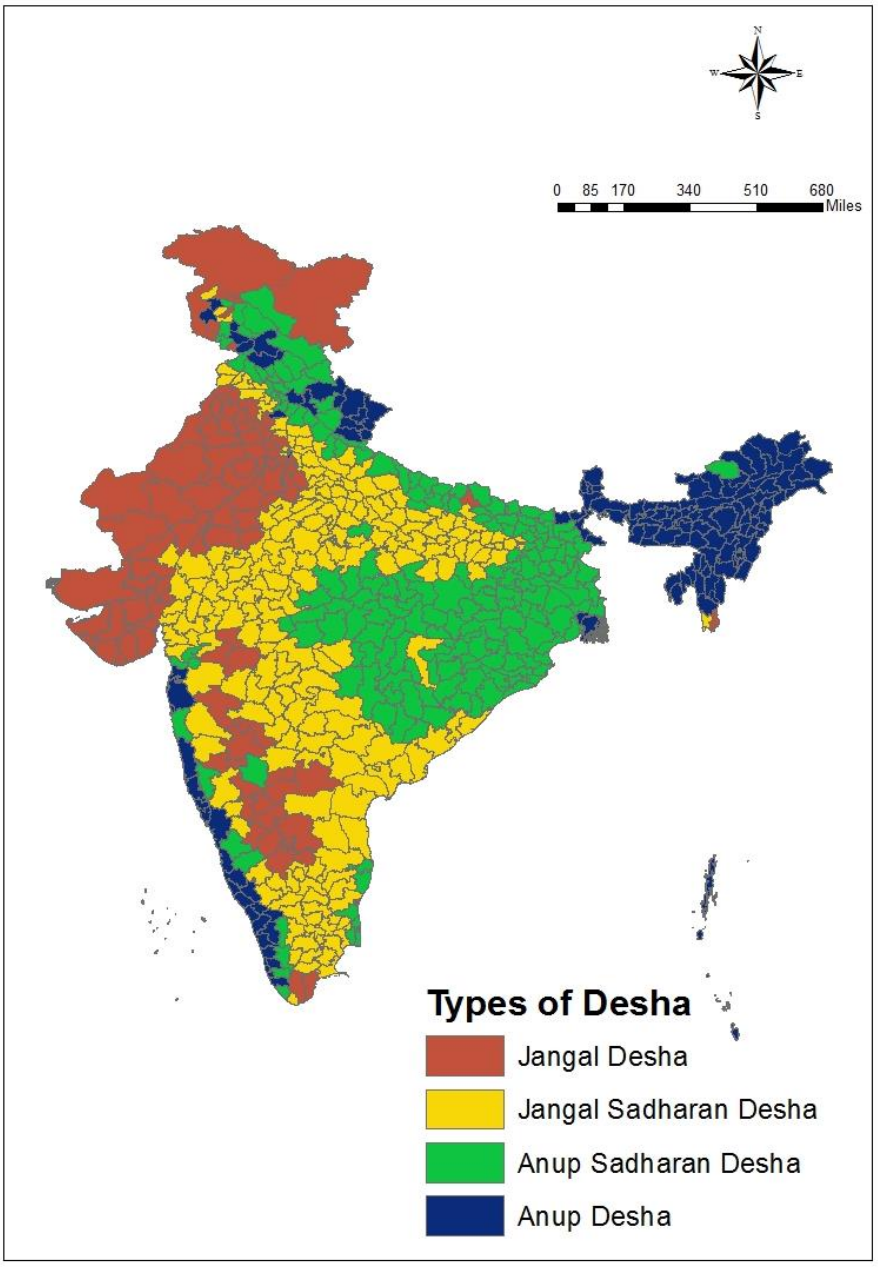
PE denotes the water need of the plants (which is called potential evapotranspiration). AE denotes the actual evapotranspiration and (PE-AE) denotes the water deficit. PE is computed by Penman's equation. AE is obtained from the water balance procedure which takes into account the water holding capacity of the soil at the place.

According to this procedure, rainfall is first utilized by the plants for evapotranspiration purpose. When the evapotranspirative demands of the plants are fully met (as given by PE) the excess amount of rainfall percolates and recharge the soil. This soil moisture recharge continues till the soil reaches its field capacity. Any excess amount of rainfall after the evapotranspirative demands are fully met and the soil is recharged completely is considered as water surplus and goes as surface or deep drainage runoff. When the rainfall is less than the evapotranspirative demands, the plant extracts moisture from the soil till the soil is dessicated of its moisture.[6]

According to a study by Richa Ojha[7,8] at el the Ayurvedic Desh Kalpna could be mapped using modern techniques as follow:

Table 1.

Value of MI	*Desha* Classifications	*Remarks*
<-55	*Jangal Desha (Hyper Arid/Arid Area/Dry Semi Arid)*	*Since Aridity is the primary attributes of the Jangal Desha, and relative degree of MI implicates non availability of water in Soils.*
-55 - -26	*Jangal Pradhan Sadharan Desha (Wet Semi Arid Area)*	*This range however having Aridity in great extent, but some degree of Moisture is available with higher degree of seasonal variability. In normal Sense it would be a Sadharan Desha, with attributes of Jangal Desha as primary components.*
-25 - 20	*AnupPradhan Sadharan Desha (Dry/Wet Sub-Humid)*	*Having Mixture of attributes while a good degree of humidity surplus is available.*
>20	*Anupa Desha (Humid/Very Humid)*	*Humidity surplus is available.*



Concept of Janpadodhwans & needs to emphasise balance of ecosystem

Today's environmental and even problems related to bio degradation is caused mainly by the over consumption of human population. In Charak Vimana sthan(5/24) it has been stipulated that "after Krityuga, people having access to resources was involved in over consumption, which leads to the corpulent and deformed body structure and originates subsequently into the diseases." You may just look into the consumption trends of the humans and co-relate it to the catastrophic effects like climate change, loss of bio-diversity, coral bleaching, and un-predictable rain and drought cycles.

In the Janpadodhwans prakaran, various characteristics of dhwans(Ruin) Space, Air, water & time has been elaborated. Characteristics of dhwans Jal, Desh & Kal contains several descriptions as like increase in population of certain types of species in a imbalanced way, migration of fish and other creature from water (which generally happens when water BOD level gone to a catastrophic mark), where dogs are barking in a random ways, where birds are dying in un natural ways, etc., which elaborates the general visible sign which can be noticed when natural cycles are not in equilibrium.

The concept of Janapadosdhwans as elaborated in Charak samhita, viman sthan having unique things in describing the concept that when the equilibrium of "Vat (Air), Jal (Water), Desh (Space), Kala (Time)" disturbed the country will lead to a catastrophic effect. Basically this advocates equilibrium of a whole ecological cycle of the country. Which will be disturbed either by a wrong policy of a state, Kings or sinful act done by the civilians of the state. What inhibits this sinful act? Charak samhita is very clear in describing the same. One of the reasons is that doing the act not as per the 'dharma'. 'Dharma' in Indian school of thought is a broader concept, which go very apart from the religion itself, as it is related to general duties of a human being to follow a path of love, compassion, and to enhance the general wellbeing. The war is another sin which result into the Janpadodhwans, is the same is derived from the greed of power, property or any earthly things.

It has to be noted that in Indian school of thinking advocate 'sadvrit' like kindness towards any living creatures, maintaining peace, maintaining 'Bramhcharya' (in broader perspective it has different meaning than celibacy, it's include curtailment of any types of greed) as a part of dharma. This is also way out to the Janpadodhwans. But Ayurveda advocates that "prevention is always better than cure". So it is of utmost importance to the society that the equilibrium of ecosystem should always be maintained, i.e. "needs to emphasise balance of the ecosystem."

Ritucharya & Dincharya a classic example of a life style management in coherence with the nature

With seasonal variation, variation is evident in the environment we live in. We see various changes in whole living & non living organism around us, such as flowering in spring and leaf-shedding in autumn in the plants, hibernation of many animals with the coming of winter, and so on. As we are also part of the same ecology, the body is greatly influenced by external environment. The same is also advocated by the core philosophy of Ayurveda, As

outer prakriti have same doshaj and mahabhuta, which our body consist, many of the exogenous and endogenous rhythm have specific phase relationship with each other; which means that they interact and synchronize each other. If body is unable to adopt itself to stressors due to changes in specific traits of seasons, it may lead to *Dosha Vaishamya*, which in turn may render the body highly susceptible to one or other kinds of disorders.[12]

Ayurvedic classic text has establish a way out to maintain the balance between seasonal diurnal variation and our body, on the core idea that "यत् पिण्डे, तत् लोके", i.e. whatever there is in environment also in the human body. The same concept of do's & do not is known as Ritucharya & Dincharya in Ayurveda.

Then what is the importance of the ritucharya or dincharya? The basic ideology of Ayurveda is that, to maintain the coherence of your daily routine and food regime in accordance to diurnal and seasonal variation in the environmental parameters and to maintain a healthy coherence among all. Analysis and description of the dosha and routine to be followed is beyond the scope of this paper. But we should emphasize that always listen to the nature, and maintain a healthy life, i.e. "प्रकृतिमभीक्ष्नं स्मरेत" च॰सू॰ 8/27, should be always kept in mind.

Collection of Aushad dravya/edible substances in accordance to the Ayurvedic principle, do not disturb the cycle of nature

Ayurveda emphasises on the collection of aushadha dravya from the native medicinal plants with minimum possible interruption in their natural life cycle. In accordance to the Charak Kalpa Sthan the following thumb rule should be followed while collecting aushadh dravya from different parts of the medicinal plants:-

Table 02:

Sr. No.	Parts to be collected	Season in which collection should be appropriated
1.	Roots	Shishir, Summer
2.	Branch, Leaf	Autumn, During Monsoon
3.	Skin, Tubers, Gum(Ksheer)	Sharad (After Monsoon season)
4.	Kernel(Sar)	Hemant

Classical Ayurvedic texts also inhibit the thumb rule for collection of edible substances from the nature. The few of them is as numerated in table-02.

Table 03:

Sr. No.	Edible substance	Thumb Rule
1.	Fruit	Except Quince, all fruits should be collected while fully ripped. Over ripped, un seasonal fruit, worm fruit and un ripped fruit should not be collected for consumption.
2.	Vegetables	Hard, over ripped, worm vegetables, vegetables grown on a barred/degraded land, un seasonal, dried vegetables should not be collected and consumed.
3.	Tubers	Un ripped, un seasonal, wormed tubers should not be collected.
4.	Cereals	Cereals affected from cold, heat, fire, polluted air, grown on infected land from the venomous saliva of snake etc, un seasonally ripped should not be collected for consumption.

Above texts clearly inhibits rules for consumption and collection of edible substances and aushadha dravya, which stipulate that un ripped, un grown, un seasonal foods and cereals, should not be collected and consumed. This echo into the minimum human foot prints on ecosystem while deriving there required inputs from there. The season for different part of the plants stipulate that the parts of the plants should be extracted while nature produces them in excess to meet requirement of other lives of the system.

Sushrut Sutra Sthan (37/10) stipulates that all medicinal plants substance inhibits their natural potency while being Kshiryukt (full of latex) & Rasyukta, that is ripped in natural manner. The importance of native knowledge is pointed in just next Shloka of the text.

The main concept of the Ayurved is to not disturb the natural cycle while taking your parts from the nature. This is of utmost importance in present scenario where human consumption foot print have rise exponentially after industrial revolution. In simplest terms Health sector in its own share a large stake of destruction of natural resources, and threatening of the biodiversity. The U.S. health care system contributes to 10% of carbon emission, 9% of other harmful emission at national level.[8] If we extrapolate the same on universal level our health sector impact could be drastic, keeping in the view that 16% of all deaths are associated to air pollution alone. The spirits of Ayurvedic texts have a lot to contribute in this drastic scenario, and the spirits of Ayurveda in simple terms is "**do not disturb the nature**."

Administration of drugs and treatment regime, "Our solution are in the nature": Ayurveda have unique concept of Daravya (~substance), Guna (~attribute), Rasa (~Taste), Prakriti (~somatic constitution), Kala (~time), Stratos (~structural or functional channels), and Agni (~digestive/metabolic factors) as regulators of metabolism and the same has a good

degree of implications in the managements of malnourishment and various metabolic disorders.[16] The eco-friendly drug processing method employed in Ayurveda often contribute to the reduction of environmental impact by minimizing waste generation and energy consumption in production of drug formulation.[17] Basically Ayurveda proposes a holistic approach to medicine, based upon the balance between different energies and forces in the body, taking into the account of influence of the mind.[18] Ayurveda have an unique concept of Naishtiki Chikitsa (~treatment protocol for excessive desire) which advocate that Upadha (~Desire) is the root cause of all the miseries and sacrifice of all Upadha (~Desire) are treatment for the miseries. Liberation from the miseries is called Nishtha and to attain the same one have to attain the distance from Upadha. Similarly accumulated Upadha cause sense of multiplying attachments with material objects, and same is being defined as Pravritti in Ayurveda. In Ayurveda it has been defined that Nivrutti (~detachment) is the best way to attain salvation. The same is being used as treatment regimen by the Ayurvedic Physician.[19] Sage Charaka prescribed for Ahara (~diet), Vihara (~pattern of social relations, consumptions, entertainment and dressing sense) in accordance to the Guna (~attributes/properties) of space and time and his own body properties.[20] Sage Shushruta well said that imbalanced diet definitely cause decay of strength and inner complexion. People who consumes with greed will definitely attract decease to himself.[21] Definitely Ayurveda advocates for the moderation in our consumption habit, social relation and entertainment and even in dressing pattern with regards to the environment for well being for not only our inner health but for sustainability of our ecosystem to. Ayurveda have its motto as ‘Our solutions are in nature’.

Extinction and over exploitation of medicinal plants, needs immediate attention

By using IUCN criteria, about 121 species have been recorded in the red data book of Indian plants from Himalayan Region; of these 17 are medicinal plants.[13] Red listed important medicinal plants species of India are 195 which contain certain drugs used in folk or traditional systems other than Ayurveda.[14]

The above data pose a threat to the vibrating ideals and sustenance of the Ayurveda. This invariably means that over exploitation is caused for the serving the interests of the business and not as per the ethics and paradigm of the Ayurveda, as most of the Red list contains extinction due to the over exploitation. One of the study conducted by the IUCN, on mere 07 species resulted into the conclusion that India’s medicinal plants species are declining due to

over collection.[15]

The regime of Ayurveda is to take the nature in the limits to what its gives to us without any disturbance caused to the nature itself. However, in present scenario it is not always possible to follow the above ideal. This is a drastic situation and needs immediate attention of the stakeholders.

Burden of Cosmetics & Ayurvedic solutions

Gouin et al.[10] estimated that per capita consumption of micro-plastics from personal care products for the U.S. population is approximately 2.4mg. person^{-1} day^{-1}, so that the US population is emitting 263 tons.year^{-1} of polyethylene micro-plastics. Once in the environment, microbeads made of high density plastics settle out of the water column and accumulate in the sediment, while low density micro-plastics float on the sea surface and found their way to aquatic food chain. This has catastrophic effects not only on aquatic bio diversity but also adversely affecting the human lives in returns as well. Micro-plastic beads are not a single component of modern day cosmetic products which bothered with the bio-diversity and ecosystem, but there is a long list as like UV filters, parabens, triclosan, siloxanes, synthetic fragrance etc. Due to this effect and rising awareness there are a rising demands for the herbal cosmetics products. But what in returns, in returns companies are just selling the products with a tag line to be herbal or organic.

Here the real solution Ayurveda can provide. There are a long and proved way to protect not only your outer beauty, but also you inner one through Yoga, Rasayan Chikitsa, Herbs like turmeric and many more things. Some simple Rasayan Yoga given in different classic text can rejuvenate the cells and induced a good metabolism. Like consumption of plane water is also works as Rasayan Yoga, e.g. regular water intake before sunrise in morning, regular 8 prasrit water intake at the time of sunrise, and water intake through nasal at the end time of night without any cloud in the sky works as Rasayan yoga. At the same time any can use amlaki (Gooseberry) Rasayan, or trifala rasayan in accordance to the Ayurvedic paradigm with minimum ecological footprint. The uses of Rasayana have tremendous effect in enhancement of inner beauty. A lot of home care products can be prepared using purely natural ingredients, even from waste generated from our consumption, as like orange peel can be used to prepare face pack at home, Manjishtha (Rubia Cordfolia) oil can be used for the face massage, even sesame oil have a lot of property beneficial in skin care. Age defying activity (Vaysthapna) e.g. Gotu-Kola or Bramhi (Centella Asiatica), youthful

radiance(Varnya) e.g. Sandlewood, protection from normal wear and tear (sandhaniya) e.g. Lajjalu or Chhui Mui (Memosa Pudica), deep healing (varnaropana) e.g. Bramhi, enhancing and nurturing (tvachya) e.g. Bramhi, Rose petals etc., anti-inflammatory (sothahara) Aloe-vera, Vasa etc., strengthening the skin metabolism (tvachagnivardhani) e.g. bramhi, maintaining skin health and retarding aging (Tvagrasayan) e.g. Amalaki is some glaring example of the anti aging properties of the Ayurvedic cosmeceutical ingredients.[11] However, over exploitation of natural resources in the name of herbal products could not be denied, however a appropriate result could be achieved using proper bio prospecting technique keeping spirits of Ayurveda in minds.

Trends of new oral hygiene and imbalance of ecosystem: a glaring example

National geographic in an article published on 14 June 2019[9] elucidate that how a new oral hygiene regime of tooth brush resulted into a catastrophic way to nature. The first plastic oral brush is made somewhere in 1930 and now a day a millions of plastic brush found their way towards the open dump yard. Till 1980, production and consumption of toothpaste in India was very low, consumption at a level of 30gms/person/year, which rise to a level of 150gms/person/year and a total of approximate 80,000 metric ton. Now, let us understand how our behavioural changes have affected the environment. First of all there is a definite environmental impact during production, transportation, storage, and marketing, an approximate number of 800 million 100gms plastic tubes have been found there way to the open dumping ground somewhere, affecting the natural cycle of whole ecosystem, in return to the human food chain also. This all is begun on what price, the price we paid first of all that breakage of a emotional bondage with our natural friend like ‘Azadiracta Indica’ and other medicinal plants.

Then what is the way out? Definitely, adoption of the Ayurvedic, paradigm of the oral hygiene could give you a better way out. Azadiracta Indica, like plants exhibits various medicinal properties, as well as the same exhibit isotonic attributes, being natural substances. This not only reduces our ecological footprints, but connects us to the nature as well.

CONCLUSION

Adoptation of Ayurvedic regime is not only adaptation of treatment regime in material but to adopt core philosophy and to be more nature oriented to meet with a vibrant and sustainable health. Adoptation of Ayurveda on the one side reduce our footprint to the nature by moderating consumption and behavioural aspects and on other side it will control our greed

and give a holistic approach of life.

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