Environmental Science
ISSN: 0974-7451

Environmental Science: An Indian Journal

Review | Vol 13 Iss 4

The Ayurveda Natural Medicine System and its Environmental Implications

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Received: July 05, 2017; **Accepted:** August 05, 2017; **Published:** August 07, 2017

Abstract

Ayurveda is a traditional medical system which is practiced since many years in India and Nepal. It proposes a holistic approach to medicine, based on the balance between the different energies and forces in the body, taking into the account the influence of the mind. Due to this, it is central to the practice of Ayurveda the idea of mind-body balance. The author has known the basic principles associated with Ayurveda for more than 20 years and has made a conscious effort to apply them to his professional engineering practice, as a person dedicated to environmental sustainability and to his work as an advisor to companies and institutions on environmental affairs. This review of the matter proposes that environmental sustainability will be highly related to conscious mental and bodily good practice, of which Ayurveda could be considered as a very useful model, not only in the countries where is traditionally applied, but everywhere.

***Keywords:** Ayurveda; Natural medicine; Sustainability; Environment*

Introduction

The challenges and the scope of sustainability

Basically, sustainability is considered as the need for human beings to develop practices compatible with the future, so that natural resources and environmental limitations are taken into account. For this, there must be an equilibrium between three basic factors: environment, economics, and society.

At first, sustainability can be understood as the survival capacity of different human endeavors (projects, companies, organizations) over time. There are different threats and risks and many human endeavors fail or are a menace for sustainability. So, sustainability and failure have become very important for humanity and planet earth, in the face of pollution, overpopulation, the existence of weapons of mass destruction and the potential depletion of resources. The World Commission on Environment and Development defines that sustainable development "is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [1]. In other words, it extends the basic and simple concept of survival, to the need to think that other people in the future have the right to fully enjoy the resources the current generation is using.

Another view of the concept of sustainability is the one put forward by the International Union of Conservation Scientists (IUCN) according to which sustainable development implies improvements in the quality of life, within the limits of the resources provided by ecosystems [2]. This concept invites to be aware that humankind cannot exceed levels of consumption beyond the ones associated with available renewable resources and at the same time it is responsible for achieving consumption balances and quality of life, without depleting resources.

Of course, this is a complex equilibrium, as shown in the following diagram, in which sustainability is symbolized as the intersection between economic aspects, care for the environment and the quality of life of society. A sample of the multiple interrelated issues are shown in FIG. 1.

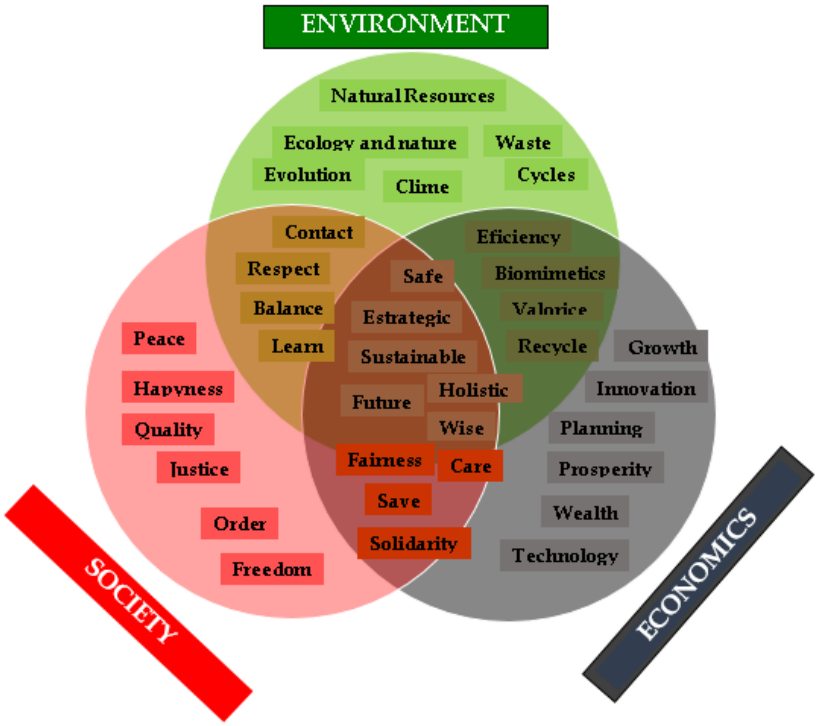

FIG. 1. **Diagram with the multiple interconnected aspects of sustainability.**

In order to visualize practical aspects of this complexity, there is something that most people easily understand, which are materials. Abundance of materials and their applications, this is to say, things, is the basis of modern society, and the corresponding high needs in the use of resources and their conversion to things, is the origin of the majority of conflicts between the triad that forms the sustainability balance equilibrium.

Modern society is clearly materialistic and oriented towards accumulation and enjoyment of material objects.

For example, engineering materials and every day materials, are those generally solid-state elements, which result from the transformation of various natural resources, mostly non-renewable. These elements are used for a whole series of devices,

tools, objects, and useful articles in many applications. In such applications, the elements are subject to very diverse environmental and contact conditions and must be able to maintain a functional, structural, and dimensional stability that allows for their use during established times.

These materials can be the object of processes of transformation, design, selection, adjustment, conformation, production, wear, reuse, disposal, and others, to adapt them and give them the properties that allow uses, duration, replacement and disposal, among others. This set of operations causes (and also mitigates) potential damages and negative impacts on their life cycles.

In facing the challenge of material sustainability, and for the matter, any kind of sustainability, the following questions should be answered:

- What principles can contribute to developing sustainable use?
- How can our vision be such that we feel that we are associated with sustainability and that we are not simply consumers and generators of a disposable and wasteful economy that leads to the depletion of materials?

These are not easy questions. The first one deals with knowledge, technology, regulation, and methods. The second one shows challenges associated with people beliefs and goals. It relates to a cultural problem.

General principles of sustainable work

For the implementation of sustainability in the use of material thigs, it is necessary to take into account some basic principles:

- The properties of the materials contain the key to their duration. Therefore, they must be studied, characterized and thoroughly known. This is the space of the laboratories and the institutions that regulate the use of things [3,4].
- The design details of a piece have profound effects on the behavior and the duration of the materials that compose it. This is the space of design [5,6].
- Corrosion, erosion, wear can come from anywhere. It cannot be guaranteed with absolute certainty that it would not happen. It is inevitable that materials will wear out. This is the space of maintenance and administration [7,8].
- Each harmful effect on materials and in their use environment, has its mitigating counterpart and its favorable or adverse circumstances that accelerate or mitigate impact and risks. This is the space for consulting work, studies and risk assessment [9-11].
- Materials tend to aggregate, react, and combine in very varied ways. This depends on their sizes, surfaces, available energies, chemical properties, biological stability, biological accumulation, and what surrounds them. The world of superficial and volumetric forms and of interactions with nature and life forms is very extensive. This is the space of behavioral, biological, ecological, structural and superficial analysis [12,13].
- Behaviors of materials and of things, have visible levels (to be studied and observed), hidden levels (to be discovered and investigated) and potential levels (those that might happen, which could be, subject to creative and innovate actions or generating unknown impacts). This is the space of research and development, field studies, ecology, economics, cost-benefit analysis, and social behavior analysis.

The choice of a material for new applications and things, must take into account several factors, including manufacturing possibilities with existing technologies, their availability, cost, risk analysis and rational design. All this to prevent problems,

to reach competing costs and prices, to avoid damages, to ensure meaningful uses and applications. Al this, taking into account complete life cycles and interactions.

The presence of wear, disorder, entropy, damage and deteriorating cycles will have serious impacts on the environment, such as the following:

- Need to replace parts much earlier than possible or desirable and with it, greater use of energy and natural resources.
- Higher energy consumption and higher pollution emissions, associated with wear, leakage, increased friction, misalignment of moving parts, corrosion and wear waste products and material damage and loss.
- Accumulation of waste residues that must be eliminated and disposed in a sustainable way.
- Accumulation of things that must be conserved, organized, maintained, causing economic and environmental burdens and social stress.

Engineers, designers, manufacturers, regulators, planners, need to weigh the advantages and disadvantages of each of new materials and things and choose the ones that best suit the real needs of the use and of the balance between nature, economy and society. It is not just a question of initial investments and prices. The inclusion of sustainability and life cycle criteria should be considered. In general, it will be necessary to adjust materials, rationalize uses, and perform tests to ensure real sustainability.

All this sounds quite familiar to the minds accustomed to delving with natural medicine and health systems based on Ayurveda principles, as shown in the next considerations.

Basic elements of the Ayurveda health system

The Ayurveda system is quite rich and ancient, full of aspects, techniques, therapies and remedies for all kind of sicknesses and health considerations. It pays a lot of attention to prevention and awareness. Here, it will be shortly described and compared to the sustainability paradigm.

The three-dosha system

The most basic idea is the existence of three natural aspects, constitutions or body and mental types, called doshas, namely Pitta, Vata and Kapha [14,15].

These three doshas come from the way life is related to three different material and energies combinations. The body and the mind show relative presences of these three forces, which are the natural constituents for each person, as some kind of personal blueprint, which Ayurveda calls prakriti (or nature). This constitution changes and oscillates in life under the influence of environment, diet, climate, age and all kind of circumstances, including personal beliefs. These changes can cause disorders and unbalances that can affect health, personal energy level and behavior.

Kapha is the dosha influenced by solid mass (earth) and liquids (water) in the body and their equivalence in the mind. The body has frames (bones) and structures (muscles and tissues). The mind has structures and fixed ideas and a set of beliefs that ensure stability and presence. People rich in the Kapha dosha are naturally athletic and they must exercise, as they have the tendency to gain weight. At the same time, because they feel strong and stable, Kapha people feel compassionate, and loyal.

They are capable of being organized, of applying methods and routines to their lives. But they also tend to accumulate selfish feelings and get used to strong fixed ideas and become stubborn, complacent, lazy and resistant to change. Because of their watery and massive nature, their metabolism tends to be heavy and slow and their skin soft. Balance for them means doing exercise, experiencing possibilities of variations, having contact with new things and challenges and giving themselves to service and pay attention to control excessive weight.

Pitta is the dosha influenced by energy (fire) in the body (digestion, blood circulation, metabolism changes) and their equivalence in the mind (intense mental energy, leadership, dominance, strong thoughts). People rich in the Pitta dosha are naturally strong, intense, and irritable, with bright, inquisitive eyes and demanding attitudes. As such, they have strong will and determination and are competitive and quick in learning and action, prone to judge and criticize people. Their digestion and appetites are strong and intense, not only to food, but also to goals and projects. They easily become involved in conflict and suffer hearth problems and inflammations. Balance for them means to be able to pay attention to their excessive fire, learning to manage it through leadership based in service and humanitarian goals and to expose themselves to observation, appreciation and contact with nature, for example taking quiet walks in the woods or being in a garden from time to time.

Vata is the dosha associated to gases (air) and spaces (internal volumes and cavities) in the body, and their equivalence in the mind (mobile, light, volatile and variable thoughts; creativity and instable feelings and nervousness). People rich in Vata tend to be thin, mentally and physically active and creative, enjoying meeting with people and traveling to places; they have a tendency to be flexible, imaginative and original. But at the same time, they can get nervous and anxious, incapable of finishing their projects and of adjusting themselves to routines. They easily experiment low immunity, insomnia, energy, mood, and appetite fluctuations and are affected a lot by the weather. Balance for them means paying attention to the mind by means of meditation and calming practices and avoiding the formation of gases in the body. Also avoiding excessive stimulants or sedative substances and try to be regular in their habits.

This can be compared, as shown, to the three elements of sustainability:
The Economy element in sustainability can be comparable to the Pitta dosha, as it supposes activities of energetic nature, in which high doses of leadership, determination, dominance and strength are required. There are complex transformations in the economical realm, which can be considered subjected to metabolic-like processes. Economy tends to be the dominant force in the sustainability triad. Such as in the case of the Pitta dosha, its balance requires intimate contact and appreciation of nature and people, so as not to lose its real purpose, which is that of service and wellbeing; and its connection with the natural resources, which are its source.

The Society factor in sustainability, can be comparable to the Vata dosha, as it supposes activities related to contact among people, relationships, instability, mobility, change, creativity, and imagination. It has to do, also, with the handling of spaces and volumes, which are related to migrations and people displacements. Balancing society has to do with the need for wisdom to fulfill promises, the capacity to administrate and organize people, and to find justice and solidarity, to respond to the many variations and difficulties caused by the circumstances. Given that, such as is the case of Vata with the weather, society is quite easily influenced and disturbed by external factors and tends to be thin and mobile, subject to many changes.

As in the case of the Vata dosha, it is of a great benefit for society to calm down individual and collective stress by means of meditation and spiritual-like practices.

The Ecology, the third element in the sustainability triad, can be assimilated to Kapha, such as it is the case for this dosha, the environment (the earth, for us) and life is formed by water and land (earth, solid mass) elements, which supposes paying attention to structure, form, size, mass, cycles, growth and accumulation. As it is the case for Kapha, accumulation is the cause of disorder, in both cases, accumulation of residue, leftovers and waste, the softness and attractiveness of Kapha type skins, minds and bodies, is analogous to the beauty of nature and life, with all its forms, abundances and openness, the same openness that can be subjected to abuse and missuses.

Knowledge and observations

According to Ayurveda, which is part of the ancient vedic science, knowledge is structured in the consciousness of things. This applies also to the knowledge of the body, its health, its behaviors and of course, and even more, to the relationships between body and mind. The Veda is a very old tradition of knowledge, which gives importance to direct subjective experience to generate knowledge and to facilitate the development of human potentials. Veda is a Sanskrit word that means pure knowledge [16].

At the same time, consciousness is structured by observation; observation of the body, the mind and its behaviors. Direct experience of the body and of the mind by the person, which acts as the knower in the structuring process. This is awareness at its full. This puts the emphasis on self-reference, and augments personal power and gives a sense of personal responsibility. Of course, the knower is supported in this by an ancient and proved tradition of wisdom and practical knowledge. But the knower himself or herself, with the power of consciousness and observation, contributes to the treatment and to the healing process. As emphasis is put on prevention and balance, the person easily understands his contribution based of awareness and observation. The normal medicine systems are based, not in prevention, but in the response to crisis or sickness. Under critical situations, normally the persons feel weakness and ignorance, and put the solution of their problems on the doctor or on the health system.

Clearly, the body type system is a tool that facilitates the observation of the body. Body types can be identified by means of easy to follow parameters. Variations cause unbalances. According to Ayurveda, the balance of constitutions or body types is the basis for understanding and attaining good physical and mental health. On the other hand, imbalance is the stimulation of the constitutions to points of functioning that give rise to diseases or problems. Variations can be observed and their relationships to health and wellbeing can be identified. People, through awareness contribute powerfully to their own health.

This Ayurveda observation and awareness paradigm is clearly applicable to sustainability goals. As a matter of fact, all the agenda points and objectives of the international conferences and meetings on sustainability call for conscious compromise, for knowledge and action. But if people, by comparison with their response to health problems and sickness, are used to think that they are responding to environmental crisis, that nature is sick, and that relationships between men and nature are part of a very complex system that only highly illustrated specialists understand, then they feel helpless and lack power to act. A change in paradigm, towards awareness and observation as the basis for knowledge and for action is clearly welcome.

This has been evident since the beginnings of the ecological movement, based on the writings by Henry David Thoreau, who "understood intuitively what we now know in more concrete and objective terms, that humanity is a biological species and thus exquisitely adapted to the natural world that cradled us. Thoreau was the scientific observer and lyrical expositor who hit upon the power of this conjunction between science and the humanities" [17].

Observation takes the observer to action. Writing is a way to create even more awareness. Nature writing is one of the major innovations of American literature, which also includes Rachel Carson, the initiator of modern environmental awareness. She wrote Silent Spring (1962), which brought environmental concerns to a large portion of the American public and spurred a reversal in national pesticide policy—leading to a ban on DDT and other pesticides—and to the environmental movement. It eventually led to the creation of the Environmental Protection Agency in USA.

Observation is related to art, and art, too, develops awareness. Ansel Adams, the American photographer and environmentalist, is well known for his beautiful photographs of the American West and Yosemite National Park, in USA, that had large influence on stablishing the national park systems in the whole world. When first visiting Yosemite he wrote "the splendor of Yosemite burst upon us and it was glorious... One wonder after another descended upon us... There was light everywhere... A new era began for me [18].

Those works based on awareness offers three powerful insights: People are able to connect and to experience new and profound realities when allowed to feel and see themselves as observers, writers, artist and image makers. This opens new spaces for changing view points and for expressing new belief systems. These experiences are more relevant when shared in human groups, with the learning process and the view point changes being highly exponential in this group environment.

It is then proposed that observation and awareness facilitate good habits, which are necessary if people are to be committed to follow new paradigmatic agendas, as the ones involved in sustainability. This requires an empathic approach to nature, society and even to economics. Empathic meaning that people are able to feel, to put themselves into situations. Empathy, the ability to understand and share the feelings of another, is closely related to appreciation, observation, and awareness. Human beings are the product of thousands of years of evolution that have allowed them to possess a very powerful tool, which is the nervous system, and that is what allows people to experience empathic practices and turn them into conscious behavior and good habits. Researchers of human behavior such as Gregory Bateson and Carl Rogers posit that there are important mechanisms of positive feedback, which allow for harmonious habits in people and organizations. Bateson brought to light that the desirable change should not only refer to our actions, but most of all, to our thoughts. He called this "ecology of mind". We could call it empathic object experimentation applied to ideas. Rogers is the father of the so-called humanistic school [19-23], which developed the concept of empathy when working with people, assuming the position of the other as a working method to achieve good human relationships. Humanistic psychology emphasizes nonverbal experience and exploration of all the states of consciousness as a means to realize the full human potential [24].

The mental and practical life implications of doshas imbalance on sustainability

According to Ayurveda [25], there is an important mental quality, called buthi, which is the capacity for intellectual discrimination. Persons with imbalanced doshas, tend to have weaknesses in their ability to discriminate and judge reality properly, which results in poor, short-term decisions when it comes to tackling problems and providing solutions. In this way, the integral aspects of the actions, their collateral effects, their long-term impacts are not taken into account. This is the case, for example, with the development and use of drugs or pesticides that give apparent solutions in the short term, but which have negative and delicate implications when viewed from a more comprehensive view. According to Ayurveda, the imbalances of the doshas tends to obscure this high-level intellectual vision, very important in all professions that have the capacity to alter the environment.

According to the Vedic knowledge [26-28], on which Ayurveda is based, there are higher states of consciousness, which allow the human being to be more appreciative of the cosmos; to be more creative and more capable of integrating and appreciatively approaching the surrounding environment; to be able to discover the underlying unity in all things, in the universe. These higher states of consciousness, are reflected in individuals in their daily actions. If they are not developed, to some extent, the individual tends to act with selfishness, with crude and rudimentary ways, and short-term vision. According to Ayurveda, there are three possibilities in people and in their actions: Tamas, Rajas and Savtas. Under tamas impulses, the approaches are rude, heavy, disorderly, abrupt; under rajas impulses, approaches are emotional, short-term, selfish, dominant; Under satvas impulses, approaches are altruistic, constructive, comprehensive, compassionate, appreciative. The imbalance of the doshas generates tamas and rajas impulses; Balance favors satva impulses, clearly more aligned to sustainability.

Treatment based in nature, herbs, purified formulas, equilibrium, cleaning, balance, and care

According to Ayurveda tradition, therapists require skills in the preparation and application of medicines; it is not a simple matter. It has to do with some quite sophisticated and technological operations, including distillation, operational skills, cooking, horticulture, metallurgy, manufacturing, pharmacy, mineral analysis and separation. The medical practictioners are expected to dedicate themselves, in body and soul, to the patient, with self-control and moderation in his words; to constantly strive to improve their knowledge and technical skills. Attention to the patient is quite personal, based on specific diagnosis tools and questions that are empathic in nature.

Ayurveda medicine is based on diet, as well as on the use of medicines based on herbs and plants, generally (although there are also mineral preparations). It emphasizes the integrated work of the body, mind and spirit in the prevention and treatment of diseases. The basic premise is to awaken the natural balance of the mind-body dosha system to facilitate health. The use of medicinal plants is oriented to take advantage of their ability to harmonize the balance between the patient and the basic influences of life, such as diet, work, and family life. With more than 2700 plants at its disposal, it is clear that Ayurveda in quite close with nature and its powers. In this way both doctors and patients easily see their connections to nature.

This approach to nature as the source of healing and to personal care, as a source of loving health care, with emphasis on the preventive side, is a very welcome feature of Ayurveda, which could permeate and facilitate our approaches to sustainability and to the rich relationships between people (society), things (economy) and nature (ecology).

One of Ayurveda's main tools are the equilibrating and cleaning treatments, especially the one known as Panchakarma, which allows to appreciate the loving, balanced and harmonious vision of Ayurveda, which makes it so unique. The term refers to the combination of five therapies. Imbalances in doshas are thought to create waste, which is called Ama. To control ama accumulation production, one must have adequate food and lifestyle, proper habits and exercises. From time to time, it is advised to undergo specific purification routines such as panchakarma. Ama is released through the secretory channels of the body such as sweat glands and skin, intestine, urinary tract.

For these eliminations, the treatment includes soft and loving massages, called abhianga, a very pleasant experience, which are performed with natural oils, such as sesame or mustard oil. Another pleasant panchakarma treatment is śirodhara, which consists of pouring on the forehead a warm mixture of oils and herbs and ghee (purified butter).

A third treatment is Virechana, purgation, that cleans the sweat glands, the large and small intestine, the kidneys, the stomach, the liver and the spleen, through careful and delicate laxative techniques, based on nutrient broths and castor oil. A fourth one, Basti (enema) is considered very important to purify the three Doshas by the intestine. It includes the introduction of medicinal substances such as sesame oil, calamus oil or other extracts of herbs in liquid form through the rectum. Basti is especially effective for dealing with Vata disturbances. Finally, Nasya treatment (cleaning of the nose), includes the application of medicinal oils by the nose to clean the upper respiratory system and head of the impurities of Kapha. The inhalation of steam from medicinal herbs is also part of this procedure.

Discussion

These somewhat detailed descriptions are shown here, to signal some applications to sustainability, which can be learned from the Ayurveda approach to balance and treatment.

The first one, is the need for loving care to remove accumulations and perturbations. The cleaning of rivers, lakes and oceans; the purification of the air and soil will require large doses of care and dedication. They will not happen only as the results of the necessary norms and regulations. And to keep up with good work and maintain a healthy state on the environment, the society and the economy will be the result of continuous effort.

The second one is the need for cleaning cycles, to eliminate disorders and accumulations. For this, it is necessary to understand how nature works, to use its own means, enhanced by technological methods and care. The five treatments methods used in panchakarma offer some interesting clues for this. Cleaning must be holistic, using all elimination channels. It should be related to air (nasya), water (virechana), processes and soil (basti). It should include the bounders between the systems, such as the skin, (abhianga) and include the commanding centers, such as the brain, near the forehead (śirodhara).

The third one is the need to develop specific and somewhat sophisticated means to treat imbalances, by establishing a tradition and an ordered technology, which implies training, dedication and love to nature, humankind and its things.

Conclusion

To solve the many contradictions between the elements of the sustainability paradigm it is proposed to learn from Ayurveda techniques and traditions. Some parallels have been expounded, which can be considered useful. This article departs from personal experiences for the author, both in his life and in his work as an environmental researcher and application engineer [29]. Humankind must learn from many of its ancient practices, especially those that are rich, useful, and compatible with sustainability, such as Ayurveda, a natural medicine system based on probed natural methods and respectful and caring processing technology.

The stablishing of linkages between traditional knowledge, such as Ayurveda and the Vedic principles, and modern science, is proposed as a powerful insight to approach the sustainability challenges.

The idea of linking the three body doshas and their mental analogs to the three main aspects of sustainability is a novel point of view, which gives practical tools for successful work. The main proposed tools are:

- Economy associated with intimate contact and appreciation of nature and people, so that it does not to lose its real purpose, which is that of service and wellbeing; and its connection with the natural resources, which are its source.
- Society that calms down individual and collective stress by means of meditation and spiritual-like practices.
- Ecology based in tender care, appreciation of beauty of nature and life, with all its forms, abundances and openness and paying attention to the danger of accumulation.

This Ayurveda observation and awareness paradigm is clearly applicable to sustainability goals. It is a matter of fact, that all the agenda points and objectives of the international conferences and meetings on sustainability call for conscious compromise, for knowledge and action. Paying attention, at all levels, to development of individual and group consciousness is a clear path towards sustainability.

The bodily and mental balancing techniques and practices of Ayurveda can be quite beneficial to allow people and society as a whole, to take smart and sensible decisions when confronted with the difficult task of sustainability. The seeing of a healthy buthi (mental discrimination), of a satvic mind (loving and altruistic set of thoughts) and of higher states of consciousness are central to integral Ayurveda practice. Society can only benefit for them. And so, nature and the economy.

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