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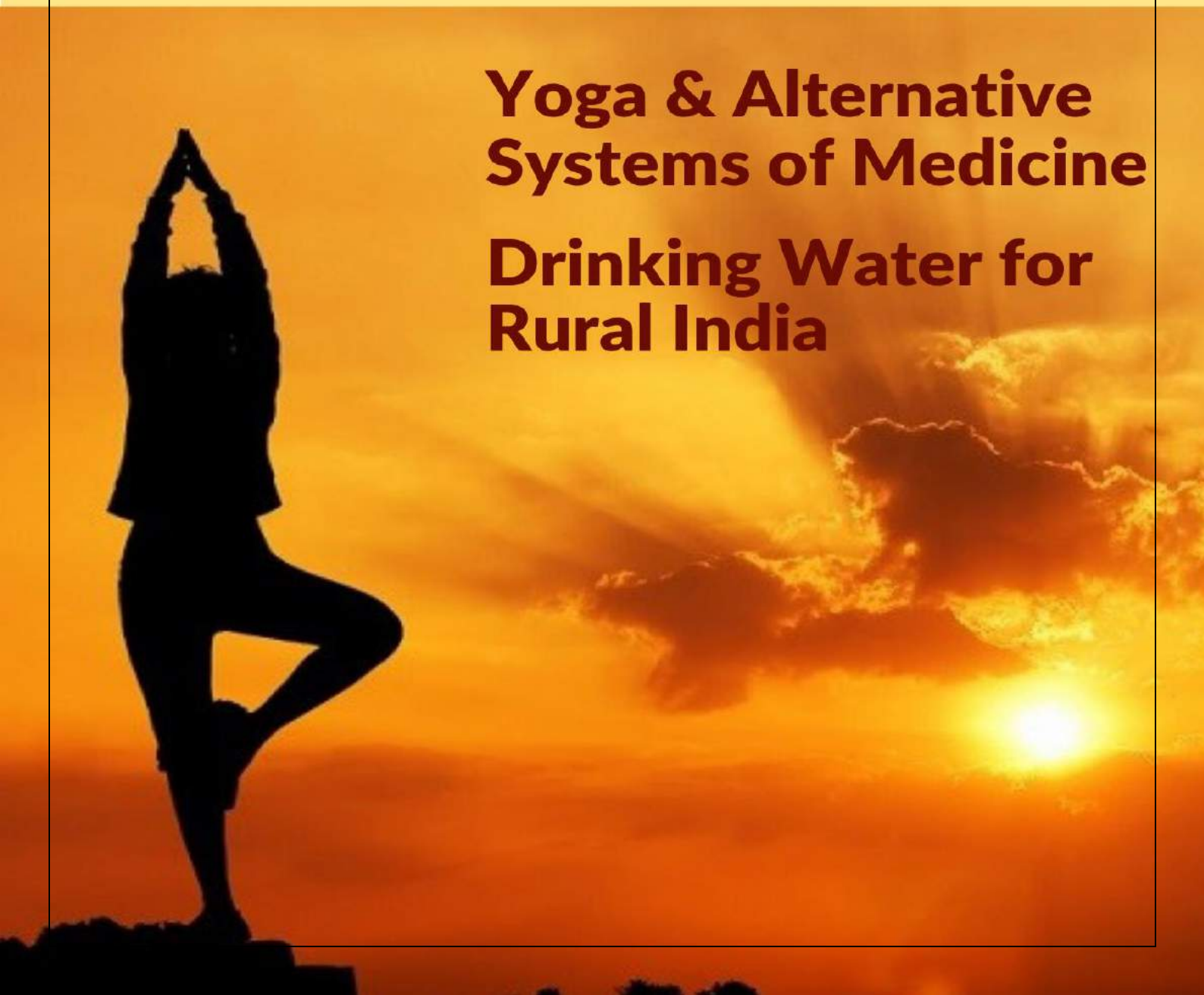

Yoga & Alternative Systems of Medicine

Drinking Water for Rural India

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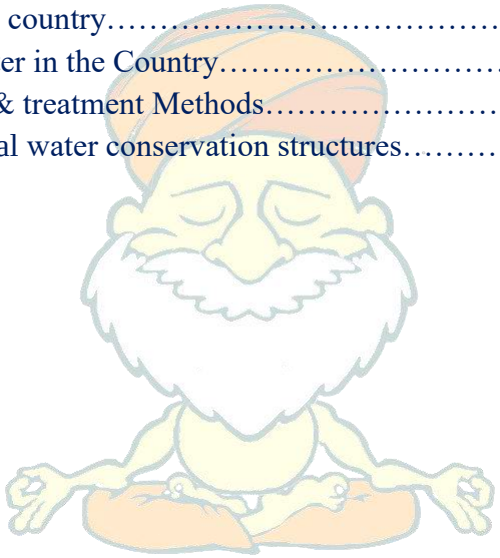


Preface

This is our 51st edition of Yojana Gist and 42nd edition of Kurukshetra Gist, released for the month of June 2019. It is increasingly finding a place in the questions of both UPSC Prelims and Mains and therefore, we've come up with this initiative to equip you with knowledge that'll help you in your preparation for the CSE.

Every issue deals with a single topic comprehensively sharing views from a wide spectrum ranging from academicians to policy makers to scholars. The magazine is essential to build an in-depth understanding of various socio-economic issues.

From the exam point of view, however, not all articles are important. Some go into scholarly depths and others discuss agendas that are not relevant for your preparation. Added to this is the difficulty of going through a large volume of information, facts and analysis to finally extract their essence that may be useful for the exam.

We are not discouraging from reading the magazine itself. So, do not take this as a document which you take read, remember and reproduce in the examination. Its only purpose is to equip you with the right understanding. But, if you do not have enough time to go through the magazines, you can rely on the content provided here for it sums up the most essential points from all the articles.

You need not put hours and hours in reading and making its notes in pages. We believe, a smart study, rather than hard study, can improve your preparation levels.

Think, learn, practice and keep improving! You know that's your success mantra ☺

Yoga & Alternative Systems of Medicine

The word yoga was first mentioned in the Rigveda, but its philosophy, science and grammar were first provided by Patanjali in his magnum opus, Patanjali Yoga Sutra. It is heartening to note that yoga has been widely accepted across the world today. The Polish government celebrates International Yoga Day. In Aligarh Muslim University here, special endeavours are being taken to make this event successful.

The word "yoga" – from the Sanskrit root yuj ("to yoke") – is generally translated as "union of the individual atma (loosely translated to mean soul) with Paramatma, the universal soul." This may be understood as union with the Divine by integration of body, mind, and spirit. In accordance with Pāṇini, Vyasa who wrote the first commentary on the Yoga Sutras, states that yoga means samādhi (concentration).

"Shareeramadyam khalu dharma saadhanam"(a healthy body is the prerequisite for achieving higher goals). Recognising that "yoga provides a holistic approach to health and well-being" and also that wider dissemination of information about the benefits of practising yoga would be beneficial for the health of people all over the world, the UN proclaimed June 21 as the International Day of Yoga via Resolution 69/131.

All is one – The Approach

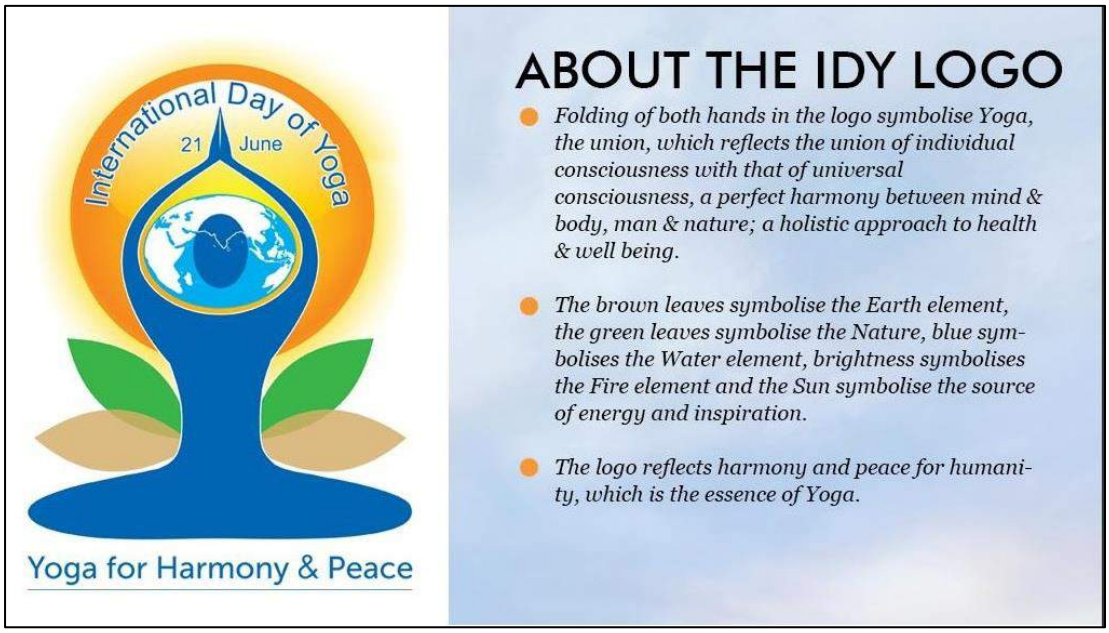
Yoga is something beyond physical health and material wealth. The human persona is not only a body; it is also a mind, an intellect, and a soul. Yoga attempts to harmonise all of them. In the process, one attains a healthy body, a sharp intellect, and a focused mind capable of realising the unity between 'I', generally defined as personal consciousness, and 'I', the universal or cosmic consciousness.

Yoga means to join. Its ultimate goal is to experience the unity of individual and universal consciousness. Yoga teaches us to recognise the fundamental unity between human beings and humankind, humans and the environment, and ultimately recognise a total interconnectedness of everything. The essence of this realisation is to experience that all is one. There is no 'us' and 'they' — everything is us. This is an integral or holistic approach.

A new way of thought

We are living in times of great challenges, of unprecedented change in unpredictable directions. The way we live, learn, work and enjoy is changing rapidly. Lifestyles are getting transformed through technology. We are making significant progress in our relentless quest for economic growth and prosperity, in enhancing convenience and comfort, in enriching our knowledge and skills, in enlarging our choices for entertainment and education. However, as the global community started drafting its development agenda in 2015, it realised that we have been missing a big component of "development". There was a need for balance. There was a need for caring for the poor. There was a need for caring for the planet. There was a need to look for gross national happiness in addition to gross national product. There was a need to avoid excesses, avoid reckless exploitation of nature, avoid excessive consumption. Our individual lifestyles and patterns of global governance needed to be rebooted. Sustainability has become the new mantra. "Balance" is at the heart of sustainability. And that "balance" in all spheres starting with physical well-being is what yoga is all about.

Globalisation based on the mechanistic world view also attempts to integrate nations through the concept of the world as one market. The recent experience of attempts to integrate the economies and technologies of nations instead of creating any global consciousness leading to oneness has turned out to be divisive, exclusivist, fragmentary and has not helped in resolving any of the conflicts. The market forces, instead of harmonising conflicts, have further deepened the fault lines. This has resulted in a world that is out of balance. Restoration of the balance in this planet is a big challenge. Enlightened global minds need to think about an alternative paradigm.



Former United Nations Secretary-General Ban Ki-moon said, "We should do this [yoga] before every negotiation so that we can work with a calm mind". This indicates that some meaningful thinking has set in. It can be argued that if international negotiations could be held on the basis of holistic tenets, along with a calm mind, perhaps the UN would be able to use its time for good purposes. If such and other practices of holistic behaviour are pursued, possibly a new culture of conducting world affairs and international relations might evolve in the future. There is increasing awareness that the present imbalance is the outcome of the inability of existing socio-economic institutions and political structures to deal with the current impasse, which is derived from the inadequacy of concepts and values of an outdated model of the universe and the belief that all problems can be solved by technology. Perhaps there is a need for a new paradigm.

Can an alternative world view for transforming human society into a non-violent, eco-friendly, non-dogmatic, egalitarian, all-inclusive, secular world family be evolved through the harmonisation of yoga and science?

Enlightened global minds should seriously ponder on such a probability. Apart from emphasising the normal benefits of yoga, International Yoga Day should be utilised to think about how a peaceful transition can be achieved for peace, harmony and happiness.

The Bhagavad Gita makes two important statements: "yoga-sthah kuru karmaani" (Do your duty with a yoga approach) and "samatvam yoga uchyate" (balance is the essence of yoga). Yoga is an approach to life that focuses on physical balance, mental equilibrium and working towards a harmonious synthesis of diverse elements including the protection of the environment. Quite appropriately, the theme of the 2019 International Yoga Day is "Climate Action".

ITBP officials in Sikkim perform yoga at an altitude of 19,000 feet in minus 15 degress Celcius temperatures.

Yoga and the Human Body

Yoga's benefits are slowly being realised the world over. As the world makes the epidemiological transition and the contribution of most of the major non-communicable disease groups to the total disease burden is increasing, it is important that individuals make healthier choices and follow lifestyle patterns that foster good health.

According to 2019 edition of Bloomberg Healthiest Country index, India is placed at 120th rank among 169 countries related to measures such as mortality by communicable & non-communicable diseases & life expectancy.

Physical inactivity is now identified as fourth leading risk factor for global mortality.

As Harvard Medical School experts have recognised, yoga, a combination of four components — postures, breathing practices, deep relaxation, and meditation — has a significantly positive impact on health. It can alleviate arthritis pain, reduce the risk of heart

disease, relieve migraines and fight osteoporosis, multiple sclerosis or fibromyalgia. A study showed how yoga increased blood vessel flexibility by 69 per cent and even helped shrink arterial blockages without medication.

Since yoga works across multiple systems in our body, Harvard researchers have documented that it helps to rev up immunity and decrease the need for diabetes medications by as much as 40 per cent. Yoga, according to these researchers, does so much for one's health and well-being that people who do yoga use 43 per cent fewer medical services and save anywhere from $640 to more than $25,000 a year!

The researchers found that people who practiced yoga had improved balance, flexibility, leg strength, depression, sleep quality, vitality and perceived mental and physical health - compared with no activity. Compared with other activities, yoga leads to improved lower body strength, lower body flexibility and depression. The research improves understanding of the benefits yoga can offer an ageing population.

- **Yogic practices enhance grey matter for cognition and white for communication**
- **Enhance white matter to avoid depression which is number one reason for ill-health;**
- **Yogic practices promote Neurogenesis in which stem cells become matured cells**
- **Yogic practices improve responsiveness of immune cells called neutrophils to a bacterial challenge**
- **Yoga promotes natural thermogenesis**
- **Period gene, timeless gene & double time gene are to control circadian rhythm (biological clock).**
- **Yogic practices activate natural process of preventing DNA damage as cells ageing, Yogic practices help to from new angiogenic blood vessels in body**
- **Maintains different parts of body in a stable and balanced way to reverse aging (homeostasis)**
- **Promotes bio-energetics (transforms energy to brain & neurons).**
- **Amritha is a deep red liquid secreted by pineal gland which produces & stimulates blissful state called Anandam.**
- **Anadamide, bliss molecule & a neurotransmitter in brain creates a state of accentuated happiness. This neurotransmitter is activated by yogic practices.**
- **Biological clock is perfected by genes; Genes are purified by Yogic practices.**

***Optogenetics*- A technique that uses light to erase bad memory & to enhance good ones by controlling Neuron activity.**

It is truly a matter of quiet satisfaction that India is contributing to the health and well-being of millions of people across the globe. Leading from the front, Prime Minister Narendra Modi has been spearheading this massive knowledge-sharing exercise. The fact that the UN resolution moved by the Modi government was co-sponsored by a record 177 countries

bears testimony to yoga's universal appeal and India's readiness to support the cause of global health.

Establishment of the first India-China Yoga College at the Yunnan Minzu University in Kunming in China and the India-Turkmenistan Centre for Yoga and Traditional Medicine in Ashgabat, Turkmenistan are a few of the important first steps in the efforts to spread the benefits of yoga.

Yoga – A New Lifestyle

Yoga is not just about health and well-being. It is also about "focusing" and "excelling". As the Bhagavad Gita states, "Yogah karmasu kaushalam"(excellence in your work is yoga). This excellence comes as a corollary to "dhyana"(concentration) and "dharana"(retention) along with "yama"(ethical behaviour) and "niyama"(discipline) as a part of the eight-fold approach of yoga as defined by Patanjali, the pioneering exponent of yoga.

Yoga, therefore, is a way of thinking, a way of behaving, a way of learning and a way of problem-solving. It is a unique way of connecting ourselves with the external environment and generating positive synergies of thought and action. It creates stability, enhances ability and promotes conviviality. It can serve as an effective ground for sustainability.

"Yoga is like music. The rhythm of the body, the melody of the mind, and the harmony of the soul creates the symphony of life," remarked the famous yoga guru, the late B K S Iyengar. This symphony is resonating in a million homes today across geographical, national, linguistic and religious boundaries.

"Sarve Bhavantu Sukhinah, Sarve Santu Niraamayaah, Sarve Bhadraani Pashyantu, Maa Kashchit Dukhha Bhaag Bhavet

(let everyone be happy, healthy and see good everywhere)".

Yoga Heals on the Spiritual, Mental and Physical Levels

Each person has a physical body made of matter, an astral body containing prana and thoughts, and a causal body which contains the quality of spirit.

The three bodies are made up of the five "koshas" or sheaths. Below is a breakdown of the three bodies and their corresponding koshas:

Physical Body – The Vehicle for the Soul

Annamaya Kosha – The Food Illusion Sheath

- Made of food
- Composed of the five elements: earth, water, fire, air, and ether.

Astral Body – A Subtle Body that the Eyes Cannot See

Pranamaya Kosha – The Energy Body

- Made of prana or vital life force
- Physical body is able to live and act because of prana

Manomaya Kosha – The Mind

- Contains your mind/emotions/thoughts
- Thoughts and emotions move the prana

Vijnanamaya Kosha – The Intellect

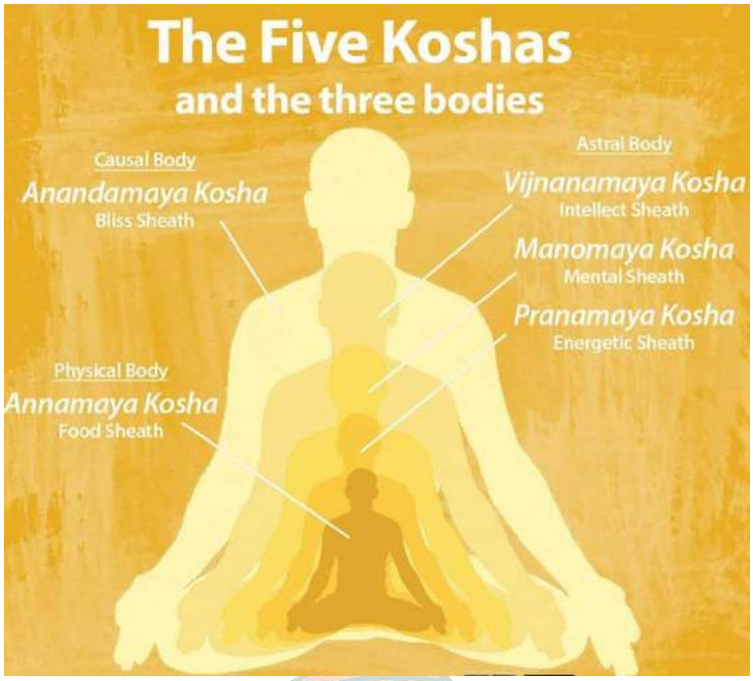
- Contains intellect and discrimination
- This is the power to know and discern

Causal Body – The Core from Which Your Karma Originates

Anandamaya Kosha – The Bliss Sheath

- A thin veil of ignorance
- Subtle identification with separateness
- Here you experience your true blissful nature

The sanksrit word "maya" means illusion and "kosha" means sheath. All of the five koshas are illusory sheaths that are veiling the reality of your true nature as Satchitananda—Existence, Knowledge and Bliss Absolute.



How Yoga is giving prisoners new directions in life?

When prison inmates do yoga, meditation, and Sudarshan Kriya, they experience freedom, are able to forget the past and develop a positive approach to the future.

Fact is these people need more help of yogis because somehow they are victims of unwanted situations, they are miserable; they need attention in their lives. Researchers say these people are going through a high level of stress, anxiety, frustration, anger, guilt, that's why they choose the wrong direction of life.

Breathe is the pivot of Yoga

Breathe is the key link between body and mind. Effective breathing brings health to our organs, balances the nervous system, and calms the mind. The traditional practices of yoga lay great emphasis on the importance of breathing in the form of pranayama. The ancient practice of meditation with the Gayatri mantra was traditionally done along with pranayama.

Benefits of Yoga

1) STRESS MANAGEMENT: Yoga is the best way to reduce stress and mind relaxation. Stress-free mind can think positive about self and society as well

2) HEALING AND RECOVERY: Yoga is a path of recovery and healing- Yoga really helps to recover fast from trauma, anxiety, anger, etc.,

3) SELF AWARENESS: Yoga helps people understand the value of self. A person who has a sense of self -awareness can create a good society and environment

4) MINDFULNESS: Yoga can work as a medicine which can make people understand how to move towards the right direction in life.

TOP 10 TYPES OF YOGA

#1 HATHA YOGA

Hatha Yoga is the most widely practiced forms of yoga and is often referred to as basic yoga. It's a simple, slow paced style of yoga and because of this, it's ideal for beginners.

The focus of Hatha Yoga is on physical and mental strength and it is designed to stimulate the mind-body connection. It does this through a combination of breathing exercises and postures.

#2 BIKRAM YOGA

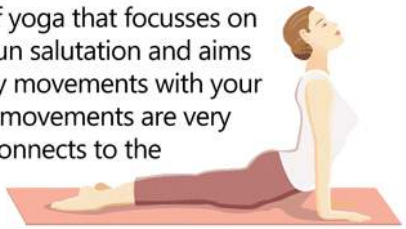
Bikram Yoga is often referred to as Hot Yoga and was created by the yoga guru Birkam Choudhary. It is practiced in a hot room with an average temperature of 35-38 degrees Celsius (95-100 degrees Fahrenheit) and includes 26 poses which are focussed on proper alignment. The heat lubricates your joints and enhances the flexibility of your muscles.

#3 ASHTANGA YOGA

Ashtanga Yoga is a dynamic, free flowing yoga style that builds your stamina and energy levels. It is one of the most physically demanding styles of yoga and a great choice if you want to lose weight or boost your overall fitness levels.

#4 VINYASA YOGA

Vinyasa Yoga is a style of yoga that focusses on flow. It emphasises the sun salutation and aims to synchronise your body movements with your breathing. Vinyasa Yoga movements are very smooth and each pose connects to the next with either an inhale or an exhale.



#5 POWER YOGA

Power Yoga is very similar to Ashtanga Yoga but does not have a strict sequence of poses and is performed in a faster, more intense style. It's a top choice if you want to build strength and flexibility but if you're interested in the spiritual side of yoga, other styles may suit you better.

#6 KUNDALINI YOGA

Kundalini Yoga focusses on the 'Root Chakra' around the lower spine and involves lots of core work. It is one of the more spiritual styles of yoga and involves plenty of breathing exercises, chants and meditations.

#7 FERTILITY YOGA

Fertility Yoga was developed by the registered nurse and yoga instructor Sherry Long. It avoids any poses that could strain the body and uses gentles poses that are designed to reduce stress and stimulate blood flow to the pelvic area. It's a great choice if you want to find inner peace or boost your fertility.

#8 IYENGAR YOGA

Iyengar Yoga is a perfect choice if you enjoy using props such as blankets, blocks, cushions harnesses and straps. It is a very methodical style and focusses heavily on proper alignment. Each pose is held for a set amount of time to ensure that you master it with both your body and your mind.

#9 ANUSARA YOGA

Anusara Yoga was created by John Friend in 1997 and is designed to open up the heart. It's probably the most spiritual of all styles of yoga and is an excellent choice if you want to boost your mental fitness and become calmer and more peaceful.

#10 RESTORATIVE YOGA

Restorative Yoga is often referred to as yoga for lazy people and focusses heavily on relaxation. It incorporates simple poses along with props such as blankets, cushions and eye pillows to promote complete relaxation. This style of yoga allows you to rest your body and cleanse your mind and is a perfect choice if you want to feel fully refreshed and rejuvenated.

Alternative Systems of Medicine (ASM)

India is faced with a highly complex scenario. On the one hand, there is the unfinished agenda of under-nutrition and communicable diseases, on the other; the burden of non-communicable ailments is crippling the lives of millions. In fact, the World Health Organisation Report for 2018 highlights that non-communicable diseases account for 63 per cent of deaths in India.

This is an alarming statistic to say the least and it is unlikely that modern medicine alone can provide the solutions. Systematically promoting integrative medicine — an approach that combines modern medicine with alternative systems like Ayurveda and Yoga — is perhaps more crucial now than ever before.

Why integration?

Unlike modern medicine, alternative systems follow a more holistic approach, with the objective of promoting overall well-being instead of focussing on curing illness alone. Such an approach assumes even greater significance in the case of non-communicable diseases which are difficult to treat once they have developed into chronic conditions.

Internationally, greater scientific evidence is becoming available regarding the health impact of alternative systems of medicine, especially Yoga. For instance, a study conducted by Massachusetts General Hospital and the Benson-Henry Institute demonstrated that Yoga and meditation could result in a 43 per cent reduction in healthcare costs.

Apart from a rich heritage in traditional medicine, India has nearly eight lakh registered Ayurveda, Yoga, Unani, Siddha and Homoeopathy (AYUSH) practitioners whose services can be better utilised for delivering healthcare to the population.

While the demand for alternative systems of medicine has been on the rise, there is still some scepticism perhaps due to the paucity of large-scale studies in India demonstrating its effectiveness.

Moreover, the emphasis of AYUSH on overall well-being makes it less tangible compared to modern medicine which focusses on treating diseases.

Resistance of some modern medicine practitioners is another key roadblock.

The Way Forward

In recent years, the government has taken several steps to promote AYUSH. A dedicated ministry was set up at the Central level in 2014. Additionally, mainstreaming AYUSH is a clearly stated policy objective under the National Health Policy, 2017. Another pioneering initiative is the establishment of a Centre for Integrative Medicine & Research by AIIMS, Delhi. Several union ministries also plan to set up AYUSH units in the hospitals operated by them.

Further, AYUSH is one of the 12 champion services sectors that the government seeks to promote by offering soft loans and interest subsidies to AYUSH establishments as well as allowing 100 per cent foreign direct investment.

There is, however, much to be done going forward. First, the co-location of AYUSH with facilities providing allopathic medicine needs to be ramped up considerably. The 'Strategy for New India @ 75' released by NITI Aayog recently sets out the explicit target of co-locating AYUSH services in at least 50 per cent of primary health centres, 70 per cent of community health centres and 100 per cent of district hospitals by 2022-23. Co-location must also be achieved in the 1.5 lakh health and wellness centres announced in Union Budget 2018-19.

Second, investments in AYUSH education and research need to be stepped up. Mechanisms should be identified for integrating modern medicine and AYUSH curricula at the undergraduate and postgraduate levels in educational institutions. In China, for instance, traditional medicine is already taught alongside Western medicine. Developing a credible research base is also critical as it will help to embed AYUSH within the overall framework of healthcare by addressing the lingering concerns around its effectiveness.

Third, a range of communication channels should be leveraged to popularise Ayurveda and Yoga and inform citizens about their preventive and curative properties. While Yoga has gained immensely in popularity as a form of exercise, the full range of physical and mental health benefits it can yield are still not widely appreciated.

Fourth, essential AYUSH medicines must be included in various national health programmes and guidelines should be developed for ensuring their quality.

The time is ripe to systematically promote and mainstream integrative medicine. We are faced with a dual disease burden on the one hand and have a rich history of traditional medicine to tap into, on the other. While the last few years have witnessed a number of enabling policy interventions, more needs to be done to reap the full benefits of integrative medicine.

A. HOMEOPATHY

Homeopathy is an alternative system of medicine, which believes that 'Like cures like.' According to it, a disease can be cured by a substance that can induce symptoms similar to the ailment itself by using highly-diluted doses of natural ingredients. These substances are believed to trigger the body's healing system.

Lower the dose of the homeopathic ingredients, higher the potency of the medicines. Some of the homeopathic substances are diluted to such great extent that no traces Aor molecules of the original substances remain.

Homeopathy was discovered by Dr. Samuel Hahnemann, who himself was a doctor practicing western medicine. Every year April 10, his birth anniversary, World Homeopathy Day is celebrated as a tribute to Hahnemann.

India also has the biggest homeopathic drug manufacturers and traders in the country.

B. AYURVEDA

Ayurvedic medicine ("Ayurveda" for short) is one of the world's oldest holistic ("whole-body") healing systems. It was developed more than 3,000 years ago in India. Ayurveda has its foundations laid by the ancient schools of Hindu Philosophical teachings named Vaisheshika and the school of logic named as Nyaya. It is also related to the manifestation framework, well-known as Samkhya, and it was established in the same period when schools of Nyaya and Vaisheshika flourished.

It's based on the belief that health and wellness depend on a delicate balance between the mind, body, and spirit. Its main goal is to promote good health, not fight disease. But treatments may be geared toward specific health problems.

Ayurveda believes that the entire universe is composed of five elements: Vayu (Air), Jala (Water), Aakash (Space or ether), Prithvi (Earth) and Teja (Fire). These five elements (referred to as Pancha Mahabhoota in Ayurveda) are believed to form the three basic humors of human body in varying combinations. The three humors; Vata dosha, Pitta dosha and Kapha dosha are collectively called as "Tridoshas" and they control the basic physiological functions of the body along with five sub-doshas for each of the principal doshas.

C. UNANI

Unani, as a system of medicine, originated in Greece. Unani medicine was the first to establish that disease was a natural process and that symptoms were the reactions of the body to the disease. It believes in the humoral theory which presupposes the presence of the four humors - Dam (blood), Balgham (phlegm), Safra (yellow bile) and Sauda (black bile) in the body.

The diagnosis of diseases in Unani system of medicine is through Nabz (pulse) and examination of Baul (Urine) and Baraz (stool).

D. SIDDHA

Siddha medicine is a system of traditional medicine originating in ancient Tamilakam (Tamil Nadu) in South India and Sri Lanka. The Siddha science is a traditional treatment system generated from Tamil culture. Palm leaf manuscripts say that the Siddha system was first

described by Lord Shiva to his wife Parvati. Parvati explained all this knowledge to her son Lord Muruga. He taught all this knowledge to his disciple sage Agasthya. Agasthya taught 18 Siddhars and they spread this knowledge to human beings.

Siddha is focused on "Ashtamahasiddhi," the eight supernatural power. Those who attained or achieved these powers are known as Siddhars. There were 18 important Siddhars in olden days and they developed this system of medicine. Hence, it is called Siddha medicine. The Siddhars wrote their knowledge in palm leaf manuscripts, fragments of which were found in parts of South India.

When the normal equilibrium of the three humors — Vaadham, Pittham and Kapam — is disturbed, disease is caused. The factors assumed to affect this equilibrium are environment, climatic conditions, diet, physical activities, and stress. Under normal conditions, the ratio between Vaadham, Pittham, and Kapam are 4:2:1, respectively. According to the Siddha medicine system, diet and lifestyle play a major role in health and in curing diseases. This concept of the Siddha medicine is termed as pathiyam and apathiyam, which is essentially a rule based system with a list of "do's and don'ts".

E. SOWA-RIGPA

“Sowa-Rigpa” commonly known as Amchi system of medicine is one of the oldest, living and well documented medical tradition of the world. The majority of theory and practice of Sowa-Rigpa is similar to “Ayurveda”. Sowa-Rigpa” (Science of healing) is one of the classic examples of it. Gyud-Zi (four tantra) the fundamental text book of this medicine was first translated from India and enriched in Tibet with its own folklore and other medical tradition like Chinese and Persian etc.

F. NATUROPATHY & YOGA

Naturopathy or naturopathic medicine is a form of alternative medicine that employs an array of pseudoscientific practices branded as "natural", "non-invasive", and as promoting "self-healing". The ideology and methods of naturopathy are based on vitalism and folk medicine, rather than evidence-based medicine.

The practice of naturopathy is based on a belief in the body's ability to heal itself through a special vital energy or force guiding bodily processes internally.[6] Diagnosis and treatment concern primarily alternative therapies and "natural" methods that naturopaths claim promote the body's natural ability to heal.

AYUSH

The new health policy pitches AYUSH as a panacea for the health problems that plague the country's 1.2 billion people. The potential of alternative therapies and practitioners to alleviate the human resource crisis in Indian healthcare is indeed enormous.

Paucity of health workforce in rural India has always been a problem. Lack of interest of modern allopathic graduates in serving the rural poor has worsened the situation little more. The National Rural Health Mission brought an innovative concept of mainstreaming of AYUSH and revitalization of local health tradition by collocating AYUSH doctors at various rural health facilities such as community health centres and primary health centres. In this context a study was aimed, based on secondary data, to make a situational analysis of health workforce in rural India and thereby analysing the status and role of AYUSH Doctors in filling this gap of health workforce inequality.

In this background Government has constituted new ministry for the promotion of AYUSH as an alternate system of treatment. The key strategies that were identified by the Government of India towards the process of mainstreaming were

- Integration and mainstreaming of the Indian systems of medicine and Homeopathy into the existing public healthcare system and the national health programmes;
- Encouragement and establishment of Indian systems of medicine specialty centres;
- Facilitation and strengthening of quality control laboratories for the AYUSH system;
- Strengthening drug standardisation research;
- Advocacy for AYUSH; and
- Establishing sectoral linkages for AYUSH.

Solve: The government has been promoting AYUSH as an alternative medicine system. What do you understand by the term AYUSH? What are its benefits? Also discuss the features of Sowa Rigpa.

***e-AUSHADHI* Portal:** Ministry of AYUSH has launched the *e-AUSHADHI* portal, for online licensing of Ayurveda, Siddha, Unani and Homoeopathy drugs.

Drinking Water for Rural India

Rural India has more than 700 million people residing in about 1.42 million habitations spread over 15 diverse ecological regions. Meeting the drinking water needs of such a large population can be a daunting task. The non-uniformity in level of awareness, socio-economic development, education, poverty, practices and rituals and water availability add to the complexity of the task. Despite an estimated total of Rs. 1,105 billion spent on providing safe drinking water since the First Five Year Plan was launched in 1951, lack of safe and secure drinking water continues to be a major hurdle and a national economic burden.

It is clear that the large investments have not yielded comparable improvements in health and other socio-economic indicators.

Rural Water Supply

The provision of clean drinking water has been given priority in the Constitution of India, with Article 47 conferring the duty of providing clean drinking water and improving public health standards to the State. Rural water supply (RWS) programmes in India can be divided into several distinct phases

Early Independence (1947-1969)

1949: The Environment Hygiene Committee (1949) recommends the provision of safe water supply to cover 90 per cent of India's population in a timeframe of 40 years.

1950: The Constitution of India confers ownership of all water resources to the government, specifying it as a state subject, giving citizens the right to potable water.

1969: National Rural Drinking Water Supply programme launched with technical support from UNICEF and Rs.254.90 crore is spent during this phase, with 1.2 million bore wells being dug and 17,000 piped water supply schemes being provided.

Transition from technology to policy (1969-1989)

1972-73: Introduction of the Accelerated Rural Water Supply Programme (ARWSP) by the Government of India to assist states and union territories to accelerate the pace of coverage of drinking water supply.

1981: India as a party to the International Drinking Water Supply and Sanitation Decade (1981-
1990) declaration sets up a national level Apex Committee to define policies to achieve the goal of providing safe water to all villages.

1986: The National Drinking Water Mission (NDWM) is formed.

1987: Drafting of the first National Water Policy by the Ministry of Water Resources.

Restructuring phase (1989-1999)

1991: NDWM is renamed the Rajiv Gandhi National Drinking Water Mission (RGNDWM).

1994: The 73rd Constitutional Amendment assigns panchayati raj institutions (PRIs) the responsibility of providing drinking water.

1999:

For ensuring sustainability of the systems, steps are initiated to institutionalise community participation in the implementation of rural drinking water supply schemes through sector reform.

- Sector reform ushers in a paradigm shift from the 'Government-oriented supply-driven approach' to the 'People-oriented demand-responsive approach'. The role of the government is envisaged to change from that of service provider to facilitator. Under reform, 90 per cent of the infrastructure is funded by the government, with the community contributing 10 per cent of the remaining infrastructure cost and 100 per cent of operation and maintenance costs. Sector reforms projects were introduced in 67 districts across the country on pilot basis.
- Total Sanitation Campaign (TSC) as a part of reform principles initiated in 1999 to ensure sanitation facilities in rural areas with broader goal to eradicate the practice of open defecation. As part of the programme, a nominal subsidy in the form of incentive is given to rural poor households for construction of toilets. TSC gives strong emphasis on Information, Education and Communication, Capacity Building and Hygiene Education for effective behaviour change with involvement of PRIs, CBOs, and NGOs

Consolidation phase (2000 onwards)

2002:

- Nationwide scaling up of sector reform in the form of Swajaldhara.
- The National Water Policy is revised, according priority to serving villages that did not have adequate sources of safe water and to improve the level of service for villages classified as only partially covered.
- India commits to the Millennium Development Goals to halve by 2015, from 1990 levels, the proportion of people without sustainable access to safe drinking water and basic sanitation.

2004: All drinking water programmes are brought under the umbrella of the RGNDWM.

2005: The Government of India launches the Bharat Nirman Programme for overall development of rural areas by strengthening housing, roads, electricity, telephone, irrigation and drinking water infrastructure. The target is to provide drinking water to 55,069 uncovered habitations; those affected by poor water quality and slipped back habitations based on 2003 survey, within five years.

2007: Pattern of funding under the Swajaldhara Scheme changes from the previous 90:10

2009: The National Rural Drinking Water Programme (NRDWP) was launched in 2009, replacing Accelerated Rural Water Supply Programme (ARWSP) of 1972-73, where the key principles of potability, reliability, sustainability, convenience, equity and priority to consumers' preference were adopted. Under NRDWP, a criterion for allocation of funds to the states was introduced, which had given utmost priority to rural population and incentivised the community management of water schemes by allocating 10 per cent weightage to such initiatives.

2016: NRDWP, launched in 2009 and revised in 2016, ensured 'water safety plan' that mandates both identification of water quality problem and also safety solution through Village Water and Sanitation Committee (VWSC) constituted by the villagers. NRDWP has made provisions for monitoring quality at both treatment plant and consumption level. Focus is more on treating water at household level to bring down burden of water-borne diseases substantially.

2017: The National Water Quality Sub-Mission, started by the drinking-water ministry, will address the "urgent need" for clean drinking water in about 28,000 arsenic- and fluoride-affected identified habitations. The Centre will need to contribute about Rs 12,500 crore over four years to March 2021.

Water is a state subject but the Union government influences its supply through the National Rural Drinking Water Programme (NRDWP). However, it has actually slashed NRDWP's funding. In 2014-15, only 0.6% of total government funding was allocated to NRDWP and by 2018-19 even this had shrunk to 0.2%. In an NRDWP budget brief, Accountability Initiative, a non-profit research organization, points out that not only has allocation decreased, but actual fund releases have also fallen sharply. In 2017-18, just 72% of allocated funds were spent by NRDWP.

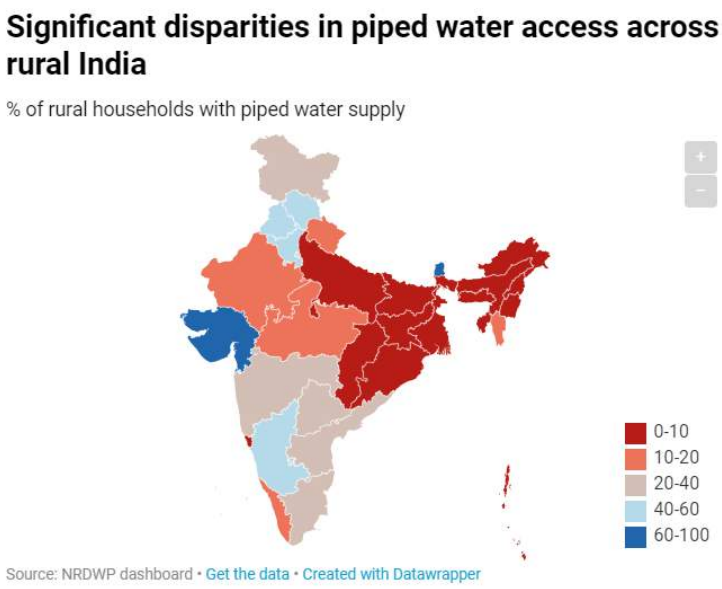
The programme's target: providing 35% of rural households with water connections and 40 litre – about two buckets – of water per person per day. Less than half that target was achieved, thanks to "poor execution" and "weak contract management", said the audit report from the Comptroller and Auditor General in its 2018 report.

Trends in the country

This funding cut comes even as the ministry of drinking water and sanitation's overall spending has increased. The majority of the ministry's budget is now allocated to the Swachh Bharat Mission (72% in 2018-19), the BJP's flagship scheme to improve sanitation in rural India. Improving sanitation is important, but water supply and better sanitation go hand in hand. NRDWP primarily focuses on providing potable water through piped household connections, but this water can be used for other purposes, including sanitation.

The lack of funding, combined with poor fund management, was an important factor behind NRDWP failing to meet important targets, according to a 2018 Comptroller and Auditor General performance audit. For instance, the programme was meant to provide at least 35% of rural households with piped water supply by 2017, and 80% households by 2020. Official data reveals that India is a long way from meeting these targets. Just 18.2% of rural households had piped water supply in 2018-19.

Status of Piped Water in the Country



Providing piped water to all households is a long overdue project.

Currently, less than 20 per cent of rural households have access to piped water; hand pumps are their main source of potable water. Piped water schemes in rural areas have been dogged by problems of infrastructure maintenance: Power fluctuations often damage motors and pipes are prone to leaks. Last year, a CAG report pointed out that "poor execution" has marred the National Rural Drinking Water Programme's attempt to provide piped drinking water to 35 per cent of the country's rural households. The auditor pointed out that, in most states, the panchayats were not provided with the informational know-how to operate the expensive piped water systems.

Historically, India has suffered from "hydro-schizophrenia", wherein the left hand of drinking water did not know what the right hand of irrigation was doing. When the drinking water aquifer was also used to irrigate water-intensive crops, it led to an exhaustion of drinking water. The formation of the Jal Shakti Ministry is a positive first step in overcoming this problem.

To ensure piped water supply to all rural households by 2024, there needs to be focus on integrated demand and supply side management of water at the local level, including source sustainability and management of household wastewater for reuse in agriculture.

But for this scheme to be a success certain preconditions must be met.

1. First, we need a clear understanding of the aquifers to be used for water supply. The National Aquifer Management Programme and the Atal Bhujal Yojana are both pioneering initiatives but they have failed to take off, primarily because the requisite multi-disciplinary capacities are missing within government. Paradoxically, as groundwater has become India's most important source, groundwater departments, at the Centre and in all states, have only become weaker. We need to urgently reverse this trend. We must also recognise that aquifer management at this unprecedented scale

cannot be left to government alone. It demands a large network of partnerships with relevant stakeholders, across the board.

2. We also need to ensure that the entire water supply system is operated and managed by local institutions led by women, adequately empowered to do so. They should decide upon tariffs for this water in a transparent and collective manner. Only then can these systems become sustainable and overcome historically inherited gender, caste and class inequities.

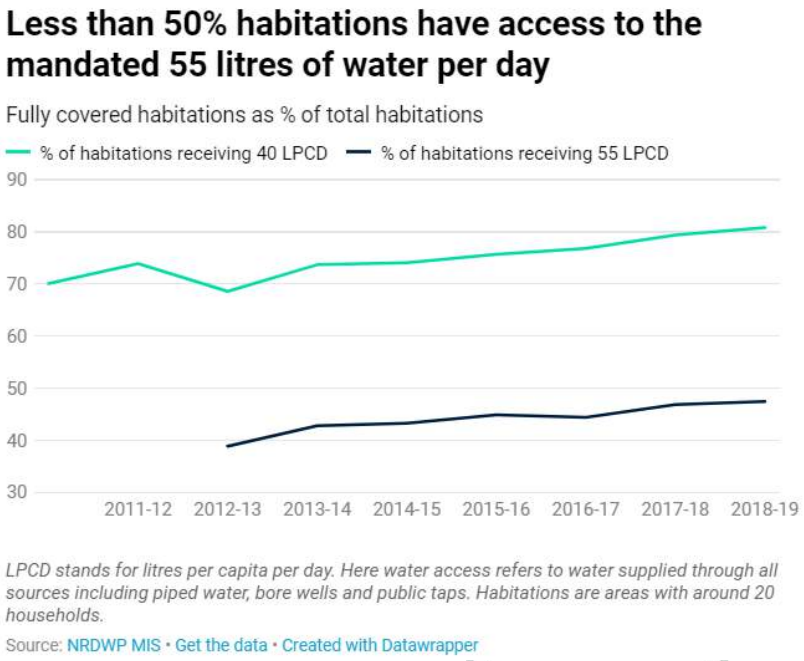
3. While drinking water is the first priority, we must remember that 90 per cent of India's water is consumed in agriculture. Without reducing this number, we can never hope to meet the domestic water needs of rural and urban India. Irrigation is monopolised by a few water-intensive crops like wheat, rice and sugarcane, even in chronically drought-prone states. A small reduction in the area under these crops would go a long way in addressing India's water problem. Any player in the stock market knows that to counter market volatility, we must diversify our stock portfolio. Farming faces an additional risk: Unpredictability of the weather. For such a risky enterprise to adopt monoculture is patently suicidal. But that is what policy has implicitly driven farmers to do. We have failed to incentivise crop diversification.
   Farmers grow water-intensive crops mainly because these are the only crops with an assured market, owing to government procurement or private purchase. We need to urgently diversify public procurement to include less water-consuming and more nutritious crops such as traditional millets and pulses. If we were to introduce them into the diets of the Integrated Child Development Services and Mid-day Meal Programs, globally the largest nutrition initiatives for children ever, we would create a large and steady demand for these crops, while also generating multiple win-wins: Greater water security, better soil health, higher, more stable net incomes for farmers and robust consumer health.

4. "Go back to basics" by promoting zero-budget natural farming: We urgently need to explore all possible alternatives to the 20th century paradigm of chemical agriculture. It is disheartening to find that a government committed to natural farming continues to provide as much as Rs 79,996 crore in chemical fertiliser subsidy, a rise of nearly Rs 10,000 crore over last year. Most of this subsidy (which in any case accrues mainly to fertiliser companies and not to small and marginal farmers) must be urgently diverted to facilitating the production of organic inputs by Farmer Producer Organisations and women's SHGs, to meet the huge demand likely to arise from the move towards natural farming. Only then can the FM credibly claim that "steps such as this can help in doubling our farmers' income in time for our 75th year of Independence".

5. Department of Water Resources within the new Jal Shakti ministry has not yet had the time to shake-off its outmoded pattern of budgetary allocations and its silo-based approach to surface and groundwater. This is totally in conflict with the refreshingly bold

pronouncements of the new Jal Shakti minister who seems fully committed to holistic, bottom-up river-basin management and river rejuvenation. It is also very strange to find that the watershed programme is not within the Jal Shakti Ministry, even though it is part of the PM Krishi Sinchai Yojana. Pathetically low allocations for this key programme are also a cause for serious concern.

The Jal Shakti ministry's challenge will be to ensure that such mistakes are not repeated. It will have to join several dots.



To address this, the NDA launched the National Water Quality Sub-Mission within NRDWP to treat water in 28,000 contaminated habitations. The number of contaminated habitations has decreased since 2011-12 but the share of these habitations that are being treated for contamination has also decreased.

Water Quality

Water quality remains a persistent issue partly because of India's reliance on groundwater, which is prone to being contaminated by chemicals. Nearly 88% of the piped water provided through NRDWP comes from groundwater. More than quality issues, reliance on groundwater could simply be unsustainable given the rapidly depleting groundwater levels driven by agriculture use.

Water access to all rural households will require addressing this issue of water scarcity and much more investment, especially if India is to meet the UN Sustainable Development Goal of clean drinking water for all by 2030.

Groundwater is the only source of water and it is contaminated with Flouride. The water is extracted through hand pump by UPJN. These hand pumps are India Mark II hand pumps and installed by the Jal Nigam. Flourosis is a common disease here due to high fluoride content of the groundwater. The village needs supply of clean drinking water immediately,

demand the villagers. There is no one to monitor the usage of the RO system, so the villagers use the filtered water for drinking, washing and bathing.

Towards cleaner water - Providing safe drinking water to all in rural India is a challenging task. Given the diversity of the country and its people, solutions have to be diverse. One has to look at an approach that seeks the participation of users through interventions engaging the communities with various government schemes and policies. Citizens should be made aware of the demand for clean drinking water as a right. Such an integrated approach would incorporate collaborative efforts of various sectors involving the government, civil society and needless to say the people.

Judgements defining people's **Right to Water**

Bandhua Mukti Morcha Vs. **Government of India (1984) –** "Right to healthy environment as part of right to life"

Subhash Kumar Vs. State of Bihar (1991) – "Right to life includes right to enjoyment of pollution free environment"

State of Karnataka Vs. **State of Andhra Pradesh (2000) –** "Right to water is right to life and thus a fundamental right"

Narmada Bachao Andolan Vs. Union of India (2000) – "Water is a basic need for survival of human beings and is part of right to life and thus a fundamental right"

Community Based Water Quality Monitoring

Many water quality problems are caused due to communities being unaware of the different aspects of managing and maintaining the quality of water resources. Raising their awareness of appropriate practices will help them realise the grim realities of depleting water sources and at the same time help in engaging them in monitoring and maintenance. There have been initiatives for community driven water monitoring programmes, such as the Community-managed Water Quality Surveillance Programme in Alappuzha district of Kerala by the Socio-Economic Unit Foundation, where the responsibility of management and operation of the water quality surveillance system has been entrusted to women's groups, called Water Quality Surveillance Groups (WQSG), as a self-employment programme.

Traditional Methods of Water Purification

- **Strychancs potatroum (Kataka seeds)** are natural coagulants used for the purification of muddy water.
- **Morenga olifers (drumstick) seeds are used as a coagulant.** They also inhibit the growth of bacteria and fungi.
- **Vetiveria zizanoides (khas)** are laid in a clay jar which has a few tiny holes in its bottom. Water filtered through this layer of roots is not only clear but also has a pleasant smell.
- **Dusting of water with plant ashes, earth from termite hills, paddy husks or crushed seed coats from elaichi (Elettaria cardamum)** improves clarity of water.
- **Osimum sanctum (Tulsi)** is a water purifier with antibacterial an insecticidal properties.
- **Water stored in Copper or brass pots** do not breed bacteria

Treatment Methods

Parameter	Treatment Methods
Turbidity	✓ Cloth Filtration ✓ Slow Sand Filtration ✓ Coagulation ✓ Candle Filtration
Odour	✓ Aeration ✓ Carbon Filtering using charcoal ✓ Boiling
Colour	✓ Carbon Filtering using charcoal ✓ Slow Sand Filtration
Bacterial Impurities	✓ Boiling ✓ Chlorination ✓ Ultra Violet Radiation - SODIS ✓ Slow Sand Filtration
Fluoride	✓ Activated Alumina Technology ✓ Nalgonda Technique
Ammonia	✓ Chlorination ✓ Boiling
Iron	✓ Oxidation and settling
Hardness	✓ Boiling and Settling/ Filtration ✓ Reverse Osmosis
Chloride	✓ Reverse Osmosis
Arsenic	✓ Ion-exchange ✓ Alum-Iron Coagulation

Revival of traditional water conservation structures

Archaeological evidence shows that the practice of water conservation is deep rooted in the science of ancient India. Excavations show that the cities of the Indus Valley Civilisation had excellent systems of water harvesting and drainage. The settlement of Dholavira, laid out on a slope between two storm water channels, is a great example of water engineering. Chanakya's Arthashashtra mentions irrigation using water harvesting systems. Sringaverapura, near Allahabad, had a sophisticated water harvesting system that used the natural slope of the land to store the floodwaters of the river Ganga. Chola King Karikala built the Grand Anicut or Kallanai across the river Cauvery to divert water for irrigation (it is still functional) while King Bhoja of Bhopal built the largest artificial lake in India.

1. Jhalara

Jhalaras are typically rectangular-shaped stepwells that have tiered steps on three or four sides. These stepwells collect the subterranean seepage of an upstream reservoir or a lake. Jhalaras were built to ensure easy and regular supply of water for religious rites, royal ceremonies and community use. The city of Jodhpur has eight jhalaras, the oldest being the Mahamandir Jhalara that dates back to 1660 AD.

2. Talab /Bandhi

Talabs are reservoirs that store water for household consumption and drinking purposes. They may be natural, such as the *pokhariyan* ponds at Tikamgarh in the Bundelkhand region or man-made, such as the lakes of Udaipur. A reservoir with an area less than five *bighas* is called a *talai,* a medium sized lake is called a *bandhi* and bigger lakes are called *sagar* or *samand*.

3. Bawari

Bawaris are unique stepwells that were once a part of the ancient networks of water storage in the cities of Rajasthan. The little rain that the region received would be diverted to man-made tanks through canals built on the hilly outskirts of cities. The water would then percolate into the ground, raising the water table and recharging a deep and intricate network of aquifers. To minimise water loss through evaporation, a series of layered steps were built around the reservoirs to narrow and deepen the wells.

4. Taanka

Taanka is a traditional rainwater harvesting technique indigenous to the Thar desert region of Rajasthan. A Taanka is a cylindrical paved underground pit into which rainwater from rooftops, courtyards or artificially prepared catchments flows. Once completely filled, the water stored in a taanka can last throughout the dry season and is sufficient for a family of 5-6 members. An important element of water security in these arid regions, taankas can save families from the everyday drudgery of fetching water from distant sources.

5. Ahar Pynes

Ahar Pynes are traditional floodwater harvesting systems indigenous to South Bihar. Ahars are reservoirs with embankments on three sides that are built at the end of diversion channels like pynes. Pynes are artificial rivulets led off from rivers to collect water in the ahars for irrigation in the dry months. Paddy cultivation in this relatively low rainfall area depends mostly on ahar pynes.

6. Johads

Johads, one of the oldest systems used to conserve and recharge ground water, are small earthen check dams that capture and store rainwater. Constructed in an area with naturally high elevation on three sides, a storage pit is made by excavating the area, and excavated soil is used to create a wall on the fourth side. Sometimes, several johads are interconnected through deep channels, with a single outlet opening into a river or stream nearby. This prevents structural damage to the water pits that are also called madakas in Karnataka and pemghara in Odisha.

7. Panam Keni

The Kuruma tribe (a native tribe of Wayanad) uses a special type of well, called the panam keni, to store water. Wooden cylinders are made by soaking the stems of toddy palms in water for a long time so that the core rots away until only the hard outer layer remains. These cylinders, four feet in diameter as well as depth, are then immersed in groundwater springs located in fields and forests. This is the secret behind how these wells have abundant water even in the hottest summer months.

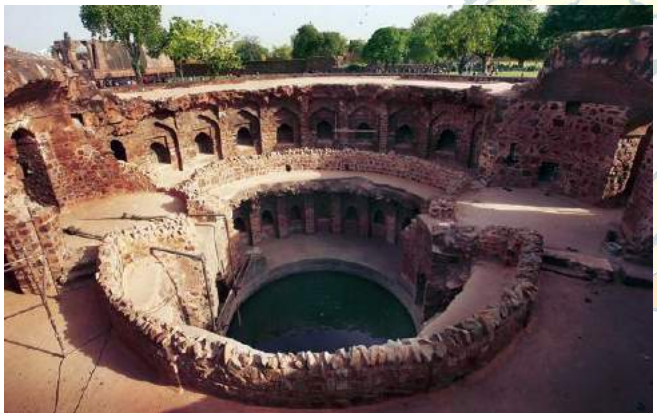
8. Khadin

Khadins are ingenious constructions designed to harvest surface runoff water for agriculture. The main feature of a khadin, also called dhora, is a long earthen embankment that is built across the hill slopes of gravelly uplands. Sluices and spillways allow the excess water to drain off and the water-saturated land is then used for crop production. First designed by the Paliwal Brahmins of Jaisalmer in the 15th century, this system is very similar to the irrigation methods of the people of ancient Ur (present Iraq).

9. Kund

A kund is a saucer-shaped catchment area that gently slopes towards the central circular underground well. Its main purpose is to harvest rainwater for drinking. Kunds dot the sandier tracts of western Rajasthan and Gujarat. Traditionally, these well-pits were covered in disinfectant lime and ash, though many modern kunds have been constructed simply with cement. Raja Sur Singh is said to have built the earliest known kunds in the village of Vadi Ka Melan in the year 1607 AD.

10. Baoli



Built by the nobility for civic, strategic or philanthropic reasons, baolis were secular structures from which everyone could draw water. These beautiful stepwells typically have beautiful arches, carved motifs and sometimes, rooms on their sides. The locations of baolis often suggest the way in which they were used. Baolis within villages were mainly used for utilitarian purposes and social gatherings. Baolis on trade routes were often frequented as resting places. Stepwells used exclusively for agriculture had drainage systems that channelled water into the fields.

11. Nadi

Found near Jodhpur in Rajasthan, nadis are village ponds that store rainwater collected from adjoining natural catchment areas. The location of a nadi has a strong bearing on its storage capacity and hence the site of a nadi is chosen after careful deliberation of its catchment and runoff characteristics. Since nadis received their water supply from erratic, torrential rainfall, large amounts of sandy sediments were regularly deposited in them, resulting in quick siltation. A local voluntary organisation, the Mewar Krishak Vikas Samiti (MKVS) has been adding systems like spillways and silt traps to old nadis and promoting afforestation of their drainage basin to prevent siltation.

12. Bhandara Phad

Phad, a community-managed irrigation system, probably came into existence a few centuries ago. The system starts with a *bhandhara* (check dam) built across a river, from which *kalvas* (canals) branch out to carry water into the fields in the phad (agricultural block). *Sandams* (escapes outlets) ensure that the excess water is removed from the canals by *charis* (distributaries) and *sarangs* (field channels). The Phad system is operated on three rivers in the Tapi basin – Panjhra, Mosam and Aram – in the Dhule and Nasik districts of Maharashtra.

13. Zing

Zings, found in Ladakh, are small tanks that collect melting glacier water. A network of guiding channels brings water from the glacier to the tank. A trickle in the morning, the melting waters of the glacier turn into a flowing stream by the afternoon. The water, collected by evening, is used in the fields on the following day. A water official called a *Chirpun* is responsible for the equitable distribution of water in this dry region that relies on melting glacial water to meet its farming needs.

14. Kuhls

Kuhls are surface water channels found in the mountainous regions of Himachal Pradesh. The channels carry glacial waters from rivers and streams into the fields. The Kangra Valley system has an estimated 715 major kuhls and 2,500 minor kuhls that irrigate more than 30,000 hectares in the valley. An important cultural tradition, the kuhls were built either through public donations or by royal rulers. A kohli would be designated as the master of the kuhl and he would be responsible for the maintenance of the kuhl.

15. Zabo

The Zabo (meaning 'impounding run-off') system combines water conservation with forestry, agriculture and animal care. Practised in Nagaland, Zabo is also known as the Ruza system. Rainwater that falls on forested hilltops is collected by channels that deposit the run-off water in pond-like structures created on the terraced hillsides. The channels also pass through cattle yards, collecting the dung and urine of animals, before ultimately meandering into paddy fields at the foot of the hill. Ponds created in the paddy field are then used to rear fish and foster the growth of medicinal plants.

16. Bamboo Drip Irrigation

Bamboo Drip irrigation System is an ingenious system of efficient water management that has been practised for over two centuries in northeast India. The tribal farmers of the region have developed a system for irrigation in which water from perennial springs is diverted to the terrace fields using varying sizes and shapes of bamboo pipes. Best suited for crops requiring less water, the system ensures that small drops of water are delivered directly to the roots of the plants. This ancient system is used by the farmers of Khasi and Jaintia hills to drip-irrigate their black pepper cultivation.

17. Jackwells

The Shompen tribe of the Great Nicobar Islands lives in a region of rugged topography that they make full use of to harvest water. In this system, the low-lying region of the island is covered with jackwells (pits encircled by bunds made from logs of hard wood). A full-length bamboo is cut longitudinally and placed on a gentle slope with the lower end leading the water into the jackwell. Often, these split bamboos are placed under trees to collect the runoff water from leaves. Big jackwells are interconnected with more bamboos so that the overflow from one jackwell leads to the other, ultimately leading to the biggest jackwell.

18. Ramtek Model

The Ramtek model has been named after the water harvesting structures in the town of Ramtek in Maharashtra. An intricate network of groundwater and surface water bodies, this system was constructed and maintained mostly by the malguzars (landowners) of the region. In this system, tanks connected by underground and surface canals form a chain that extends from the foothills to the plains. Once tanks located in the hills are filled to capacity, the water flows down to fill successive tanks, generally ending in a small waterhole. This system conserves about 60 to 70 % of the total runoff in the region!

19. Pat System

The Pat system, in which the peculiarities of the terrain are used to divert water from hill streams into irrigation channels, was developed in the Bhitada village in Jhabua district of Madhya Pradesh. Diversion bunds are made across a stream near the village by piling up stones and then lining them with teak leaves and mud to make them leak-proof. The Pat channel then passes through deep ditches and stone aqueducts that are skilfully cut info stone cliffs to create an irrigation system that the villagers use in turn.

20. Eri

The Eri (tank) system of Tamil Nadu is one of the oldest water management systems in India. Still widely used in the state, eris act as flood-control systems, prevent soil erosion and wastage of runoff during periods of heavy rainfall, and also recharge the groundwater. Eris can either be a system eri, which is fed by channels that divert river water, or a non-system eri, that is fed solely by rain. The tanks are interconnected in order to enable access to the farthest village and to balance the water level in case of excess supply. The eri system enables the complete use of river water for irrigation and without them, paddy cultivation would have been impossible in Tamil Nadu.

These ecologically safe traditional systems are viable and cost-effective alternatives to rejuvenate India's depleted water resources. Productively combining these structures with

modern rainwater-saving techniques, such as percolation tanks, injection wells and subsurface barriers, could be the answer to India's perennial water woes.

Solve: India is not a water-deficient country. We have merely managed our plentiful water very poorly. Discuss.

All the best ☺