

Sub-Theme-II

Health, Hygiene and Sanitation



Health, Hygiene and Sanitation

2.1. Background

Health is the level of functional and metabolic efficiency of a living organism. The World Health Organization (WHO-2006) defined human health in its broader sense as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”. (http://www.who.int/governance/eb/who_constitution_en.pdf) Health, or health and well-being, also includes a supportive environment, personal security, freedom of choice, social relationships, adequate employment and income, access to educational resources, and cultural identity (Diaz et al., 2006; Millennium Assessment 2005).



Over the last decade, health promotion practitioners have increasingly been asked to think about the relationships between humans and the environment in terms of ecosystems (Brown, 1994) and to adopt an ‘ecological’ approach to health promotion (Kickbusch, 1989) with the environment an integral part of human development (Hancock, 1993a).



Hygiene is a set of practices performed to preserve health. According to the World Health Organization (WHO), “Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases. Hygiene is a concept related to cleanliness, health and medicine. It is as well related to personal and professional care practices. In medicine and everyday life settings, hygiene practices are employed as preventative measures to reduce the incidence and spreading of disease. Hygiene practices vary, and what is considered acceptable in one culture might not be acceptable in another. In the manufacturing of food, pharmaceutical, cosmetic and other products, good hygiene is a critical component of quality assurance.

The terms cleanliness and hygiene are often used interchangeably, which can cause confusion. In general, hygiene refers to practices that prevent spread of

disease-causing organisms. Cleaning processes (e.g., hand washing) remove infectious microbes as well as dirt and soil, and are thus often the means to achieve hygiene.

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and feces. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal.(WHO).



Environmental sanitation envisages promotion of health of the community by providing clean environment and breaking the cycle of disease. It depends on various factors that include hygiene, status of the people, types of resources available, innovative and appropriate technologies according to the requirement of the community, socioeconomic development of the country, cultural factors related to environmental sanitation, political commitment, capacity building of the concerned sectors, social factors including behavioral pattern of the community, legislative measures adopted, and others. India is still lagging far behind many countries in the field of environmental sanitation.(Pandve, 2008).

Ecological sanitation, which is commonly abbreviated to ecosan, is an approach, rather than a technology or a device which is characterized by a desire to “close the loop” (mainly for the nutrients and organic matter) between sanitation and agriculture in a safe manner. Put in other words: “**Ecosan systems** safely recycle excreta resources (plant nutrients and organic matter) to crop production in such a way that the use of non-renewable resources is minimized”. When properly designed and operated, ecosan systems provide a hygienically safe, economical, and closed-loop system to convert human excreta into nutrients to be returned to the soil, and water to be returned to the land. Ecosan is also called resource-oriented sanitation

Sustainable sanitation considers the entire “sanitation value chain”, from the experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment, and reuse or disposal. The term is widely used since about 2009. In 2007 the Sustainable Sanitation Alliance defined five sustainability criteria to compare the sustainability of sanitation systems. In order to be sustainable, a sanitation system has to be economically viable, socially acceptable, technically and institutionally appropriate, and it should also protect the environment and the natural resource

Sustainable Development – the core concept for the Post-2015 Development Agenda – provides an *integrated response* to the complex environmental, societal, economic and governance challenges that directly and disproportionately affect children. With appropriate focus, investment and innovation, the Post-2015 Development Agenda presents an unprecedented opportunity to create a *World Fit for All Children*.

The relationship between children and sustainable development is symbiotic. Progress in sustainable development underpins child rights and well-being, and conversely, child rights and well-being underpin lasting and equitable development progress. Finding the balance to achieve progress for all in today's world and for future generations depends upon three key propositions:

1. Sustainable development starts with safe, healthy and well-educated children;
2. Safe and sustainable societies are, in turn, essential for sensitive groups such as children, women and elderly; and
3. Children's voices, choices and participation are critical for the sustainable future we want.

2.2. Focus of the Sub theme

The primary objective of this sub theme is to explore, document and analyze the role of health, hygiene and sanitation on the health of not only humans but of the entire ecosystem and thus its impact on sustainable development in terms of use of science, technology and innovative approaches and ideas. The brief objectives are could be :

- i. Identifying the status of prevailing sanitary and hygiene conditions which affect the health and wellbeing of living beings. This may in turn have major impact on economic productivity, since inadequate sanitation impacts individuals, households, eco systems, communities and nations as a whole.
- ii. Addressing mental health problems amongst children and adolescents which include depression, anxiety, eating and sleeping disorders that can be attributed to several reasons such as decrease in physical activities, spending too much time in the virtual world which put such children at risk of delayed emotional and social development.
- iii. Improving health conditions of the urban/peri-urban and rural citizens, especially children, women and elderly through providing access to safe drinking water, sanitation and introducing preventive interventions in domestic places, workplaces and outdoors.

2.3. Logical Frame work

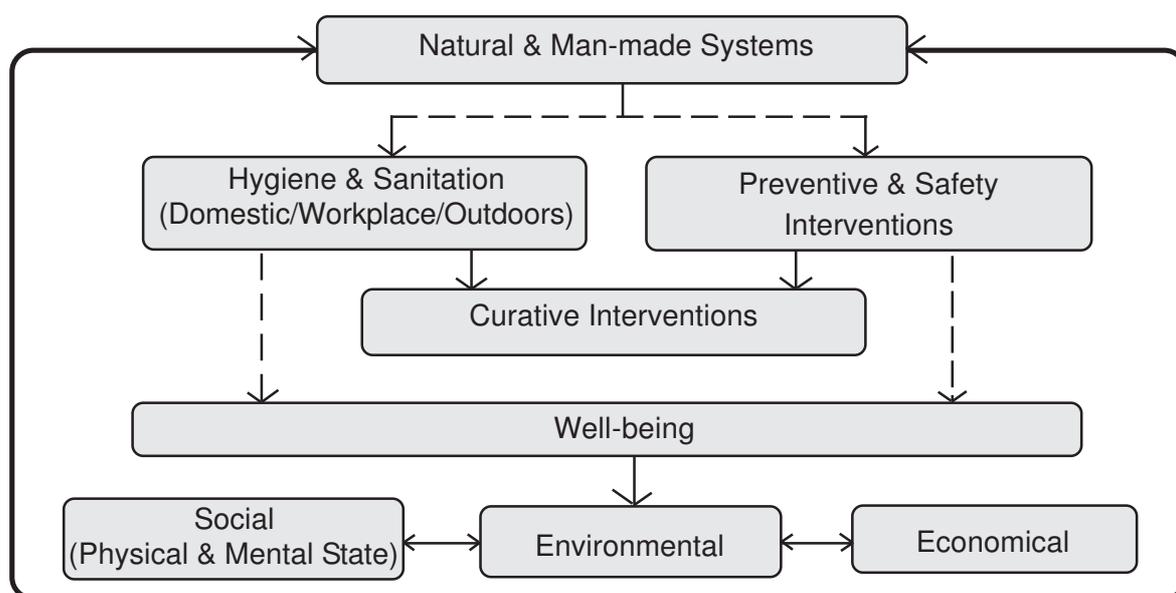
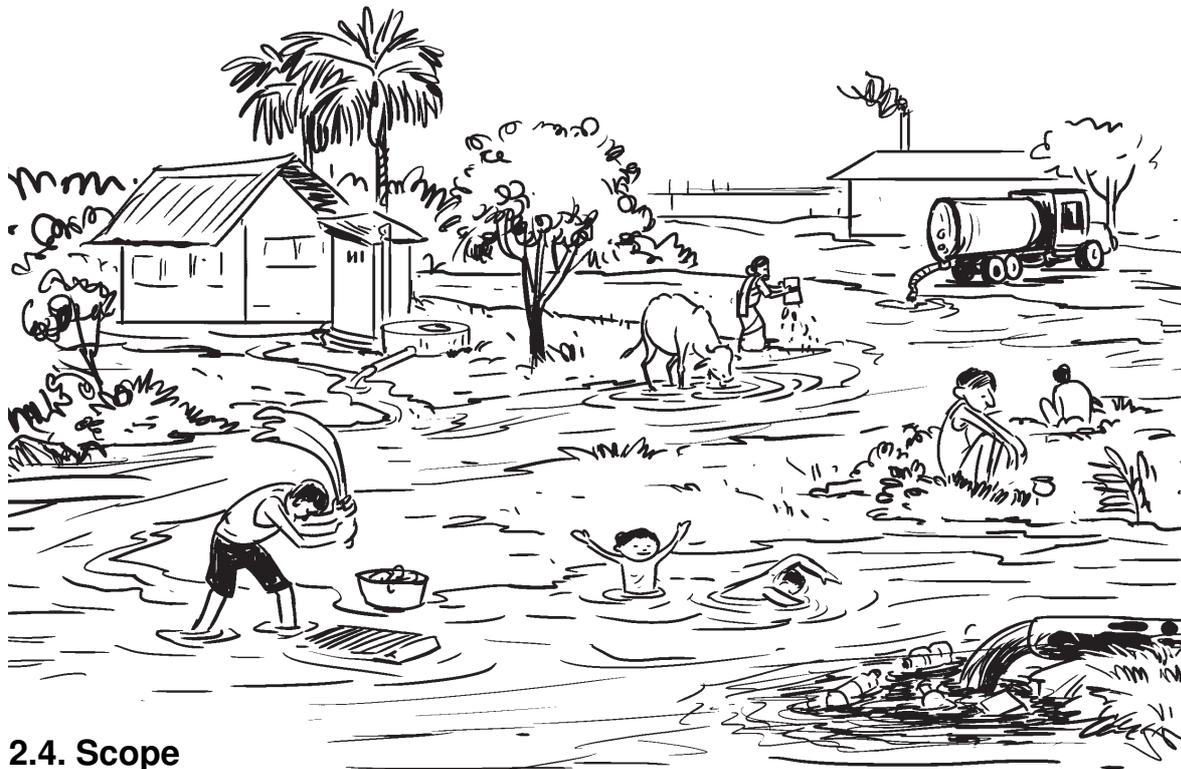


Fig.-2.3. Flow chart showing relationship of health, hygiene and sanitation with sustainable development



2.4. Scope

The strong synergies between health and nutrition (World Bank 2013) are well-documented; good health is not possible without good nutrition. Malnutrition remains one of the main determinants of the global burden of disease, with 45% of child mortality attributable to under nutrition (Black et. al. 2013).

The major challenges faced by the sanitation sector are the lack of proper sanitation for the majority, ill effects owing to poor sanitation, water shortage and pollution, food insecurity and unplanned urban growth. The population un-served by sanitation facility is about 40% of the world population. Approximately 6000 children die every day from diarrheal diseases related to inadequate sanitation and hygiene. About 1 billion people worldwide-mostly children - are infested with intestinal worms and as a result suffer from nutritional deficiency and poor growth. Both these groups of diseases are mostly transmitted through unhygienic conditions. Sewage discharges are a major component of water pollution all over the world. Only a small portion of the polluted water is treated before it is discharged into open water channels or bodies. Pollutants also leak into ground water from sewers, septic tanks, soak pit toilets and cesspools. By 2030, more than half of world population will face shortage of water.

The sanitation practices promoted today are either based on hiding the human excreta in deep pits (drop-and-store) or on flushing them away and diluting them in rivers, lakes and the sea (flush-and-discharge). Whereas ecological sanitation is based on three fundamental principles which are preventing pollution rather than attempting to control it after we pollute; sanitizing the urine and faeces; and using the safe products for agricultural purposes (sanitize – and –recycle).



Spurred on by Agenda Goals, along with changing national realities, many low and middle-income countries will need to invest heavily in sanitation in the next decade. The decisions they make and the approaches they take today will have far-reaching consequences for sustainability and for the well-being of their citizens.

Sanitation is an integral piece of the sustainable development puzzle. The right sanitation systems can not only minimize health and environmental risks associated with open defecation and poorly managed waste disposal, but also, in many cases, yield multiple benefits in areas from health to food security, resilient livelihoods, business growth, energy, and ecosystem services. The Initiative focus on “productive” sanitation approaches.

Hygiene - specifically hand-washing with soap - is one of the most important interventions for human health and development and is a universal necessity. Fundamental to fighting under nutrition, reducing child mortality, overcoming antibiotic resistance, and advancing access to education, hygiene underpins the delivery of several other SDGs and ultimately advances gender equity, dignity, and human rights.



Promotion and demonstration of safe hygiene practices – i.e., hand-washing with soap, food hygiene, menstrual hygiene management, safe stool disposal, and solid waste management – at the household, community and institutional level needs to be carried out collaboratively with the health, education, community development and business development sectors . The success of these programs involves ensuring that schools and health facilities enable the practice of safe hygiene behaviors and those health workers and educators are trained on appropriate behavior change Communication. Developing educational and communication materials for WASH, and strengthening school health club programs, are also instrumental to reinforcing hygiene promotion in schools.

The concept of **WASH**, groups together water, sanitation, and hygiene because the impact of deficiencies in each area overlap strongly. Addressing these deficiencies together can achieve a strong positive impact on public health.

The UN's Millennium Development Goals included improvement of WASH services in Target 7.C: “Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation. This has been replaced by the Sustainable Development Goals, where Target 6 aims to “ensure availability and sustainable management of water and sanitation for all”.

Access to WASH, in particular safe water, adequate sanitation, and proper hygiene education, can reduce illness and death, and also affect poverty reduction and socio-economic development. Lack of sanitation contributes to approximately 700,000 child deaths every year due to diarrhea. Chronic diarrhea can have a negative effect on child development (both physical and cognitive) In addition, lack of WASH facilities can prevent students from attending school, impose a burden on women and diminish productivity.

Although access to sanitation has been improving over the past decades, the World Health Organization (WHO) estimates that still “2.5 billion people – more than one third of the global population – live without basic sanitation facilities”. In 2015, 750 million people lacked access to safe, clean drinking water and approximately 2,300 people die every day from diarrhoea

Policies made in all sectors can have a profound effect on population health and health equity. The health of people is not solely a health sector responsibility; it is also impacted by issues such as transport, agriculture, housing, trade and foreign policy. To address the multi-sectoral nature of health determinants requires the political will to engage the whole of government in health. The health sector should promote “Health for All” policy across sectors that systematically takes into account the health implications on decisions, seeks synergies and avoids harmful health impacts in order to improve population health and health equity and address the social determinants of health.



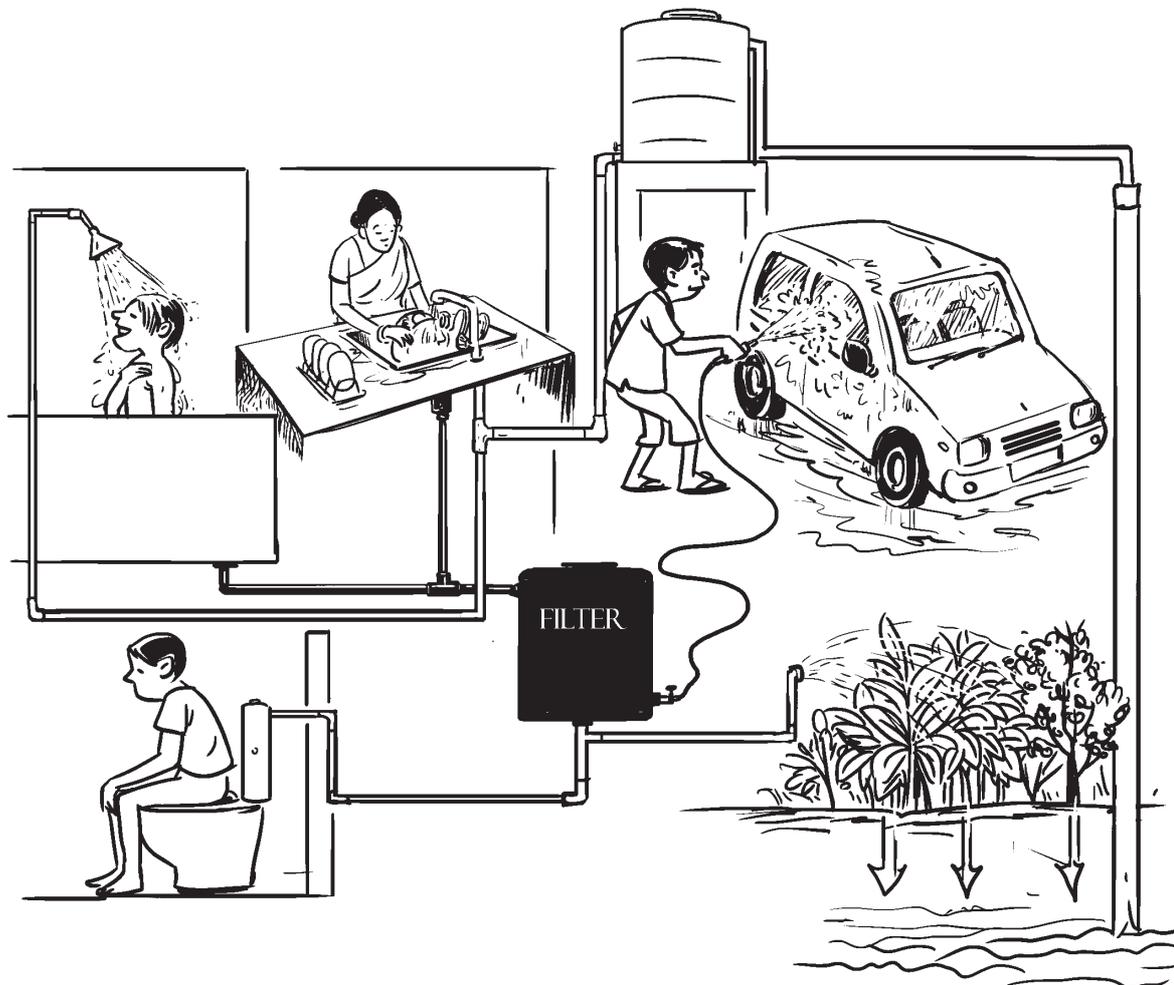
In short;

- Today more than 1 billion people are chronically undernourished and food insecure.
- Undernourishment compromises immune systems, which leads to a higher incidence of illness and disease that in turn contribute to lower productivity and life expectancies.
- Poor nutrition undermines economic growth. According to UNICEF, billions of children younger than 5 are chronically malnourished. Chronic undernourishment in children creates a vicious cycle of compromised physical and cognitive development that reduces their economic productivity when they become adults, mirroring people in poverty that, in turn, leads to chronic undernourishment and poor health in the next generation.
- A massive disease burden is associated with deficient hygiene, sanitation, and water supply and is largely preventable with proven, cost-effective interventions.
- The total benefits of these interventions are greater than the health benefits alone and can be valued at more than the costs of the interventions.
- Hygiene, sanitation, and water supply are development priorities, yet the ambition of international policy on drinking water and sanitation is inadequate.
- Hygiene, sanitation, and water supply continue to have health implications in the developed world.
- The active involvement of health professionals in hygiene, sanitation, and water supply is crucial to accelerating and consolidating progress for health.

2.5. Project Ideas

Project – 1:

Bio-filtration/bio-remediation processes to improve water quality for reuse



Introduction

About 30% of the drinking quality of water is used everyday to flush the toilets, Grey water (from kitchen, bath and wash) generated in a household if treated can be reused for flushing toilets and gardening purposes using reed-bed (a channel filled with pebbles with aquatic plants growing on it), it would be possible to improve the quality of water for reuse.

Objective

- 1) To assess the quality and quantity of water required for different household uses
- 2) To understand the influence of growing microbial and plant communities on the quality of water passing through it
- 3) To understand the influence of residence time on the emergent water quality

Methodology

- 1) Collect samples of Grey water (Kitchen, Bath, Wash) and check for its quality (bacterial and physical)
- 2) Construct a reed bed in a plastic drum by filling it with clean pebbles and planting wetland plants (plants growing on the submerged edges of ponds)
- 3) Pass the grey water from the bottom to emerge from the top
- 4) Monitor the water quality difference between the incoming and outgoing water
- 5) Increase the residence time of grey water in the reed bed and record its influence on emergent water quality
- 6) Determine the optimum size of a reedbed required by a household



Expected outcome

1. Understanding the way in which wetlands purify water
2. Understanding designing and sizing of a reedbed to suit family needs
3. Appreciation of simple, economical ways of reusing & conserving water at household level

Project – 2:

Study of plant and animal diversity in a pond as an indicator of water quality



Introduction

Aquatic biota are very sensitive to water quality. As the water quality deteriorates the plant and animal communities also change. Studying the presence of flora and fauna in ponds of different water quality will help in understanding the tolerance of biota to pollution.

Objective

1. Understanding the influence of water quality on the aquatic biota
2. To relate the presence or absence of aquatic fauna and flora to pollution levels

Methodology

1. Identify ponds of different pollution status in your locality
2. Study the presence of macro fauna and flora, and identify them
3. Collect the water samples from the ponds and test their quality (physico-chemical and biological including bacteriological)
4. Relate the water quality to the presence of the aquatic biota

Expected outcome

1. To appreciate the sensitivity of the aquatic biota to changing water quality
2. To understand the influence of pollution level on the aquatic ecosystem
3. To be able to use the presence or absence of the aquatic biota to predict water quality

Project – 3:

Personal hygiene – for not missing out on studies

Objective:

To establish role between personal hygiene and health in everyday life, particularly for students

Methodology

1. Design and develop a questionnaire with key questions related to personal hygiene (hand-washing, bathing, using soap, cleanliness – hair, nail, frequency of keeping oneself clean, and the likes)
2. Record number of children absent for a definite period (may be for a month)
3. Assess reasons behind the absence, and identify number absent due to illness
4. Correlate type of illness with parameters of personal hygiene (a common factor among children)
5. Record number of classes, chapters in different subjects missed out by the absentees
6. Record level of personal hygiene followed by the others who has been present all through the study period
7. Create awareness about personal hygiene measures to be taken and the manner in which these are to be adopted



Expected Results

Establish the role of personal hygiene with the missed out studies, signifying importance attached to personal hygiene on day-to-day basis.

Project- 4:

Improving quality of potable water

Objective

Assess quality of potable water in school / community and make it fit for consumption (if not consumable) using suitable mechanisms / process



Methodology

1. Collect 100 ml of water sample in a dry and clean (free from any kind of chemicals) bottle or container from the source
2. Analyze the sample collected for physical (color, smell, turbidity, etc.), chemical (pH, metals, etc.), and microbial (algae, bacteria, etc.) properties, at school / college / research institute / laboratory
3. Establish whether the sample water, based on properties analyzed, fit for consumption
4. If found unfit for consumption, use suitable mechanism / process, like bio-filtration (filtration through specific type of plant and the likes)
5. After processing, reanalyze for properties

Expected Results

Establish the efficacy of the bio-filtration

Project – 5:

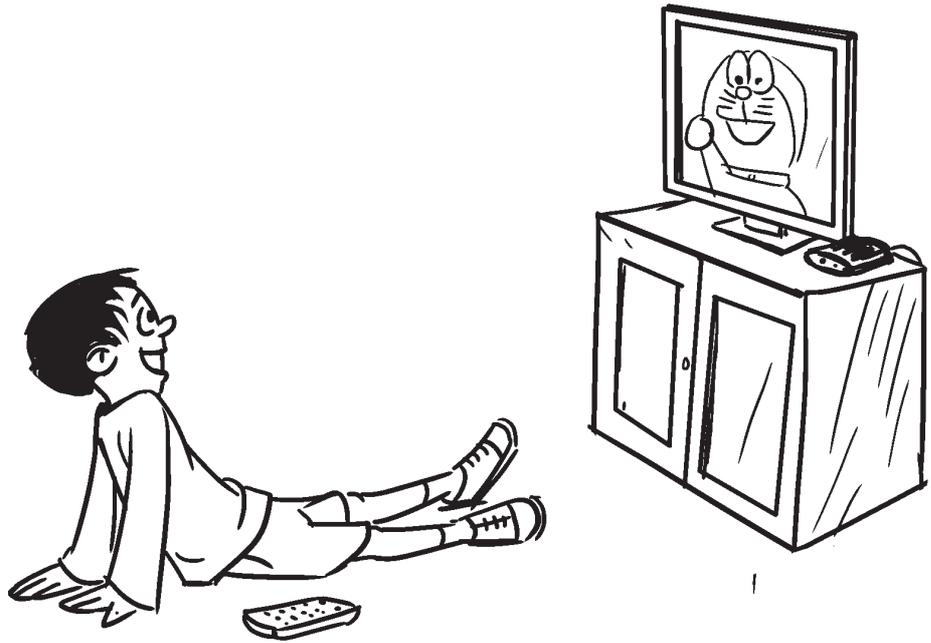
Perform studies to understand the cognitive development in kids due to extended exposure to electronic media

Objectives

- 1) To develop an understanding of changing lifestyle amongst children
- 2) To explore and understand the overall psychological problems of children.
- 3) To develop a comparative understanding of lifestyles of rural children and urban children with respect to the impact of exposure to electronic media day to day activities
- 4) Finding out if there is any relationship between children who are engaged in excessive exposure to Internet/cell phones with behaviours such as parent conflict/difficulty in making friends/other social changes in behaviour

Background

Changing lifestyles: lack of physical activities, excessive uncontrolled use of digital gadgets and online social media, decreasing social communication, competitiveness, diversified backgrounds and many such reasons attributing to growing stress, anxiety and other disorders amongst children.



Methodology

- 1) Base line surveys of children living in rural areas as well as urban areas
- 2) Surveys should act as an instrument to understand children's engagement with Digital Gadgets and Online Social Media/Apps eg. (Facebook, Twitter, Instagram, WhatsApp) and understanding their response, activity and behavioral patterns of the students etc.
- 3) Key information interviews/questionnaires – children, parents and teachers from both rural and urban communities

Expected Results

- 1) Change in Rural & Urban lifestyle Map with respect to exposure to digital Media and its Impacts.
- 2) Analysis of current trends in use of electronic media for a given set of demographic conditions
- 3) Report on relationship between children who are engaged in excessive exposure to Internet/cell phones with deviant social behaviours

Case Study-1

Aging is a critical societal concern in developed countries and many high class families in developing countries like ours as well. Especially, the elderly living alone may face various health problems in their daily lives. Social welfare organizations or people themselves hire social caregivers to help the senior citizens who live alone; however, there often is a shortage of professional caregivers due to steep increase in elderly population and insufficient budget. You would like to address this problem by developing a cheap technology-driven solution to monitor and help the elderly on a daily basis.

Case Study-2

What causes sustainable changes in hygiene behaviour? A cross-sectional study from Kerala, India (Cairncross et al., 2005)

This study was designed and the field work carried out by a non-governmental organization (NGO) responsible for implementing hygiene promotion. The sustainability of changed hygiene behaviour was studied at various periods up to nine years after the conclusion of a multifaceted hygiene promotion intervention in Kerala, India. Various methods including a questionnaire to assess knowledge, spot observation, demonstration of skills on request, and household pocket voting were used and compared for the measurement of the hygiene outcome. Pocket voting gave the lowest prevalence of good practice, which we infer to be the more accurate. Good hand washing practice was reported by more than half the adults in intervention areas, but < 10% in a control area. Hand washing prevalence showed no association with the elapsed time since the interventions, indicating that behaviour change had occurred and persisted. Recall of participation in health education classes was significantly associated with good hygiene as indicated by women's hand washing practice (OR 2.04, CI 1.05–3.96) and by several other outcomes, suggesting that the classes were an effective component of the intervention. The evidence for a specific impact on behaviour from home visits and an awareness campaign is less strong, although the home visits had influenced knowledge. The finding of an association between interventions and male hand washing, in ecological analysis (comparing administrative areas i.e. panchayats) but not at individual level, suggests that the effect of the interventions on men may have been indirect, via women or neighbours, underlining the need to direct interventions at men as well as women. The finding that hygiene behaviour persisted for years implies that hygiene promotion is a more cost-effective health intervention than previously supposed.



Problem: Unobtrusive Fall Monitoring

Lots of elderly people fall unexpectedly at home due to their weakened muscles and motor ability. Also, internal health problems like stroke could cause sudden falls. Fall is one of the biggest threats to the elderly, especially for those who live alone, since they cannot get immediate help from their family. You would like to design an accurate and robust sensor-driven system to monitor if an elderly falls. Upon the detection of fall, your system will automatically call an ambulance and notify a nearby hospital.

Objectives

You have the following four objectives for the design of your system: (1) high coverage (the whole apartment unit needs to be covered), (2) low cost (the cost of sensors should be less than 15,000INR per house), and (3) low false negative rate (ideally, all falls need to be detected while you can have a few false positives), (4) passive monitoring (the elderly does not want to wear or hold any types of devices).

Methodology

A key part of this system is to monitor the occurrence of falls. The requirements for its first version are: 1) to detect 'catastrophic falls' where the elderly person falls and unconscious or immobile for more than 30 seconds, and 2) to cover a one-bedroom apartment unit (with 1 main door, 1 living room, 1 bedroom, 1 kitchen and 1 bathroom) where one elderly person lives alone. You don't have to consider scenarios where the elderly falls and gets up within 30 seconds or there are visitors at home who can provide *in-situ* help.

2.6. Additional Project Ideas

1. Metals / heavy metals in potable water and its management
2. Water quality assessment
3. Biofiltration / bioremediation processes to make water available for recycling
4. Hygiene at personal / familial / community level and its impact on community health
5. Assessment of hygiene maintained at regular basis
6. Level of hygienic conditions during different seasons
7. Occurrence of diseases due to breakdown in hygienic conditions and its management
8. Waste management (eg.Diapers)
9. Diseases (microbial / parasitic) and their impact of social / economical / environmental parameters
10. Impact and management of zoonotic diseases
11. Impact and management of conditions arising out of vital nutrient deficiency / malnutrition
12. Comparison of sanitation before and after Swachh Bharat campaign, in terms of behavioral change
13. Impact of cookware used to cook on health
14. Effect of Indoor Air Pollution on health
15. Maternal health and hygiene during pre and post-partum stages
16. Gender specific health and hygiene and its control / management

17. Safe use of anthropogenic waste in agriculture.
18. Impact of use of public transport on community health.
19. Improving occupational health.
20. Promoting city health through sensing technologies
21. Unobtrusive fall monitoring of the elderly.

Swachh Bharat Abhiyan

“A clean India would be the best tribute India could pay to Mahatma Gandhi on his 150 birth anniversary in 2019,” said Shri Narendra Modi as he launched the *Swachh Bharat* Mission at Rajpath in New Delhi. On 2nd October 2014, *Swachh Bharat* Mission was launched throughout length and breadth of the country as a national movement. The campaign aims to achieve the vision of a ‘Clean India’ by 2nd October 2019.

Swachh Bharat Abhiyan has become a ‘*Jan Andolan*’ receiving tremendous support from the people. Citizens too have turned out in large numbers and pledged for a neat and cleaner India. Taking the broom to sweep the streets, cleaning up the garbage, focussing on sanitation and maintaining a hygienic environment have become a practice after the launch of the *Swachh Bharat Abhiyan*. People have started to take part and are helping spread the message of ‘Cleanliness is next to Godliness.’



MISSION INDRADHANUSH

Zindagi Indradhanush Banayein!



Full immunization against preventable childhood diseases is the right of every child. With a view to provide this right to every child, the Government of India launched the Universal Immunization Program (UIP) in 1985, one of the largest health programs of its kind in the world.

Despite being operational for over 30 years, UIP has been able to fully immunize only 65% children in the first year of their life and the increase in coverage has stagnated in the past 5 years to an average of 1% every year.

To strengthen and invigorate the program and achieve full immunization coverage for all children at a rapid pace, the Government of India launched Mission *Indradhanush* in December 2014.

Mission *Indradhanush* will ensure that all children under the age of two years and pregnant women are fully immunized with all available vaccines.

National Deworming Day

The National Deworming Day is an initiative of Ministry of Health and Family Welfare, Government of India to make every child in the country worm free. This is one of the largest public health programs reaching large number of children during a short period.

More than 836 million children are at risk of parasitic worm infections worldwide. According to World Health Organization 241 million children between the ages of 1 and 14 years are at risk of parasitic intestinal worms in India, also known as Soil-Transmitted Helminths (STH).

About STH:

Helminths (worms) which are transmitted through soil contaminated with faecal matter are called soil-transmitted helminths (Intestinal parasitic worms). Roundworm (*Ascarislumbricoides*), whipworm (*Trichuristrichiura*) and hookworms (*Necatoramericanus* and *Ancylostomaduodenale*) are worms that infect people.

STH transmission:

- ♦ Adult worms live in human intestines for food and survival and produce thousands of eggs each day.
- ♦ Eggs are passed in the faeces of infected person.
- ♦ Infected people who defecate outdoors spread worm eggs in the soil.
- ♦ Eggs contaminate the soil and spread infection in several ways: ?
- ♦ Ingested through vegetables that are not carefully cooked, washed or peeled;
- ♦ ingested from contaminated water sources;
- ♦ ingested by children who play in soil and then put their hands in their mouths without washing them.
- ♦ STH infections can lead to anemia, malnutrition, impaired mental and physical & cognitive development, and reduced school participation.

STH Infections can be prevented by:

- ♦ Using sanitary toilets, not defecating outside
- ♦ Hand-washing, particularly before eating and after using toilets
- ♦ Wearing slippers and shoes
- ♦ Washing fruits and vegetables in safe and clean water
- ♦ Eating properly cooked food

Objective of National Deworming Day:

The objective of National Deworming Day is to deworm all preschool and school-age children (enrolled and non-enrolled) between the ages of 1-19 years through the platform of schools and Anganwadi Centers in order to improve their overall health, nutritional status, access to education and quality of life.

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