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## UNIT 14 HUMAN HEALTH

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### 14.1 INTRODUCTION

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The problems related to climate change being multi-dimensional in nature; cannot be resolved by a single organisation or agency. Thus, it becomes pertinent to create a dedicated system to address the challenges posed by climate change. Therefore, there is no one solution, rather a set of institutional arrangements that should be carried out to strengthen institutional capacity building. The goal of adaptation is to reduce the vulnerability of human population to the adverse impacts of climate change such as sea level rise, extreme weather events or issues related to food security. According to IPCC report on Climate Change Impacts, Adaptation and Vulnerability published in 2014, the governments are

also focussing better at adaptation policies that are increasingly being integrated into development plans. In this unit, we would be discussing the public health perspectives on climate change; and public health actions to address climate change. An effort has also been made to discuss the ways to strengthen the public institutions; and resilient health service infrastructure.

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## **14.2 OBJECTIVES**

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After studying this unit, you should be able to:

- explain the adaptation measures for climate change;
- explain the clinical and public health interventions;
- discuss the means of strengthening public institutions, investment, primary health care, and education; and
- explain the concept of resilient health – service infrastructure.

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## **14.3 ADAPTATION MEASURES - CLINICAL AND PUBLIC HEALTH INTERVENTIONS**

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With advances in research in the field of climate change, evidences for global warming, melting glaciers, rising sea levels, and increasing climate variability have been obtained. These changes are expected to have substantial impacts on human health. Therefore, a public health approach is the need of the hour; that encompasses both clinical and public health services and involves the coordination among government agencies, the private agencies, and nongovernmental organizations.

The main health effects due to climate change include problems as a result of extreme weather events such as heat waves, droughts and flash floods; infectious diseases related to changes in pest pattern, allergic, respiratory and cardiovascular diseases related to air pollution; and shortages in food production. Indirect consequences include mental health issues, changes in ecosystem composition and functions.

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## **14.4 PUBLIC HEALTH PERSPECTIVES ON CLIMATE CHANGE**

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There has been rising awareness to the effects of climate change and involves ‘public health preparedness’. This mainly involves 3 phases:

### **14.4.1 Prevention**

Its main objective is to prevent the adverse effects due to pest infestation or extreme weather events. This can be tackled by the processes of immunization or setting up of early warning systems to minimize the impacts of extreme weather events. It is also referred to as ‘Primary Prevention’. Secondary prevention aims to diagnose diseases in the initial stages; for example, screening for hypertension and breast cancer. Tertiary prevention occurs once disease is diagnosed; it aims to reduce morbidity, avoid complications, and restore function.

### 14.4.2 Mitigation

These include steps taken to reduce greenhouse gas emissions; to slow down, or reverse climate change; changes in perspectives from the point of view of energy (enhanced focus on renewable energy) or architecture (green buildings); that have an indirect bearing on human health.

### 14.4.3 Adaptation

These include steps taken to prepare for the effects of climate change, so as to reduce the associated health burden by focusing on medical and public health practices. In recent years, preparedness efforts have gained a central role in public health in recent years, which is in consonance with the predicted effects of climate change. Examples include onset of hurricane or outbreak of an epidemic.

Another important framework in this context is 'Risk management' which implies continuous ongoing efforts to identify and reduce risks to health. For example, US Environmental Protection Agency (USEPA) identifies risks posed by hazardous chemicals to the environment, and develop strategies to reduce the risk of chemical releases or other incidents. Further, a public health approach that focuses on health benefits such as reduction of greenhouse gases would also result in improved air quality; that would lead to lesser incidences of respiratory health problems. Using lesser frequency of automobiles would also reduce carbon footprint and promote physical activity; thus, helping in fighting obesity. Looking at the economic aspects, it is believed that health care costs as a result of climate change would be enormous compared to the costs of mitigation and adaptation efforts.

## 14.5 PUBLIC HEALTH ACTIONS TO ADDRESS CLIMATE CHANGE

Thus in the wake of climate change, it becomes essential to have a public health system that would ameliorate the health burdens imposed by climate change. The standard framework for public health action was developed by the American Public Health Association (APHA) and a group of federal, state, and local agencies in 1994; known as the 10 Essential Services of Public Health (Public Health Functions Steering Committee, 1994) (shown in Table 14.1).

**Table 14.1: The 10 essential services of public health, with examples related to climate change**

S. No.	Service	Examples from climate change domain
1	Monitor health status to identify and solve community health problems.	Tracking of diseases and trends related to climate change.
2	Diagnose and investigate health problems and health hazards in the community.	Investigation of infectious water, food-, and vector-borne disease outbreaks.

3	Inform, educate, and empower people about health issues.	Informing the public and policymakers about health impacts of climate change.
4	Mobilize community partnerships and action to identify and solve health problems.	Public health partnerships with industry, other professional groups, faith community, and others, to craft and implement solutions.
5	Develop policies and plans that support individual and community health efforts.	Municipal heat-wave preparedness plans.
6	Enforce laws and regulations that protect health and ensure safety.	(Little role for public health)
7	Link people to needed personal health services and ensure the provision of health care when otherwise unavailable.	Health care service provision following disasters.
8	Ensure competent public and personal health care workforce	Training of health care providers on health aspects of climate change.
9	Evaluate effectiveness, accessibility, and quality of personal and population-based health services.	Program assessment of preparedness efforts such as heat-wave plans.
10	Research for new insights and innovative solutions to health problems.	Research on health effects of climate change, including innovative techniques such as modelling, and research on optimal adaptation strategies.

**Source:** Public Health Functions Steering Committee, 1994

• **Challenges in Addressing Climate Change**

The following challenges shall lie in front of public health professionals in implementation of climate change policies:

- 1) There are various regional variations observed in the effects of climate change.
- 2) There is variation in susceptibility to population groups, implying not all age groups are equally susceptible to climate change.
- 3) The regional variations will also play a critical role in public health responses to climate change. For example, the effects of climate change in hilly areas would be quite different to that of low-lying coastal areas.

- 4) The approach towards planning of adaptation to climate change should be multi-dimensional; since the nature of climate change is quite complex.

Thus, taking these challenges into account, the following steps may be taken to ensure that adequate planning and adaptation measures can lead to minimizing the effects of climate change:

- **Diagnosis of Community Health Hazards:** It becomes essential for a public health personnel to diagnose and investigate the health problems and hazards in the Community. The input for the same is received from the previous step of monitoring. Improvement in diagnostic techniques and enhanced laboratory facilities can greatly aid in reporting of diseases at the earliest.
- **Effective Health Communication:** Effective health communication on climate change will inform the public and policymakers about potential health effects and about steps that can be taken to reduce risk. Thus, communication, information, education, and empowering people, government agencies, and non-governmental organizations about health issues are some key factors to reduce climate change related health hazards in the wake of lack of clarity related to climate change.
- **Develop Policies and Plans that Support Individual and Community Health Efforts:** This involves linking climate change effects to health issues such as reduced morbidity and mortality. Linking extreme weather events such as addressing risk of heat waves in urban areas to climate change calls for preparedness plans to mitigate health threats as a result of climate change.
- **Implementation of Legislative Framework:** Public health can provide inputs for enforcement of laws and regulations that protect health and ensure safety. Examples include building codes and laws related to air and water pollution.
- **Development of Infrastructure:** Development of a very strong infrastructure for delivering health care services must be part of the health response to climate change. This involves linking people to needed health services at local or regional level or in case of emergency, such as onset of hurricane or cyclone to ensure provision of disaster response capacity.
- **Ensure a Competent Public and Personal Health Care Workforce:** This implies inclusion of trained and competent workforce that is prepared for the potential impacts of climate change and other challenges. Further, health professionals must evaluate effectiveness, accessibility, and quality of health services to reduce the health impacts of climate change. Besides, health personnel should strive to search for innovative solutions to health problems by empirical research focussing on relationship between climate change and human health.

## **14.6 STRENGTHENING PUBLIC INSTITUTIONS**

Since the problem of climate change is shrouded with uncertainties and complexities, it becomes imperative for institutions to engage stakeholders with varied perspectives for reducing the climate vulnerability (Commonwealth

of Australia, 2007). Most of the climate information as well as adaptation measures in various countries are scattered and non-coordinated among various participating agencies. Further, limitations in governance sector also play a very challenging role in designing policy frameworks that are sufficiently integrated with legislative sectors. In wake of these challenges, the following measures can be undertaken at institutional level to tackle climate related responses:

#### **14.6.1 Entrepreneurial Aspects**

Institutions should possess a set of characteristics for improving functional performance and adapting to unexpected changes, thus requiring active entrepreneurial behaviour (Meadowcroft, 2009). This will help the institutions in identifying the opportunities for innovations to enhance climate capabilities. For example, Jalyukta Shivar Abhiyan (JSA) programme was started in 2014 by the Government of Maharashtra in India to tackle the issue of increasing incidences of drought in the state.

#### **14.6.2 Access to Resources**

It becomes imperative for institutions to align adaptation to climate change within the limit of financial resources such as personnel, information, reallocation of core domestic budget and additional climate finance, if required. For example, national and provincial governments in India try to realign adaptation within domestic budgets.

#### **14.6.3 Incentives**

Institutions need to frame incentives to strengthen climate capabilities by identifying technically feasible and socially or politically acceptable options by engaging the stakeholders in deliberations related to climate change for innovation (Ballard et. al., 2010).

#### **14.6.4 Climate Finance**

In recent years, there has been an increasing attention towards new sources of climate finance that focus primarily on institutional architecture through cross-sectoral collaboration, policy frameworks and importance of finance ministries for maximising the impact of investments to strengthen climate capabilities (World Bank, 2010).

#### **14.6.5 Formal Interventions**

Formal interventions in institutional framework involve:

- **Technical assistance to institutions:** It involves strengthening the planning for climate change.
- **Training of the staff members:** This comprises of training the staff of institutions on climate resilient agriculture or water management to manage climate change (Pound et al., 2018; James et al., 2018). Thus, it forms a crucial component of capacity building measures.
- **Access finance:** This stage involves procuring finance from core budgets, donors and climate funds to implement policies and programmes pertaining to climate change.

Some examples of formal intervention include:

- ACT has supported the Government of Chhattisgarh in setting up strategies for climate-resilient water management.
- In Odisha, the government requested ACT’s support to develop a Mahanadi Flood Forecasting Model in response to the regular flooding occurring along the river. This has increased the warning time from eight to 36–72 hours.
- ACT has helped in developing a framework for vulnerability and risk assessment for National Adaptation Plan (NAP) of the Government of Nepal,
- ACT has provided to preparing a three-year work plan for the National Climate Change Authority (NCCA) in Pakistan.

**14.6.6 Informal Interventions**

Informal interventions are also known as ‘Soft Influencing’ approach (Clare et. al., 2018) and involve building teams of people that link climate action to development objectives and have the ability to identify opportunities for innovation that can reorient interests and solve institutional inertia (Faustino, 2012).

**Check Your Progress 1**

- Note:** i) Use the space below for you answers.  
 ii) Compare your answers with those given at the end of this unit.

1) What clinical and public health interventions can be made to mitigate climate change?

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2) How will you strengthen institutions for climate change?

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**14.7 STRENGTHENING INVESTMENT**

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It is no doubt that the phenomenon of climate change will continue to manifest themselves in the coming years. Although the progress on mitigating greenhouse gas (GHG) emissions has been substantial; still global warming cannot be completely mitigated in the coming years. It becomes imperative to mention that the most vulnerable communities are often the least able to prepare for the effects of climate change. Thus, large scale mitigation investments are the need of the hour that would focus on reducing GHG emissions and low carbon transformation in the coming years. Further, the funds for adaptation and resilience are not adequate as compared to their estimated requirements; yet public finance for resilience can be invested more effectively. Private-sector involvement in adaptation remains limited. The main focus of agencies for strengthening

investment lies in:

- Maximizing the amount of public finance from various sources for adaptation and resilience;
- Strengthening insurance strategies; and
- Developing private-sector models and approaches to resilience.

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## **14.8 STRENGTHENING PRIMARY HEALTH CARE**

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If we look at the genesis of primary health care (PHC) in India, its existence can be traced to the recommendation of Bhore Committee Report in 1946 (Bhore Committee, 1946). With further developments in the field of medicine, disease pathogenesis and its diagnosis, PHC has improved vastly and has been implemented in various developing countries with great success due to efficient planning and support from governmental and non-governmental agencies. If we analyse the current scenario of PHC in India, the picture doesn't seem very bright. The chief lacunae lie in availability of formal primary care, shortages of skilled health-care workers, and low rates of institutionalized delivery and lack of training to health-care professionals. Further, the quality of health-care service is not uniform throughout public and private sector due to lack of regulatory standards. Affordability of health care is also a serious issue in India. Thus strengthening PHC through effective planning would be major step toward achieving organized health-care system in India. This has implications for targeting communicable and non-communicable diseases which are a manifestation of climate change. The following steps may be taken to further strengthen PHC in India:

- Innovative health care practices to reduce health-care expenditure care are the need of hour.
- Planning and management is necessary to reduce wastage of public funds and resources and improve the quality of health care resources.
- Besides, skill development of health care professionals and larger Immunization coverage can also strengthen the health care system in India.
- Linking Aadhar card of patients with health centres can also help in tracking the progress of the patient, quicker diagnosis in laboratories and reducing the maternal and infant mortality rate. This would also be helpful in case of outbreak of epidemics for prevention and management of such outbreak.
- Another important aspect to be looked into is telemedicine that may link PHC to tertiary health care and would be greatly useful in remote areas.
- Community participation in rural and urban areas would also aid in smooth health care delivery.
- The importance of increased public expenditure on health cannot be



undermined.

- Social insurance schemes would play a major role in the long term in strengthening health care system in India. So far, there are three central government health insurance schemes: Central Government Health Schemes, Employee State Insurance Scheme, and Rashtriya Swasthya Bima Yojana; that have improved health-care delivery at affordable cost. Many more such schemes are required.
- The shortage of trained health care workers can be tackled by effective public–private partnership, affordable technologies, and training.
- There is a need to channelize technical and financial aid from WHO, UNICEF, World Bank, and other funding agencies toward strengthening PHC.

Thus, to strengthen PHC, realization of health care as primary objective is necessary. There is a need to build sustainable PHC for providing quality health services on an affordable basis.

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## 14.9 STRENGTHENING EDUCATION

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The concept of strengthening education lies in the fact that the countries/parties to the UN Framework Convention on Climate Change have accepted commitments for promoting and facilitating various education, training and awareness programmes at the national and regional levels and adopting a participatory process for addressing climate change and its effects. This should also involve exchange of ideas and organizing scientific and technical personnel for climate change mitigation.

Education, training and public awareness have been identified as one of the important components of capacity building in developing countries. Another approach is Development Alternatives (DA) that has conceptualized a Climate Change Centre in 1997 and has been working on issues of mitigating climate change. An example of DA is that in 1989, Development Alternatives (DA) field office at Jhansi in Central India began promoting check dams for sustainable livelihood approach to rural development. On one hand, it promotes restoration of degraded natural resource and promotes expansion of agriculture; on the other hand, it aims to reduce poverty by creating livelihoods through intensification of agriculture due to recharging of aquifers. Hence, strengthening education system will go a long way in capacity-building in the following aspects:

- Creating awareness about climate change issues;
- To make people aware about the role played by anthropogenic contributions;
- Generate awareness about emissions reduction, linkages between CDM and sustainable development, etc.
- Training of officers to enable them to incorporate climate change concerns in developmental activities; and
- Assessment of vulnerable population and adaptation mechanism.

Capacity-building efforts at different levels would certainly facilitate developing countries in building, developing, strengthening, enhancing, and improving their capabilities to mitigate climate change. UNESCO aims to provide climate education to people and make them understand effects of global warming through Climate Change Education for Sustainable Development programme, under the framework of the Global Action Programme on Education for Sustainable Development.

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## **14.10 RESILIENT HEALTH-SERVICE INFRASTRUCTURE**

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There has been an increase in frequency of extreme weather events as a result of climate change. This has created complex hazards that are not in consonance with existing infrastructure capabilities or disaster preparedness and response. Hence, resilient essential health services must remain available to communities and individuals during and immediately following extreme weather events. Further, the Department of Health and Human Services (HHS) has developed the Sustainable and Climate Resilient Health Care Facilities Toolkit developed to assist organizations engaged in health care facility and climate resilience as they improve their response to extreme weather events. This tool has been developed through a public-private partnership with the health care industry, and consists of online tools that focus on best practices for developing sustainable and climate-resilient health care facilities. The Toolkit is organized around five elements that illustrate specific health sector resilience principles and practices. These five elements are:

### **14.10.1 Climate Risks and Community Vulnerability Assessment**

This element focuses on maintaining updated database on climate hazards and community health vulnerabilities, and uses such analyses to inform health services and infrastructure for planning resilience strategies.

### **14.10.2 Land Use, Building Design, and Regulatory Context**

This element emphasizes on the land use, building design and regulatory context within which current health care facilities are situated. The local and community land use vulnerabilities that may impact health care facilities are also looked into.

### **14.10.3 Infrastructure Protection and Resilience Planning**

This involves constructing critical health care facilities with sustainable communications and resilient infrastructure which have the ability to resume services within a short period following an extreme event.

### **14.10.4 Essential Clinical Care Service Delivery Planning**

This element ensures that essential clinical care services such as emergency departments, laboratory and imaging services remain operational during and immediately following extreme weather events; and should be within reach of vulnerable populations.

### 14.10.5 Environmental Protection and Ecosystem Adaptations

This element focuses on management of ecosystems to mitigate extreme weather hazards. Examples of strategies include wildlife corridors, green infrastructure practices, heat island mitigation and enhanced storm-water management.

The five-element framework does not directly address institutional and administrative support for disaster- or emergency-preparedness efforts, however, this framework and its accompanying checklists and resources should be integrated within a broader health care facility and focus on health care infrastructure resilience. This five-element framework has been adapted from the following agencies:

- The Canadian Coalition for Green Health Care
- United Nations Office for Disaster Risk Reduction (UNISDR)
- World Health Organization
- Resilient Design Institute

Thus, by building climate-resilient health systems, countries across the world can achieve their Sustainable Development Goal (SDG) of health and wellbeing for all, and adaptation to climate change would not be such a herculean task as it seems in the current times.

#### Check Your Progress 2

- Note:** i) Use the space below for you answers.  
ii) Compare your answers with those given at the end of this unit.

- 1) How will you strengthen education for climate change?  
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- 2) What is the basis of the five elements of health resilient infrastructure?  
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### 14.11 LET US SUM UP

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There is no disagreement among scientific community that the climate is changing. Evidences suggest that climate change will have direct health impacts on human health such as illnesses from severe weather events, heat exposure; increases

in vector-borne diseases; while indirect effects may include anxiety, depression, mass migration and regional conflicts.

Addressing these concerns is the biggest challenge for public health. Although the complexity of the climate change requires a multi-dimensional approach; the conceptual framework for an effective public health response to climate change includes preventing injuries and illnesses, enhancing public health preparedness, and reducing risk. Regional and local level institutions in the country have an important role to play in this regard by means of capacity building. This involves strengthening the infrastructure as well as education system and health care facilities for mitigating the impacts of climate change. A draft policy on Climate Change and Effects on Human Health at international level should be framed in near future and its strict implementation be ensured to mitigate the effects of climate change.

### **Acronyms**

ACT	:	Action on Climate Today
JSA	:	Jalyukta Shivar Abhiyan (Maharashtra)
NAP	:	National Adaptation Plan (Nepal)
NCCA	:	National Climate Change Authority (Pakistan)
SDG	:	Sustainable Development Goal
ToR	:	Terms of Reference
UNISDR	:	United Nations Office for Disaster Risk Reduction
WHO	:	World Health Organization
HHS	:	Health and Human Services
UNFCCC	:	United Nations Framework Convention on Climate Change
USEPA	:	United States Environment Protection Agency

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## **14.12 KEY WORDS**

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**Adaptation** : Adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects.

**Heat Stress** : The negative health impacts, such as heat stroke or heat exhaustion, caused by exposure to extreme heat or long periods in hot environments.

**Resilience** : A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

**Health** : A state of physical, mental and social well-being, and not

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## **14.14 ANSWERS TO CHECK YOUR PROGRESS**

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### **Check Your Progress 1**

1. Public preparedness by means of prevention, mitigation, adaptation; risk management and overcoming the challenges therein.
2. This involves formal and informal interventions such as entrepreneurial aspects, access to resources; incentives; climate finance, and training to generate skilled human resources.

## Check Your Progress 2

1. Education can be strengthened by creating awareness about impacts of climate change and capacity building.
2. The five-element framework has been adapted from the following agencies:
  - The Canadian Coalition for Green Health Care
  - United Nations Office for Disaster Risk Reduction (UNISDR)
  - World Health Organization
  - Resilient Design Institute

