

Innovation & Technology Intervention

Water Security & Ground Realities

WWS 2021 | August 21, 2021

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CoalitionWILD Global Mentorship Programme

Responsible Tourism Society of India

International Council for Circular Economy (ICCE)

Indian Science Congress Association

Global Foundation for Advancement of Environment & Human Wellness

An Indo-American Initiative

Founded on

Triple Bottom Line Philosophy



To bring in

Innovative & Enduring Solutions

to address socio-environmental challenges through

Multi-stakeholder, Trans-disciplinary & Hands-on Approach



Thematic Areas



Water Security

Climate Security

Food Security

**Biodiversity
Conservation**

Climate Action

**Sustainable
Tourism**

Fresh Water

**Waste
Management**

**Mountain Sustainable
Development**

**Alternative
Livelihood**

**Sustainable
Agriculture & Food**

**Education, Training and
Capacity Development**

Fighting Covid-19



Noida's apartment complexes 'Roti Bank' to help feed the poor

The unique 'Roti Bank' has each family contributing a few rotis every day to feed over 300 people. In 10 days they have collected over 1 lakh rotis



स्थान ग्लोबल फाउंडेशन ने ग्रीनफील्ड का किया वितरण
मास्क एवं सैनिटाइजर का किया वितरण

The Sentinel
of this land, for its people

Face masks distributed

A CORRESPONDENT

MORIGAON, Nov 14: Delhi-based organization Global Foundation for Advancement of Environment and Human Wellness - has provided 7000-N95 facemasks to frontline COVID warriors like doctors, nurses, cleaners, police personnel and the volunteers of Red Cross Society who are engaged in COVID-19 duty, through the Deputy Commissioner, Superintendent of Police and Joint District & Medical Officer.



The Global Foundation for Advancement of Environment and Human Well-being handed over the 700

N95 face masks to Morigaon District In-Red Cross Society (IF on Friday and accord-ly, the Red Cross Soc-

the on Saturday handed over 3,000 face masks to the Indian 1,000 face masks to the Joint Director of Health (ICS) Deputy Commissioner, Services and 1,000 to the 2,000 face masks to the volunteers of Indian Police Superintendent of Police. Cross Society.



बचछ बनाने में जुटे निवासी



দৈনিক অঙ্গ



**‘নয়ডা ৰঙী সেৱা’ আৰু ‘অসম এছ’চিয়েচন’ৰ
লক্‌ডাউনৰ দুঃসময়ত সহায়ক**



দৈনিক অসমৰ বাতৰি
গুৱাহাটী, ২৩ মে' : লক্ষ্যডাউনৰ
আৰ্জনলক্ষ সন্মত আগবঢ়াই মানৱ
বহিঃৰাজ্যত কৰ্মৰত বহুকেই
ক'ম'নাটকৰ বাবে দেশজুৰি হোৱা ল-
বাইজৰ অবস্থা শোচনীয় কৰি তুলিছে।
উদ্যোগত কৰ্মৰত অসমীয়া যুবক-
কৰ্মসংস্থাপন পৰ্যন্ত হেৰুৱাবলগীয়া



तब
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महिला
रही थी
का नारा
तो टस कु
पुरा इन म

From Noida to Assam, 'Medicine Bank' to offer relief to flood-hit areas

After a successful 'roti' donation drive, good Samaritans of Noida & Greater Noida housing societies have now opened a 'medicine bank' for flood-hit areas



COVID-19 pandemic is not only taking lives, it is also taking away livelihoods. An attempt has been made to help secure livelihoods of marginalized communities by engaging migrant women in mask making. These masks are environment friendly & is offering a much needed alternative to masks made of inorganic materials.



Mask making is a turnkey avenue, needy women are able to reinvent their livelihood & support their families through this during the crisis.

COMMUNITY EMPOWERMENT THROUGH MASK MAKING AND BETTER HYGIENE



कोरोना से लड़ने वाले योद्धाओं को
जिला अस्पताल में दिये मास्क



Partnerships & Collaborations



WASTE
IMPACT



EduCARE-India



Global Compact
Network India

FiTure
OF TOURISM



ELDF POLYPLEX
ENVIRONMENT LAW & DEVELOPMENT FOUNDATION



ACT GRANTS
ACTION COVID-19 TEAM



Developing Smart Cities
for our Citizens



Contemporary Environmental Challenges



Environmental Challenges



Not A Good Change

Climate change or not, there's little doubt now that extreme weather events in India are becoming more common



Extreme Heat

WHAT WE KNOW

Annual mean temperature of India has risen by 0.6°C in past 114 years
West coast and southern India are projected to shift to new, high-temperature

climatic regimes

WHAT CAN BE DONE

Stop towns from being heat 'islands' through planning



Rainfall

WHAT WE KNOW

A decline in monsoon rainfall since the 1950s has happened.
A 2°C rise in global average temperature will make India's monsoon go haywire

WHAT CAN BE DONE

Boost hydro-meteorological systems to conserve water



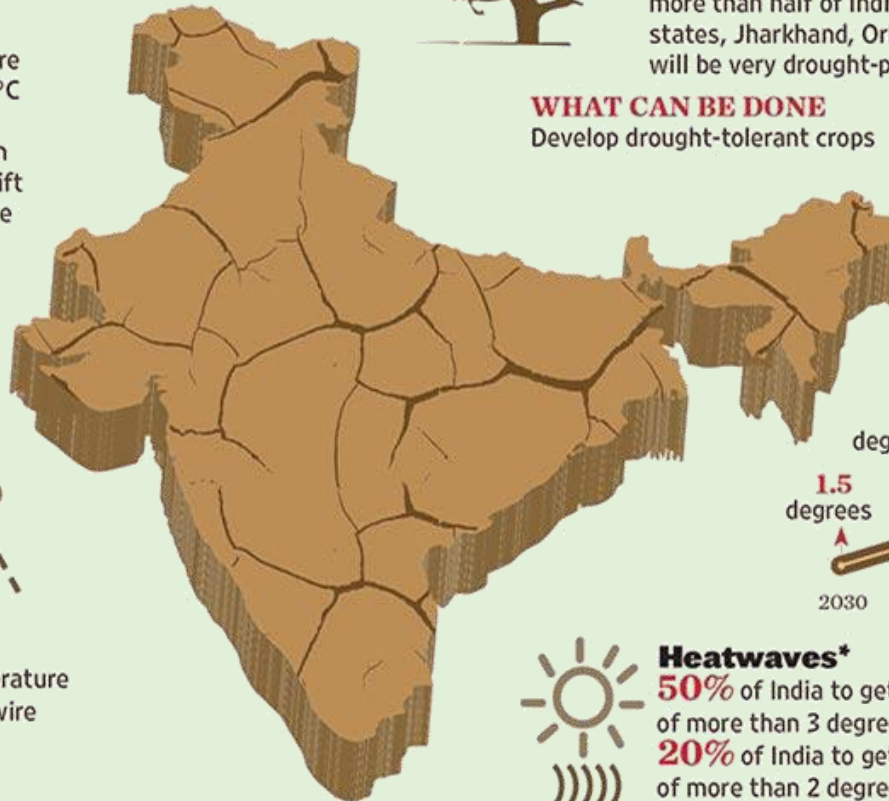
Droughts

WHAT WE KNOW

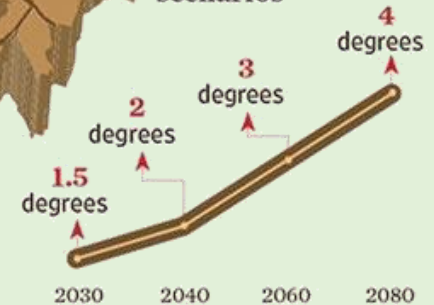
In 1987, 2002-2003 and 2009 droughts gripped more than half of India's sown area. Western states, Jharkhand, Orissa and Chhattisgarh will be very drought-prone

WHAT CAN BE DONE

Develop drought-tolerant crops



Projections* India Warming scenarios



Heatwaves*

50% of India to get heatwaves of more than 3 degrees
20% of India to get heatwaves of more than 2 degrees
15% of India to witness heatwaves of more than 1.5 degrees

* In the absence of climate change solutions

HOSTED BY Source: MoEF, IPCC, World Bank

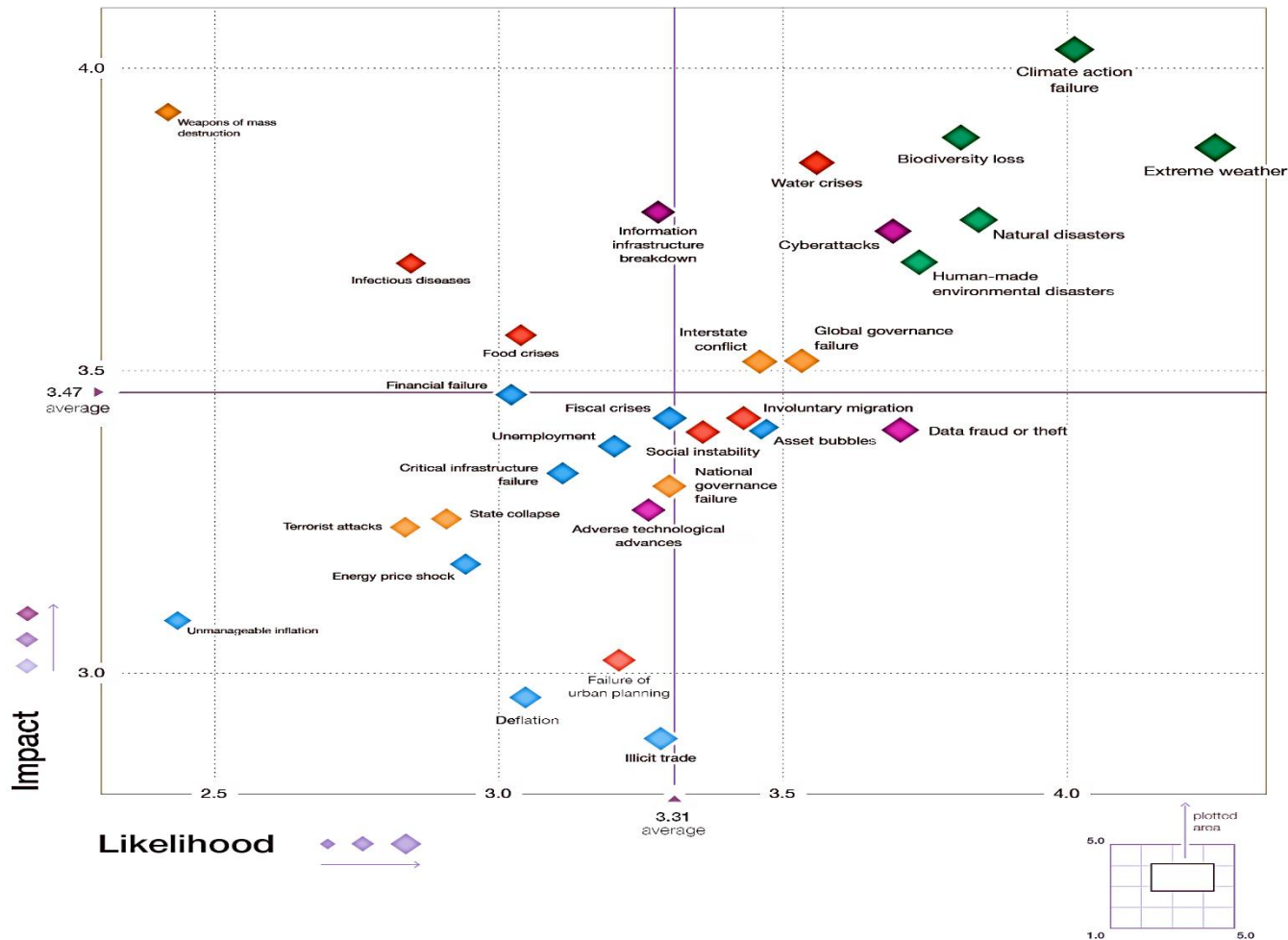
Source: <https://www.team-bhp.com/forum/shifting-gears/221546-climate-change-impact-india-world.html>



The Global Risks Report 2020

Marsh & McLennan Companies

Figure II: The Global Risks Landscape 2020



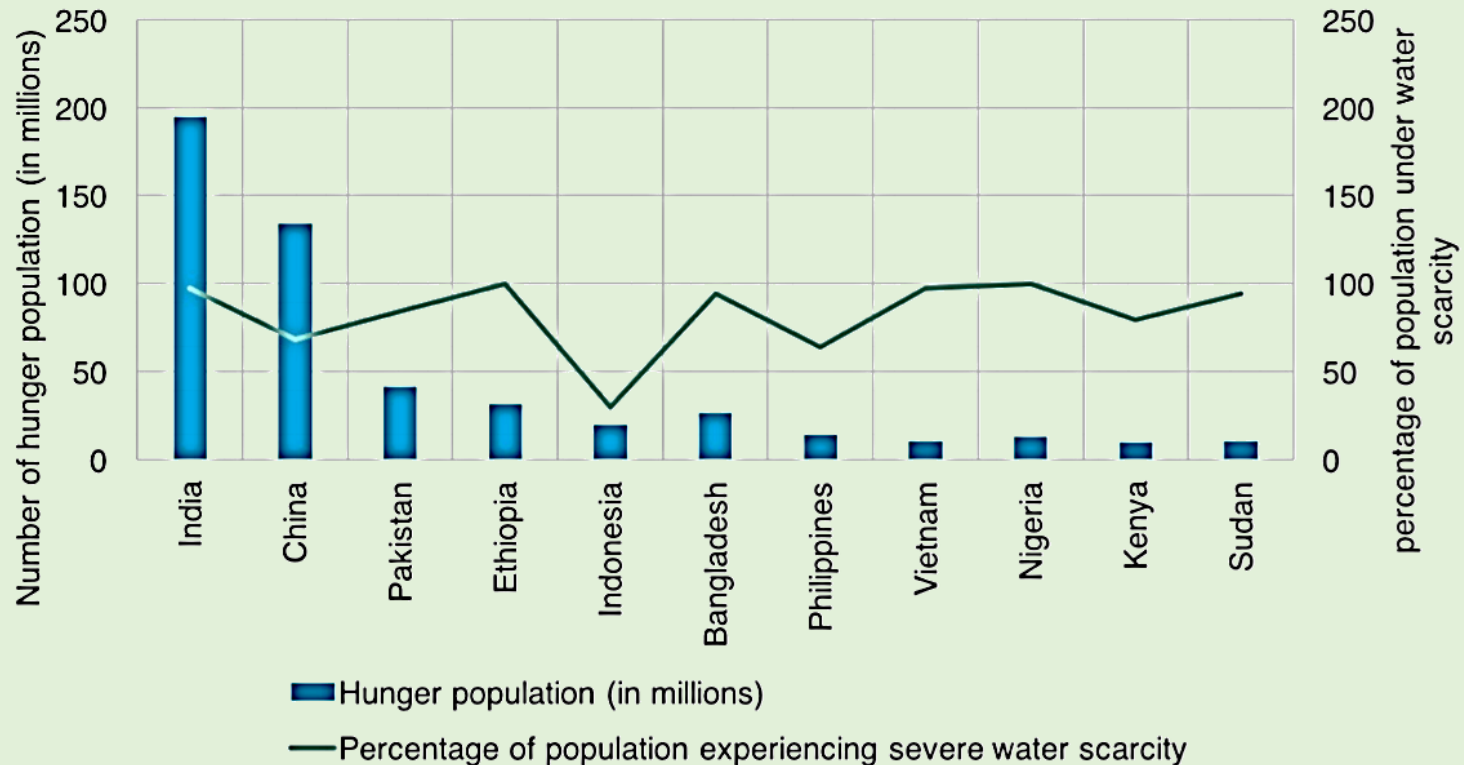
India is the fifth most vulnerable among 181 countries to the effects of climate change.

- Global Climate Risk Index 2020 / Germanwatch



Counties With Sever Water Scarcity

Percentage of population experiencing severe water scarcity at least one month a year with countries that have the largest number of undernourished people



Source: [https://waterfootprint.org/media/downloads/Blog -
_Water_scarcity_what_does_it_mean_for_sustainable_development.pdf](https://waterfootprint.org/media/downloads/Blog_-_Water_scarcity_what_does_it_mean_for_sustainable_development.pdf)



India's Water Scenario



163 Mn

people do not have access to safe drinking water

*Source: Aid report



>6 in 10

households report that they do not treat their water prior to drinking



*Source: NFHS-4 (2015-16)



India loses

73 Mn

working days due to water-borne diseases

*Source: IndiaSpend report 2016

443 Mn

School days are lost each year from water related illness

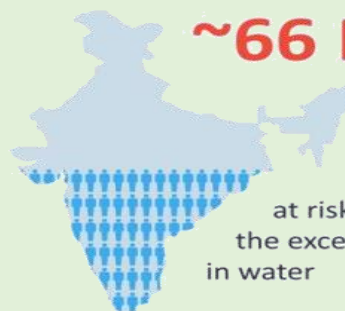
*Source: Human Development Report 2006



21%

of the disease reported in the country are water related

*Source: World Bank Report



~66 Mn

people in

20

states are at risk because of the excessive fluoride in water

*Source: Ministry of Drinking Water and Sanitation (MDWS) Report



~6 Mn

children below age 14 suffer from dental, skeletal and non-skeletal fluorosis

*Source: Fluorosis Research and Rural Development Foundation

Arsenic is the other big killer putting at risk nearly

~10 Mn

people

*Source: World bank report



Urban Water Crisis

METRO CRISIS

India's urban population is set to grow massively over the next three decades—a major problem, since existing supplies of water are already insufficient to meet demand

40%

of India's population is projected to live in urban areas by 2030, up from 34 per cent in 2011

31%

of urban households lack access to piped water or public tap water

67.3%

of urban Indian households are not connected to a piped sewage discharge system

48%

of the urban water supply in India comes from groundwater, according to the Centre for Science and Environment

Sources: United Nations Department of Economic and Social Affairs; National Family Health Survey, 2015-16; Census 2011; Central Public Health and Environmental Engineering Organisation; Centre for Science and Environment



THE SUPPLY GAP

Average quantity of water supplied by urban local bodies in India

69.25

litres per person per day



Required quantity of water to be made available in the cities

135

litres per person per day

KEEPING IT FLOWING

While 80 per cent of households in India's cities have water sources within their premises, the challenge is to keep them recharged

Outside dwelling but within premises

24.6%

Less than 200 metres

13.8%

200 m–500 m

3.2%

500 m–1 km

1.2%

1 km–1.5 km

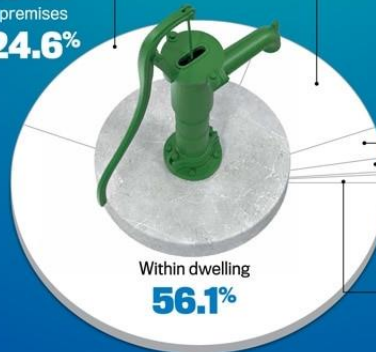
0.5%

More than 1.5 km

0.6%

Within dwelling

56.1%



THE 30 CITIES MOST AT RISK

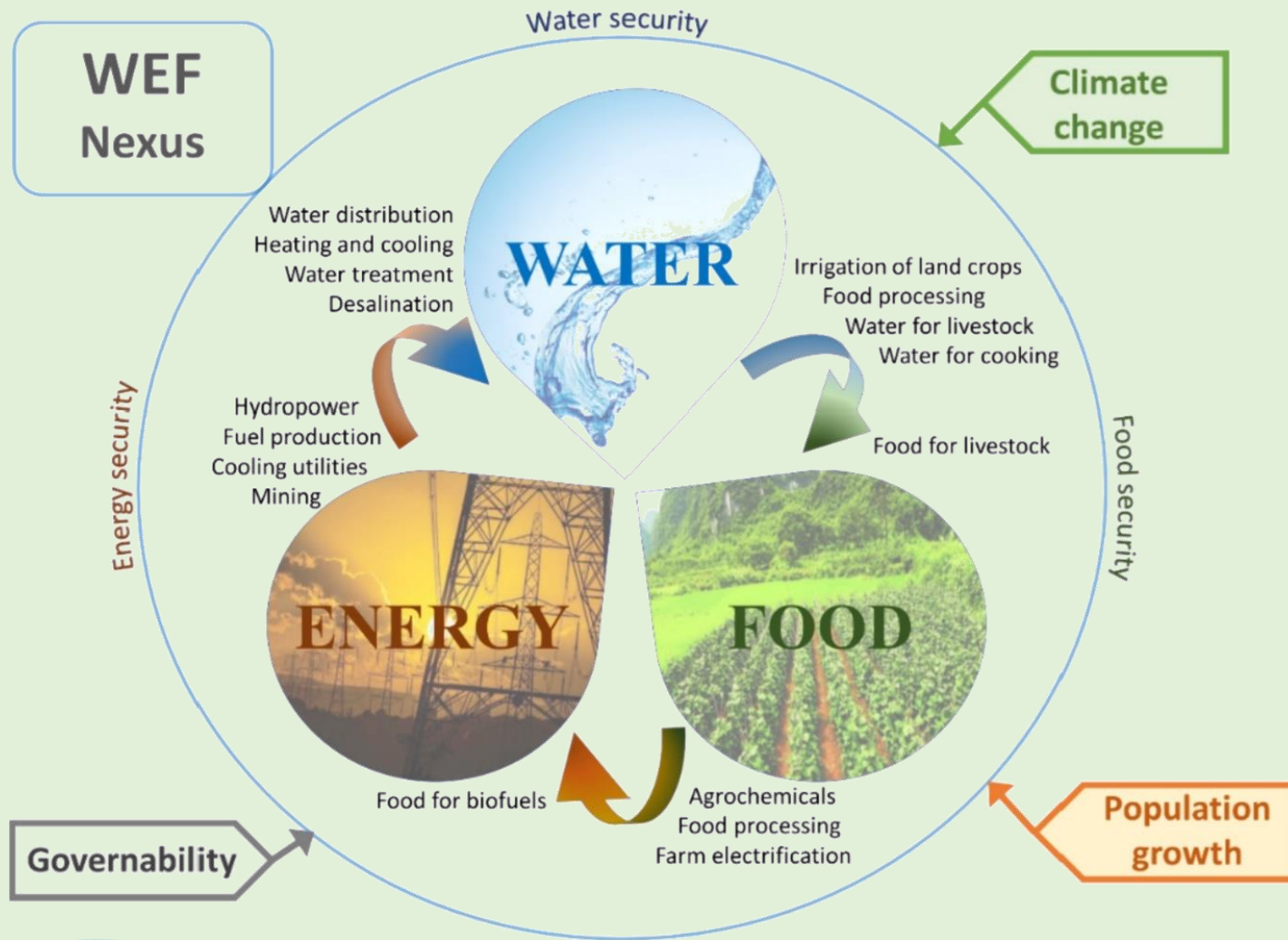
A WWF-India report projects that the following cities will face a 'grave water risk' by 2050 due to sharp increases in population

- | | |
|-------------|-------------------|
| 1. Jaipur | 9. Visakhapatnam |
| 2. Indore | 10. Bengaluru |
| 3. Thane | 11. Kolkata |
| 4. Vadodara | 12. Ahmedabad |
| 5. Srinagar | 13. Jabalpur |
| 6. Rajkot | 14. Mumbai |
| 7. Kota | 15. Lucknow |
| 8. Nashik | 16. Hubli-Dharwad |



- | | |
|----------------|---------------|
| 17. Nagpur | 24. Bhopal |
| 18. Chandigarh | 25. Gwalior |
| 19. Amritsar | 26. Surat |
| 20. Ludhiana | 27. Delhi |
| 21. Jalandhar | 28. Aligarh |
| 22. Pune | 29. Kozhikode |
| 23. Dhanbad | 30. Kannur |

Water - Energy - Food Nexus

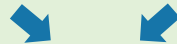


Source: <https://www.sciencedirect.com/science/article/pii/S0360544219325198>

The Fall Out

Provisioning Alternatives and
Growing Opportunities

Unsustainable ways Climate change



Global Warming, Pollution & Water Stress



Life and Ecosystems disturbed



Loss of Agriculture and Loss of Job



Water and Sustainable Development Goals



Source: United Nations Economic and Social Commission for Asia and the Pacific [UN ESCAP] (2017).

GRID-Arendal/Studio Atlantis



WATER FOR A SUSTAINABLE WORLD



SOCIETY

THE WATER AND SOCIETY RELATIONSHIP

1/4 POPULATION LIVES IN DEVELOPING COUNTRIES THAT FACE WATER SHORTAGES DUE TO

INFRASTRUCTURES TO TRANSPORT WATER FROM RIVERS AND LAKES IS INSUFFICIENT

1/5 POPULATION LIVES IN AREAS WHERE WATER IS PHYSICALLY SCARCE

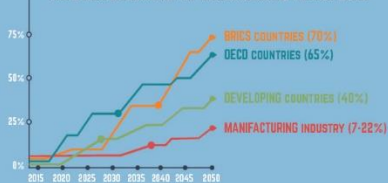
3 BILLIONS PEOPLE LACK ACCESS TO DRINKING WATER THAT IS REALLY SAFE



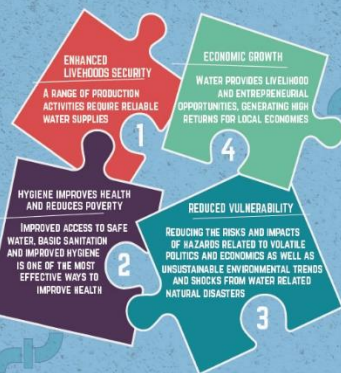
INVESTING IN IMPROVED WATER MANAGEMENT AND SERVICES IS ONE PREREQUISITE TO REDUCING POVERTY AND ACHIEVING SUSTAINABLE ECONOMIC GROWTH



THE OVERALL DEMAND FOR WATER DEMAND THROUGH 2050



WATER MANAGEMENT CONTRIBUTES TO FOUR KEY DIMENSIONS OF POVERTY REDUCTION

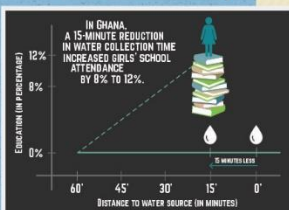


IN 2012 2.5 BILLIONS PEOPLE DID NOT HAVE ACCESS TO SANITATION FACILITIES



MORE THAN 80% OF THE WORLD'S POPULATION LIVES IN COUNTRIES WHERE THE INCOME DISPARITIES ARE WIDENING

TIME TO CHANGE IMPROVED GENDER EQUALITY IS A KEY TO BOOSTING WATER MANAGEMENT AND ACCESS. ONE 2012 ESTIMATE SUGGESTS THAT CUTTING JUST 15 MINUTES OFF THE WALKING TIME TO A WATER SOURCE COULD REDUCE UNDER-FIVE CHILD MORTALITY BY 11% AND THE PREVALENCE OF NUTRITION-DEPLETING DIARRHOEA BY 41%.



ECONOMY

EXPANDING ECONOMIC OPPORTUNITIES THROUGH WATER

WATER IS AN ESSENTIAL RESOURCE IN THE PRODUCTION OF GOODS AND SERVICES, INCLUDING FOOD, ELECTRICITY AND MOST MANUFACTURED PRODUCTS.

WATER SUPPLY (QUANTITY AND QUALITY) MUST BE RELIABLE AND PREDICTABLE TO SUPPORT FINANCIALLY SUSTAINABLE ECONOMIC ACTIVITIES. INFRASTRUCTURE THAT REDUCES RISKS FROM WATER SCARCITY AND WATER-RELATED DISASTERS SUCH AS FLOODS AND DROUGHTS INCREASES THE RESILIENCE OF ECONOMIES.



IMPACTS OF 3 YEARS OF REPEATED FLOODS IN PAKISTAN (2010-2012)

- CAUSED 3,072 LIVES LOST
- US\$16 BILLIONS IN DAMAGES
- CUT THE EXPECTED ANNUAL GROWTH RATE IN HALF (8.0% INSTEAD OF THE PROJECTED 4.5%)

IMPACTS OF NEGLECTFUL WATER MANAGEMENT

OVER 80% OF WASTEWATER WORLDWIDE IS NOT COLLECTED OR TREATED. SMALL-SCALE INDUSTRIES, SUCH AS AGRO-PROCESSORS, TEXTILE DYEING AND TANNERIES, CAN RELEASE TOXIC POLLUTANTS INTO LOCAL WATERS. UNTREATED EFFLUENT FROM URBAN SETTLEMENTS AND INDUSTRY POSSES A MAJOR HEALTH THREAT TO PEOPLE, THE ECONOMY AND THE ENVIRONMENT.

DEFORESTATION RESULTS IN DEGRADATION AND DESERTIFICATION OF WATERSHEDS AND CATCHMENT AREAS, AND REDUCES THE AMOUNT OF SAFE WATER AVAILABLE DOWNSTREAM.

BASIC PROVISION OF WATER AND SANITATION SERVICES IS REQUIRED TO UNLOCK THE POTENTIAL OF ECONOMIC GROWTH. PARTICULARLY TO BREAK THE VICIOUS CYCLE OF LOW PRODUCTIVITY LINKED TO POOR HEALTH AND LACK OF EDUCATIONAL OPPORTUNITIES THAT MAINTAINS POVERTY AND ECONOMIC STAGNATION.

DROUGHTS IN THE UNITED STATES, THE 2012 DROUGHT AFFECTED 80% OF FARMS AND RANCHES, RESULTING IN CROP LOSSES IN EXCESS OF US\$20 BILLION AND A WIDE RANGE OF RIPPLE EFFECTS. THE FULL COSTS ARE ESTIMATED TO BE AS HIGH AS US\$50 BILLION.

ENHANCING WATER RESOURCES MANAGEMENT

A US\$15 TO US\$30 BILLION INVESTMENT IN IMPROVED WATER RESOURCES MANAGEMENT IN DEVELOPING COUNTRIES CAN HAVE DIRECT ANNUAL INCOME RETURNS IN THE RANGE OF US\$60 BILLION.

EVERY US\$1 INVESTED IN WATERBODIED PROTECTION CAN SAVE ANYWHERE FROM US\$75 TO NEARLY US\$200 IN COSTS FOR A NEW WATER TREATMENT AND FILTRATION FACILITY.

THERE IS A NEED TO CHANGE THE WAY WE VALUE, MANAGE AND USE WATER AND THE ENVIRONMENT, AND TO REFOCUS INVESTMENTS

SUSTAINING THE GAINS OF ECONOMIC PROGRESS REQUIRES INVESTING IN THE PROTECTION OF ECOSYSTEMS FOR MAINTAINING THE VARIOUS WATER-RELATED ENVIRONMENTAL SERVICES THEY PROVIDE, AND UPON WHICH THE ECONOMY DEPENDS.

ENVIRONMENT

AQUATIC ECOSYSTEMS ARE CENTRAL TO SUSTAINING BIODIVERSITY AND ALL FORMS OF DEVELOPMENT.



THERE IS A NEED TO SHIFT TOWARDS ENVIRONMENTALLY SUSTAINABLE ECONOMIC POLICIES THAT ALSO CONSIDER THE INTERCONNECTION OF ECOLOGICAL SYSTEMS TO ADDRESS HUMAN IMPACTS AND MAINTAIN PRODUCTIVE ECOSYSTEMS.

IN SOME CASES, HUMAN-BUILT INFRASTRUCTURE CAN CAUSE BIODIVERSITY LOSS AND DEGRADATION OF ECOSYSTEM SERVICES.



THE CHALLENGE IS TO MANAGE WATER RESOURCES TO MAINTAIN A BENEFICIAL BALANCE BETWEEN BUILT AND NATURAL INFRASTRUCTURE AND PROVISION OF THEIR RESPECTIVE SERVICES.

CURRENT FOOD PRODUCTION PRACTICES ARE RESPONSIBLE FOR NITROGEN, PHOSPHORUS AND PESTICIDES LOADING AND FISHERIES DEPLETION.

IT IS ESTIMATED THAT BETWEEN US\$4.5 AND US\$20.2 TRILLION PER YEAR WORTH OF ECOSYSTEM SERVICES WERE LOST BETWEEN 1997 AND 2011 DUE TO LAND USE CHANGE.

CLIMATE CHANGE HAS A SIGNIFICANT IMPACT ON ECOSYSTEMS, THREATENING BIODIVERSITY WHILE INCREASED FREQUENCY AND STRENGTH OF STORMS AND TIDAL SURGES WILL INCREASE DAMAGE AND VARIATION OF SEDIMENT TRANSFER IN RIVER FLOWS.

THE CREATION OF 'GREEN CORRIDORS' ALONG RIVERS, FLOODPLAINS AND STREAMS CAN LINK ECOSYSTEMS THUS ABSORBING NUTRIENTS AND REDUCING WATER POLLUTION.

THE REAL CHALLENGE IS IN BUILDING AWARENESS OF THE ECONOMIC VALUE OF HEALTHY ECOSYSTEMS

POLICIES SHOULD SEEK TO INCREASE PARTICIPATION OF ALL STAKEHOLDERS (LOCAL, REGIONAL AND NATIONAL) INCLUDING RURAL WOMEN, IN DEVELOPING COUNTRIES, WHO ALREADY ACT AS GRASSROOTS ECOSYSTEM MANAGERS.

AS POPULATIONS INCREASE AND ECOSYSTEM SERVICES DECLINE, THE RISK OF RESOURCE CONFLICTS RISES ESPECIALLY WHERE TENSIONS ALREADY EXIST.

ECOSYSTEM VALUATION IS BASED ON WHAT USERS WOULD BE WILLING TO PAY DIRECTLY FOR SERVICES, OR WHAT IT WOULD COST TO REPLACE THE SAME SERVICES WITH BUILT INFRASTRUCTURE.

THE CONTENT OF THIS INFOGRAPHIC HAS BEEN EXTRACTED FROM THE UNITED NATIONS WORLD WATER DEVELOPMENT REPORT (WWDR) 2015. DOWNLOAD THE REPORT AT: WWW.UNITEDNATIONS.ORG/WWDR

The Bigger Picture

- ❖ (Non) Availability and over/mis-use are not the only concerns here
- ❖ The bigger challenge is supply chain – inefficient and non-existent
- ❖ Little concern about the embedded water/virtual water
- ❖ Are we doing enough to revive the dying water bodies ??

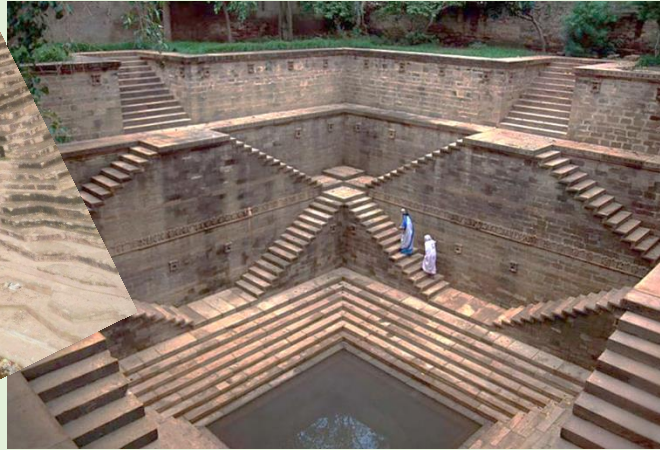


Now What



Traditional Knowledge

Learning from the past



India's Water Conservation Heritage



Source: <https://geographyandyou.com/ten-traditional-water-conservation-methods/>



Old V/s New



Pond System



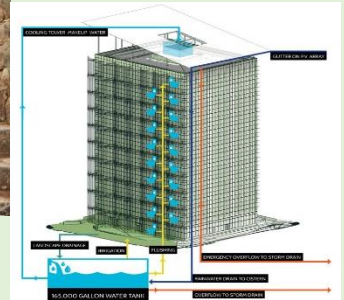
Irrigation



Water Lifting



Transportation



Rain water Harvesting



Aquifer Recharge

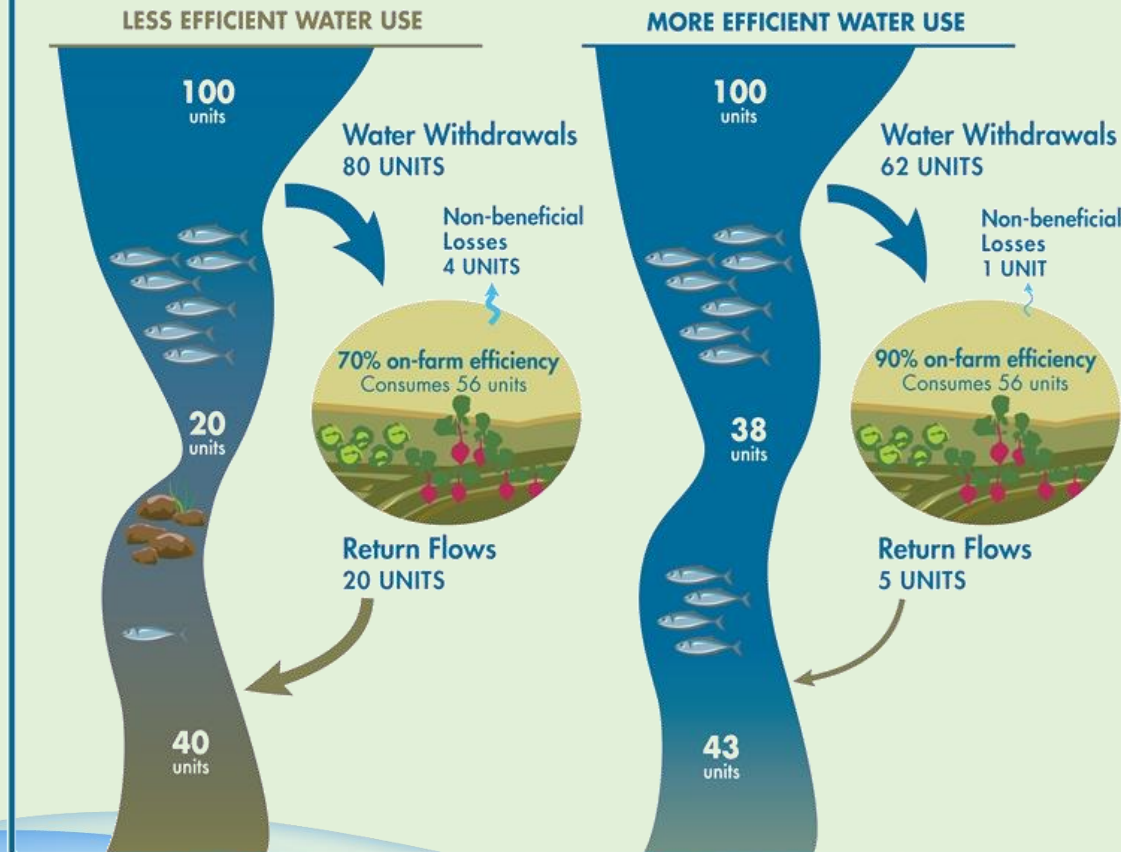


Distribution

Increased Efficiency



The Multiple Benefits of Water Efficiency



BENEFITS OF EFFICIENCY INCLUDE:

- Maintain agricultural production
- Reduced non-beneficial consumptive losses, creating new supply
- Less polluted runoff into rivers, streams, and groundwater aquifers
- More water to support in-stream flows
- Less energy for pumping
- Reduce or eliminate need for expensive infrastructure
- Less vulnerability to drought



www.pacinst.org

*Numbers in this figure are for illustrative purposes. Actual quantities would depend on site-specific conditions.

Source: <https://mavensnotebook.com/2014/08/05/blog-round-up-bloggers-on-water-conservation-drought-the-bdcp-groundwater-stormwater-wasted-water-and-more/>



Increasing Global Demand

Global Facts & Statistics

Global demand for water will exceed viable resources by **40%** by **2030**, if we continue business as usual.¹

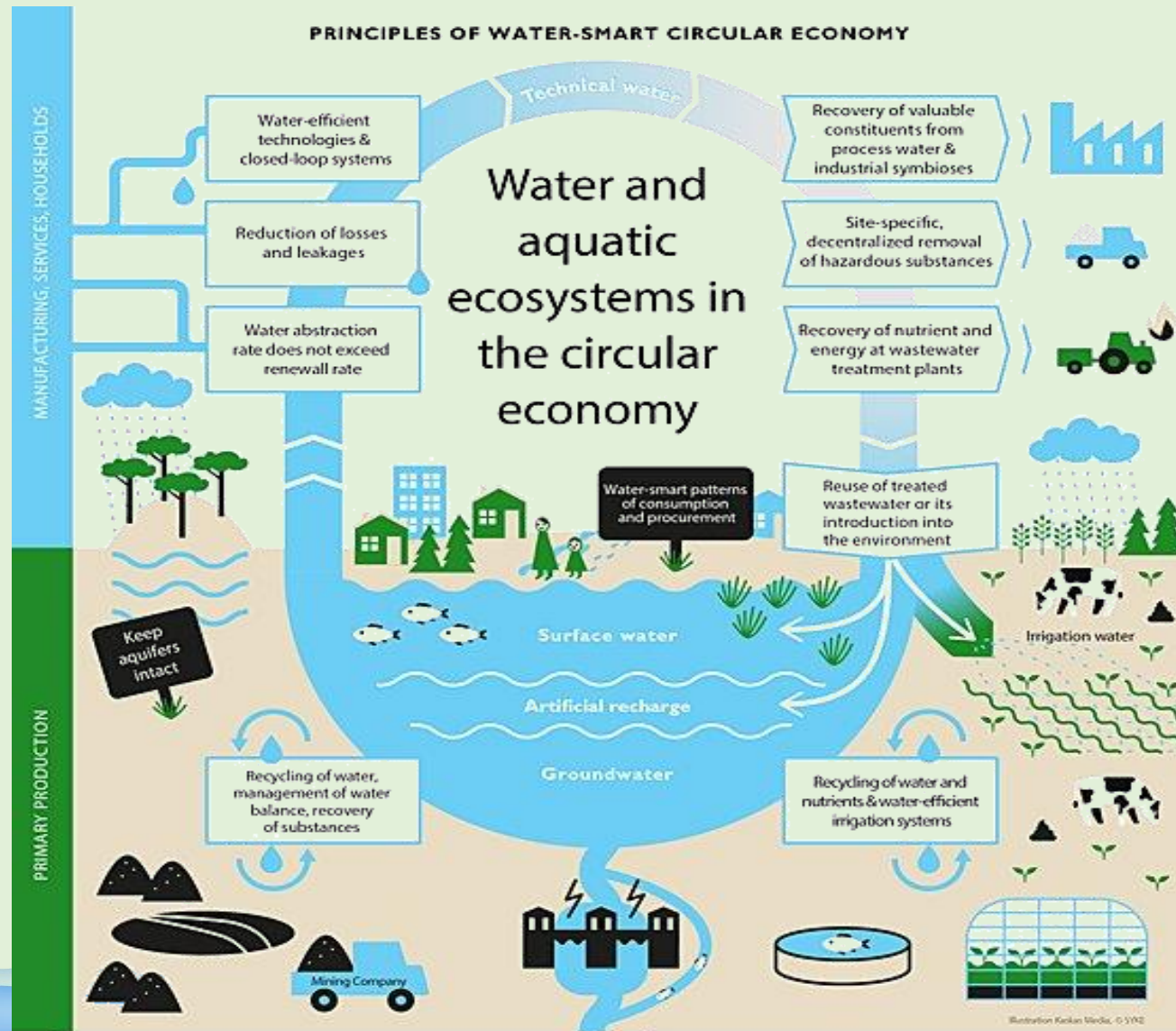
Industry is the **second largest** user of water, behind agriculture.²

Global water demand for manufacturing is anticipated to increase by **400%** by **2050**.³

Realizing a circular economy could globally divert up to **340 million tons** of waste from landfill each year.⁴

By applying circular practices in the near term across the consumer sector, **30% more materials could be recovered**.⁵

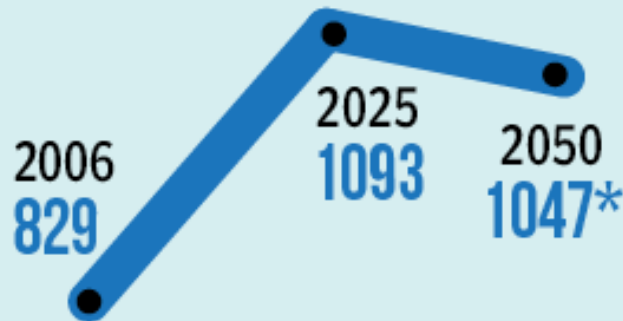
Emergence of Circular Economy



Hard Reality

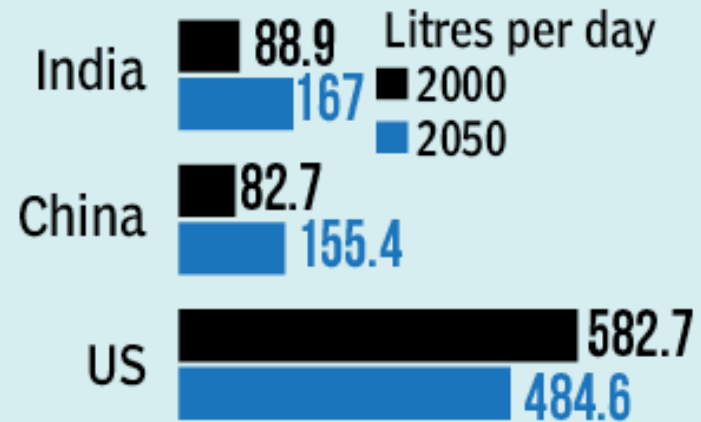


INDIA'S WATER DEMAND



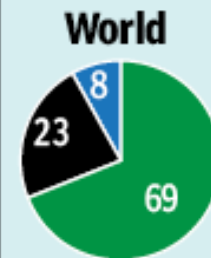
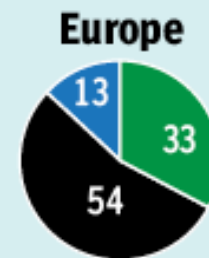
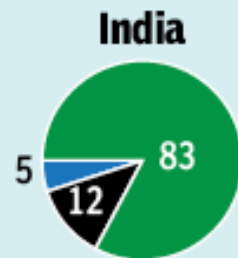
*Demand declines as population starts declining and water use is more efficient

PER CAPITA WATER USE



INDIA CONSUMES MOST OF ITS USABLE WATER FOR AGRICULTURE PURPOSES, WHILE HOUSEHOLDS GET ONLY **5%** OF IT

WATER USE SHARES (%)



Source: GOI, IWMI, UN



India's Effort

JAL SHAKTI ABHIYAN

Campaign will cover both Rural and Urban Areas



Source: <https://www.insightsonindia.com/2019/12/16/insights-into-editorial-not-many-lessons-learnt-from-water-planning-failures/>



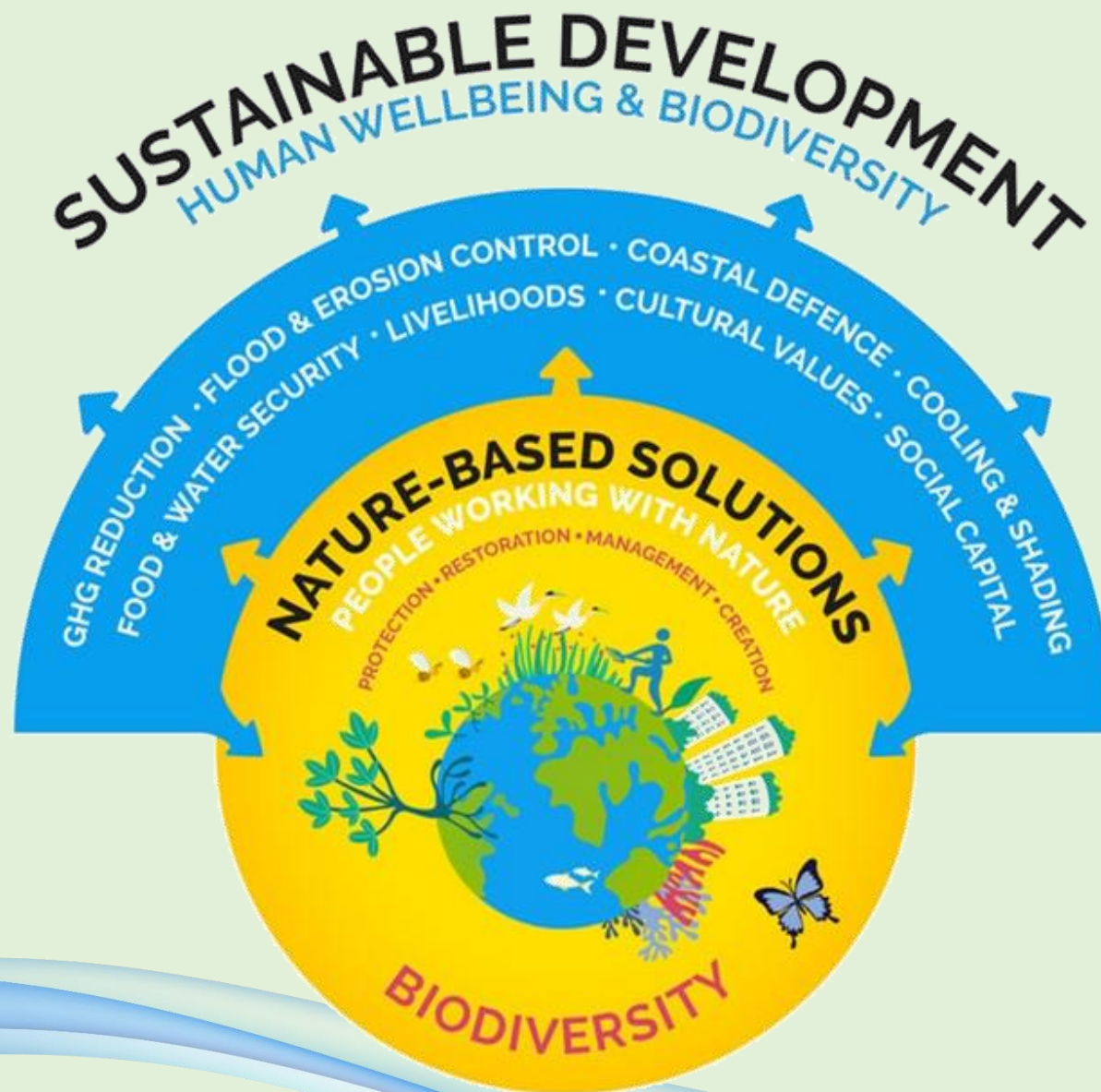
Crisis or a Rising Opportunity

"You never let a serious crisis go to waste. And what I mean by that it's an opportunity to do things you think you could not do before."

-Rahm Emanuel



Nature-based Solutions



Examples of Nature-based Solutions

Recreation areas to promote health and happiness



Tree planting to clean the air and to filter pollutants



(Re-)Greening waters to buffer noise and to filter pollutants



Revitalization of wetlands/rivers to balance the urban water cycle



Bioswales to store rainwater in streets and to lower the flood risk



Constructed wetlands to regulate ground- and surface water flows



Restoring fluvisols to bind and immobilize pollutants



Room for rivers to alleviate floods and to safe cities from hazards



Nutrient-cycling for food production in cities and prevent food import

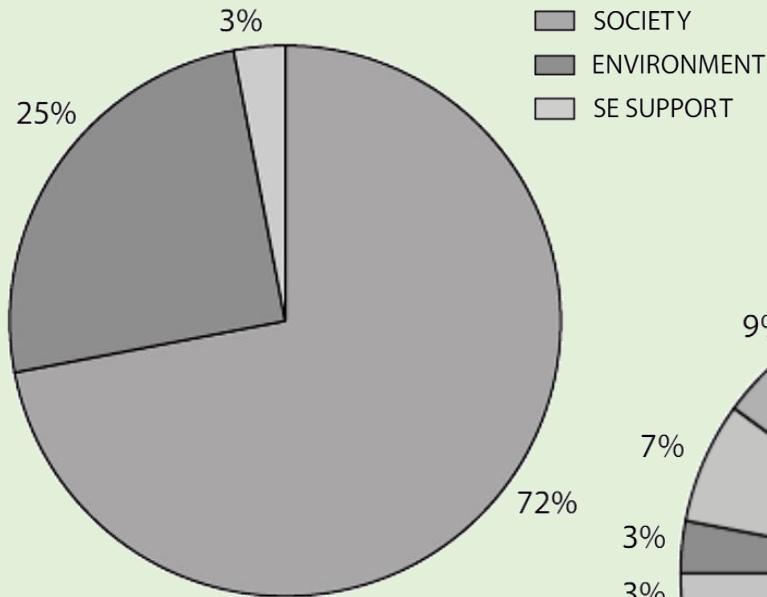


Entrepreneurship and Employment Opportunities

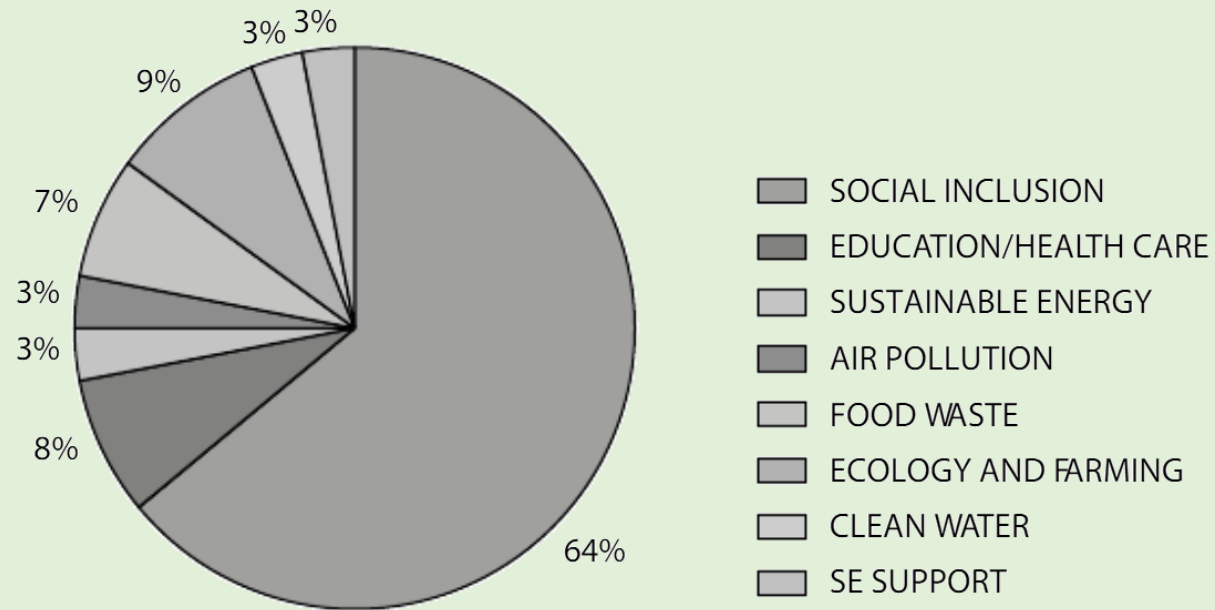
- ❖ Investment in small-scale projects providing access to safe water and basic sanitation in Africa could offer an estimated economic return of about **US\$28.4 billion** a year.
- ❖ Such investments also seem to have a beneficial effect on employment. In the United States, every **US\$1 million** invested in the country's traditional water supply and treatment infrastructure generates between 10 and 20 additional jobs.
- ❖ Meanwhile, the U.S. Department of Commerce's Bureau of Economic Analysis found that **each job** created in the local water and wastewater industry creates **3.68 indirect jobs** in the national economy.
- ❖ Another study in Latin America found that investing **US\$1 billion** in expanding the water supply and sanitation network would directly result in 100 000 jobs.
- ❖ The International Renewable Energy Agency (IRENA) estimates that **7.7 million people were already employed in renewable energy in 2014**.



The Rise of Social Enterprises



Source: own elaboration.



Source:


https://www.researchgate.net/publication/322155956_New_generation_of_social_entrepreneurs_Exploratory_research_and_cross_case_study_analysis_of_new_generation_of_social_enterprises



The Bigger Questions

- ❖ Are these technologies/innovations – easily available, affordable and implementable
- ❖ Do we have enough resources – financial resources and skill ready people
- ❖ Are we socially ready for these changes
- ❖ Is the local community on board, sensitized and capacity developed
- ❖ Do we have an effective mechanism to implement/follow-up it at the grassroot level
- ❖ Above all do we have an appropriate policy for all these?





When something is
important enough, you
do it even if the odds are
not in your favor.

-Elon Musk

Thank You

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