

# HEALTH IMPACT

There are a variety of measures that can be taken to prevent deaths due to climate change, and many of them are very affordable.<sup>218</sup> Since outbreaks of disease related to climate change are concentrated within certain regions, age groups, and socio-economic groups, good targeting of these diseases is feasible. Life-saving measures to address these health problems are some of the most well-documented and effective measures we have in fighting the negative effects of climate change. Such measures will require financing but could save hundreds of thousands of lives, especially among children and infants.

**VERY HIGH**  
Overall Effectiveness Rating

**10** #Actions Assessed

## FINDINGS

Around three quarters of the health impacts of climate change involve just three disorders – malnutrition, diarrhea and malaria – and are concentrated in children living in Sub-Saharan African regions and in South Asia.

Only a small fraction of occurrences of these three disorders worldwide are related to climate change. On the one hand, resources of the health, development and humanitarian communities have for decades been put to use to develop highly effective responses to these diseases.<sup>219</sup> Indeed, much of this section of the report is based on the expansive Disease Control Priorities in Developing Countries project, which in its second global edition has brought together large volumes of research from hundreds of experts and organizations active around the world.<sup>220</sup> On the other hand, measures addressing those same diseases – such as the simple mixture of sugar, salt, and clean water used to rehydrate people suffering from diarrhea – are so cost-effective that these diseases almost never lead to death in wealthy countries.

It is the poor that fall victim to deadly but preventable diseases. Whatever measures and programmes are employed to tackle these health problems must support the poorest of the poor, and external resources must support that effort.<sup>221</sup> Indeed, expanded efforts to deal with these diseases in recent years have reduced their frequency.<sup>222</sup> The loss of millions of lives every single year is linked to an ongoing shortfall of support. Climate change is projected to further encumber efforts to tackle these major illnesses. So it is all the more crucial that we step up campaigns to address maternal and child health, particularly in the areas of malnutrition, diarrhea and malaria. Such campaigns are critical to preventing reversals, for example, reoccurrences of malaria outbreaks in areas where the international community has already committed to achieving eradication. Yet health interventions are currently quite underrepresented in national climate-change adaptation action plans.<sup>223</sup>

### REVIEW FINDINGS



## THE REVIEW

All the health measures assessed in this report registered high levels of effectiveness in limiting the negative effects of climate on health.

For each health concern there is a corresponding array of immediate, medium- and long-term measures that are effective for various age groups and for various urban and rural settings.

All of the health-related interventions included in this report are cost-effective, and several are highly cost-effective, requiring less than USD 500 to prevent one year's ill health (which the health community refers to as Disability Adjusted Life Years).

In almost every case, the measures that could be taken to reduce health problems also have clear socio-economic benefits or other advantages. For instance, in-school feeding programmes also yield educational advantages, and improved water and sanitation facilities help foster wider economic activities.<sup>224</sup>

There is generally a highly comprehensive body of accumulated evidence and empirical and case-study research available to rate the

effectiveness of various health measures and to support decisions on how to go about implementing those measures. Guidelines and training programmes are also readily available for all measures suitable to the worst-affected populations, which include lowest-income and conflict-stricken communities as well as communities experiencing emergency situations. In cases where rising temperatures are enabling diseases like malaria and dengue fever to spread to populations in higher altitudes, for instance, existing measures (such as the distribution of insecticide-treated bed nets) can be implemented in the newly affected zones.

The factor most likely to hinder implementation of specific measures to combat climate-change related health problems is feasibility. Improving water supplies is possible, for example, only if a reliable source of water is available. And a range of factors – among them climate change itself – make finding reliable water sources increasingly difficult.<sup>225</sup> Similarly, construction and maintenance of adequate sanitation facilities in rural or island communities require local expertise and resources that are not always on hand.<sup>226</sup>

## TIMEFRAME CONCERNS

A phased approach is critical to effectively addressing the health impacts of climate change, and rolling back the burden of climate-sensitive diseases in general, as is the international community's established goal.

A number of measures can have an almost immediate effect and, in some instances, can reliably avert death in the large majority of cases. Bed nets and in-door insecticide spraying, for example, offer immediate protection for families located in malaria-endemic areas by keeping disease-carrying mosquitoes away.<sup>227</sup> Oral rehydration therapies, such as use of water-based sugar-salt solutions, can prevent death and help patients recover from dehydration.<sup>228</sup> None of these interventions permanently reverses the course of disease.

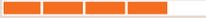
Some illnesses can be tackled at the root of their cause. For instance, Rotavirus A, which causes 90% of infectious diarrhoea cases, is passed from person to person via contaminated faecal particles introduced into

the body via the mouth.<sup>229</sup> Improved water and sanitation facilities limit transmission of the disease. Immunization can also help prevent the virus from making children sick.

Almost all health measures included in this report fall into the immediate or short-term (impact within one year) categories. Excessive heat notification and response systems, for example, will really only have an effect when a heat wave occurs.<sup>230</sup>

IN ALMOST EVERY CASE, THE MEASURES THAT COULD BE TAKEN TO REDUCE HEALTH PROBLEMS ALSO HAVE CLEAR SOCIO-ECONOMIC BENEFITS OR OTHER ADVANTAGES

# HEALTH IMPACT ADAPTATION ACTIONS

	ACTION SET	VULNERABILITIES	MOST VULNERABLE POPULATIONS	EFFECTIVENESS RATING	EVIDENCE RATING
1	CHILD SURVIVAL PROGRAMME WITH NUTRITION COMPONENT	• Malnutrition		Very High 	Medium 
2	SCHOOL HEALTH AND NUTRITION PROGRAMMES	• Malnutrition		Very High 	High 
3	BREASTFEEDING PROMOTION	• Diarrhea • Malnutrition		High 	High 
4	ORAL REHYDRATION THERAPY AND ZINC SUPPLEMENTATION	• Diarrhea		Very High 	High 
5	IMMUNIZATION PROGRAMMES (ROTAVIRUS, HIB, HEPATITIS B, PNEUMOCOCCAL)	• Diarrhea • Acute respiratory infections		High 	High 
6	IMPROVED WATER SUPPLY INFRASTRUCTURE	• Diarrhea		Very High 	Medium 
7	BASIC SANITATION FACILITIES	• Diarrhea • Waterborne diseases		Very High 	High 
8	INSECTICIDE-TREATED BED NETS	• Malaria • Dengue, other vector-borne diseases		Very High 	High 
9	INDOOR RESIDUAL SPRAYING	• Malaria		Very High 	High 
10	EXCESSIVE HEAT EVENT NOTIFICATION AND RESPONSE PROGRAMMES	• Cardiovascular and respiratory diseases		High 	High 

# CHILD SURVIVAL PROGRAMME WITH NUTRITION COMPONENT

1

Community-based nutrition programmes to prevent stunted growth, control disease, and improve survival. Such programmes promote breastfeeding, provide

education, and offer counselling on how best to feed children, prevent diarrheal disease, and monitor growth.

## ASSESSMENT

Very High

		EFFECT		IMPLEMENTATION TIMEFRAME	
		Immediate	Short-Term	Quick Start	Implementation Lapse
COST-EFFECTIVENESS	Very High 	↓ ↓	↓ ↓	×	✓
CO-BENEFITS	Very High 	↓ ↓	↓ ↓	✓	×
FEASIBILITY	Medium 	↓ ↓	↓ ↓	×	×
SCALABILITY	Very High 	↓ ↓	↓ ↓	✓	×
EVIDENCE BASE	Medium 	↓ ↓	↓ ↓	×	×

Expense: \$2 (less intensive) - \$10 (more intensive) per child

## Impacts Addressed: **Child health, malnutrition**

Child survival programmes rate highly on scalability, cost-effectiveness, and co-benefits. At \$42 per DALY, this programme is among the least expensive of all health programmes assessed here. Improving child health can result in a number of other positive socio-economic benefits. Excellent guidelines and simple, effective training are readily available to help expand this programme to new areas. The programme is also particularly suited to low-income communities vulnerable to malnutrition, since that is a problem it specifically targets.

The programme received a low rating for feasibility, mainly because, in some cases, children take the nutrition supplements and food home to adults rather than consume them themselves. The programme has only a moderate base of evidence for its effectiveness. Additional research and peer-reviewed studies would help more accurately establish the programme's value.

The programme has very quick effects. In highly vulnerable communities, we see the effect well within one year of implementation. That effect continues for the length of the programme cycle, typically one year of duration, and can have benefits beyond that due to its educational component.

## MDG BOOST

↑1, ↑4, ↑5

# SCHOOL HEALTH AND NUTRITION PROGRAMMES

2

Simple school-based programmes to improve health through low-cost interventions such as treatment for intestinal worms and schistosomiasis; prompt recognition and treatment of malaria; distribution of insecticide-treated

bed nets, micronutrient supplements, meals, snacks, and first-aid kits; and referrals of children to youth-friendly clinics and associated programmes.

## ASSESSMENT

Very High

		EFFECT		IMPLEMENTATION TIMEFRAME	
		Immediate	Short-Term	Quick Start	Implementation Lapse
COST-EFFECTIVENESS	Very High 	↓ -----	✓	Quick Start	✓
CO-BENEFITS	Very High 	-----	✓	Implementation Lapse	✗
FEASIBILITY	Very High 	-----	✗	Programme Cycle	Typically 1 year
SCALABILITY	Very High 	-----	-----		
EVIDENCE BASE	High 	-----	-----		



Expense: \$37 per DALY

## Impacts Addressed: Child health, malnutrition

School health and nutrition programmes rate highly on cost-effectiveness (\$37 per DALY), co-benefits, feasibility, and scalability. This programme is among the least expensive of all health measures assessed here. Improving child health can also lead to better educational results. Such programmes can roll out quickly using existing educational networks and have an especially high impact on the poorest and most undernourished children.

Evidence shows that the number of children reaching school age (defined as 5 to 14 years of age) is increasing due to such child survival programs. In The Gambia, girls were more than twice as likely to enroll in primary school if they had received malaria prophylaxis in early childhood. In Kenya, treatment of Helminth infections reduced absenteeism by one-fourth, with the youngest children (who typically suffer the most ill health) showing the largest gains.

The evidence base for the programme is high -- we have several well-documented examples from various geographical regions. However, not all types of intervention are relevant to all situations or locations, so it is essential to assess the needs of a community prior to each implementation.

The programme's positive impact is consistent only as long as the children continue to attend school. Positive impacts can have an almost immediate effect, since the programme rolls out through existing networks. The programme's effectiveness ends as soon as the programme does.

## MDG BOOST

↑1, ↑3, ↑4, ↑5, ↑6

Sources: DCPD

# BREASTFEEDING PROMOTION

3

Encouraging new mothers to breastfeed their infants for the first six months of life. Breastfed infants should receive no other food or drink, including water, except for supplements of vitamins and minerals and necessary medicines.

## ASSESSMENT

Very High

		EFFECT		IMPLEMENTATION TIMEFRAME	
COST-EFFECTIVENESS	High 	Immediate ↓ 		Quick Start	
CO-BENEFITS	Very High 				
FEASIBILITY	Medium 	Short-Term ↓ 		Implementation Lapse	
SCALABILITY	Very High 				
EVIDENCE BASE	High 	Long-Term ↓ 		Programme Cycle	Typically 1-2 years

Expense: \$0.46-\$17.50 per child

## Impacts Addressed: Diarrheal disease

Breastfeeding-promotion programmes rate highly on scalability, co-benefits, and cost-effectiveness (\$930 per DALY). Technical specifications and guidelines for implementing this programme already exist, and global training programmes are well developed and accessible. Promoting increased breastfeeding can result in other health benefits. Exclusive breastfeeding eliminates the intake of potentially contaminated food and water. Breastfeeding also significantly lowers the risk of transmitting infections to children and reduces child mortality rates, especially among the poorest groups. Breastfeeding promotion is among the least costly actions available to the health community today.

The programme has a large base of evidence for its effectiveness. Various empirical studies and economic analyses have been carried out in multiple countries. Studies have shown that in developing countries, breastfed children under six months of age are 6.1 times less likely to die of diarrhea than infants who are not breastfed.

The programme ranks low on feasibility because it relies heavily on behavioural change. For example, it is possible to promote breastfeeding through community-based mothers' support groups, but few such support groups exist, and where they do, their members tend to be women who are already motivated to breastfeed. There is also some danger in promoting exclusive breastfeeding in HIV-affected communities, since there is some risk of transmitting infection to the infant.

## MDG BOOST

↑1, ↑4, ↑5

Sources: DCPD

# ORAL REHYDRATION THERAPY AND ZINC SUPPLEMENTATION

4

A simple water, sugar, and salt (or similar) solution and a zinc nutrient supplement provided as a drink to patients to prevent dehydration and chronic diarrhea.

## ASSESSMENT

Very High

		EFFECT		IMPLEMENTATION TIMEFRAME	
COST-EFFECTIVENESS	<p>Very High</p>	Immediate 		Quick Start	
CO-BENEFITS	<p>Medium</p>				
FEASIBILITY	<p>Very High</p>	Short-Term 		Implementation Lapse	
SCALABILITY	<p>Very High</p>				
EVIDENCE BASE	<p>High</p>	Long-Term 		Programme Cycle	Typically 1 year

Expense: \$0.02-\$11.00 per person

## Impacts Addressed: Diarrheal disease

Oral rehydration programmes rate highly in feasibility, scalability, and cost-effectiveness. The programme received a high rating for cost-effectiveness, since it is instantly implementable and requires little management, although the cost per treatment can vary widely (from \$73- \$1,062 per DALY) depending on how the solution is prepared and administered.

The programme has a high feasibility rating due to its high success rate across a variety of contexts, its ease of implementation, and its consistent results. The programme has a high base of evidence for its effectiveness. It is a widely applied tool that has been broadly used for many decades. Its

success has been well documented through various studies from WHO and The Disease Control Priorities Project. Also, since rehydration solutions are simple, readily available, and universally applicable, the programme can scale up very easily.

The programme rates low on co-benefits, mostly because its core focus is to avert death due to dehydration, the main cause of fatality in cases of diarrhea.

The programme can be put into operation instantly to avert almost imminent death. However, it does nothing to reduce the problem of infectious diarrhea.

## MDG BOOST

↑1, ↑4

# IMMUNIZATION PROGRAMMES

5

Rotavirus vaccination to prevent the most common cause of infectious diarrhea, and/or Haemophilus influenzae type B (Hib) vaccination to prevent pneumonia and meningitis.

## ASSESSMENT

High

		EFFECT		IMPLEMENTATION TIMEFRAME	
COST-EFFECTIVENESS	High 	Immediate ↓ 	✓	Quick Start	✓
CO-BENEFITS	High 				
FEASIBILITY	High 	Short-Term ↓ 	✓	Implementation Lapse	✗
SCALABILITY	Very High 				
EVIDENCE BASE	High 	Long-Term ↓ 	✓	Programme Cycle	Typically 1-3 years



Expense: \$17 on average per fully immunized child

## Impacts Addressed: Diarrhea (rotavirus), acute respiratory infections (pneumonia)

Immunization programmes (including Hib and Hepatitis B) rate highly on cost-effectiveness (\$296-\$2,478 per DALY) and scalability. In Chile, the government determined that the creation of a combined diphtheria-tetanus-pertussis and Hib vaccine was worthwhile and that the vaccine could be delivered as part of an already well-functioning system of routine immunization.

WHO has already established a standard immunization schedule, and a number of countries operate large-scale, sustainable training programmes at the community level. However, affordable medical care is generally lacking, and inadequate clinical conditions may result in less effective vaccine treatments. Additionally, rural populations may be excluded from treatment due to the difficulties of distributing vaccines to remote areas.

While the evidence base is high, additional research and peer-reviewed studies would help more accurately establish the effectiveness of vaccination programmes. The long-term consequences and co-benefits of vaccinating against diarrheal diseases remain poorly studied. Additionally, investments in R&D are required before large-scale rollout of a rotavirus vaccine programme can be considered.

Immunization has a close to immediate effect protecting against infection and transmission but cannot eliminate an existing infection or fatality risk.

## MDG BOOST

↑4, ↑6

Sources: DCPD

# IMPROVED WATER SUPPLY INFRASTRUCTURE

6

Installation of hand water pump, standpost, or house connection in areas where clean water supply is limited and no plumbing infrastructure exists.

## ASSESSMENT

High

		EFFECT	IMPLEMENTATION TIMEFRAME
COST-EFFECTIVENESS	<p>Very High</p>	<p>Immediate</p> <p>✓</p>	<p>Quick Start</p> <p>✓</p>
CO-BENEFITS	<p>Very High</p>		
FEASIBILITY	<p>Medium</p>	<p>Short-Term</p> <p>✓</p>	<p>Implementation Lapse</p> <p>✗</p>
SCALABILITY	<p>High</p>		
EVIDENCE BASE	<p>Medium</p>	<p>Long-Term</p> <p>✓</p>	<p>Programme Cycle</p> <p>Typically 1-3 years</p>



Expense: \$17 (borehole) - \$144 (house connection) per person

## Impacts Addressed: **Drinking water, diarrheal disease**

Improved water supply infrastructure programmes rate particularly highly on co-benefits and cost-effectiveness (\$159 per DALY). Dozens of viruses, bacteria, protozoa, and helminths cause diarrheal and other diseases. They are generally picked up through fecal-oral transmission, often by drinking contaminated water or eating unwashed foods in areas lacking a clean water supply.

The programme's costs are consistently low, although they may differ in urban and rural environments. The programme improves living conditions and prevents a wide range of contaminants from entering the body. It also has various indirect effects, including time saving (an Indian national survey for UNICEF found that women spent an average of 2.2 hours per day collecting water) and nutritional benefits (if poor households spend less money on water, they will have more funds for food).

The programme rates lowest on feasibility, since it demands ongoing investment and cannot succeed in areas where water is in very short supply. However, the programme has shown that, once implemented, it delivers consistent results. Technical specifications and guidelines are extensively available and fully tested, and many good case examples exist of the programme's success in low-income communities.

Installation is quick, and its effect on halting the spread of disease and bacteria due to unclean water and food is virtually immediate. If the infrastructure is maintained, the programme yields long-term benefits.

## MDG BOOST

↑2, ↑3, ↑4, ↑6

# BASIC SANITATION FACILITIES

7

Construction and promotion of basic sanitation where sanitation facilities are limited.

## ASSESSMENT

Very High

		EFFECT	IMPLEMENTATION TIMEFRAME		
COST-EFFECTIVENESS	 <p>Very High</p>	Immediate 		Quick Start	
CO-BENEFITS	 <p>Very High</p>				
FEASIBILITY	 <p>High</p>	Short-Term 		Implementation Lapse	Typically after 0-2 months
SCALABILITY	 <p>Very High</p>				
EVIDENCE BASE	 <p>High</p>	Long-Term 		Programme Cycle	Typically 5 years

 Expense: \$60-\$160 per person

## Impacts Addressed: Diarrheal disease

Basic sanitation facilities programmes rate highly on cost-effectiveness, co-benefits, and scalability. At a construction cost of \$60 per capita for basic sanitation facilities and a lifetime of 5+ years for a latrine, this programme remains among the least expensive of the health measures assessed here. Lower-cost models are possible in areas that lack infrastructure or where more complex sanitation systems are not feasible, making such a programme highly cost-effective even where construction costs are high.

The programme is beneficial to all groups in a community lacking sanitation and reduces the spread of diarrhea while also producing socio-economic and cultural benefits. However, it is unclear whether we can attribute the positive effects to the installation of latrines alone, since benefits have only been measured in combination with improved hand-washing habits. Benefits are highest where a clean water supply is also available.

WHO, UNICEF, and the World Bank have already developed technical specifications and guidelines for low-cost sanitation projects, and many well-documented case examples exist. However, there is a lack of training in appropriate construction techniques.

Successful implementation also depends on behavioural changes. Some studies indicate that, to reap the full impact of the programme, communities must make cultural adjustments over time.

Implementation can occur quickly depending on the solution chosen. Benefits accrue immediately thereafter and, with well-maintained infrastructure, last long-term.

## MDG BOOST

↑4, ↑6, ↑7

Sources: DCP, Jamison et al. (2006)

# INSECTICIDE-TREATED BED NETS

8

Treatment of purchased or subsidized bed nets with insecticides.

## ASSESSMENT

Very High

		EFFECT		IMPLEMENTATION TIMEFRAME	
COST-EFFECTIVENESS	<p>Very High</p>	Immediate 		Quick Start	
CO-BENEFITS	<p>Very High</p>				
FEASIBILITY	<p>High</p>	Short-Term 		Implementation Lapse	
SCALABILITY	<p>High</p>				
EVIDENCE BASE	<p>High</p>	Long-Term 		Programme Cycle	Typically 5 years



Expense: \$5 per bed net

## Impacts Addressed: **Malaria**

Bed nets rate very highly on cost-effectiveness (\$5-17 per DALY) and co-benefits. Use of insecticide-treated bed nets provides personal protection by killing or repelling mosquitoes and is a very effective strategy for controlling malaria. This action is among the least expensive of all known health measures. Bed nets are easy to distribute through subsidies or other programmes, and costs are consistent in Sub-Saharan Africa (the area where malaria is most prevalent). The programme is applicable and relevant to all groups in a community.

Recent cross-country comparisons of economic growth indicate that eliminating malaria can have a strong positive impact on economic development. Currently, bed nets must be treated

semi-annually; however, new technology should eliminate this requirement. When bed net users receive basic training in how to use the net, the programme's success rate is high. Protection is only during sleeping hours, but that is a high-risk period, which is why over 20 studies in Africa and Asia have demonstrated a protective success rate of over 50 percent for individual net users.

Training programmes should be culturally sensitive and adapted to local customs. More operational experience is necessary before it is possible to inform national initiatives on how to scale up use. Bed nets function immediately, can be distributed extremely quickly, and the latest models have a lasting effect for many years if well maintained (in particular through the repair of holes).

## MDG BOOST

↑4, ↑5, ↑6

Sources: DCP, Jamison et al. (2006), WHO (2006)

# INDOOR RESIDUAL SPRAYING

9

Applying long-lasting insecticides to the walls and surfaces of dwellings.

**ASSESSMENT** Very High

		EFFECT		IMPLEMENTATION TIMEFRAME	
COST-EFFECTIVENESS	Very High 	Immediate ↓		✓	Quick Start ✓
CO-BENEFITS	Very High 				
FEASIBILITY	High 	Short-Term ↓		✓	Implementation Lapse ✗
SCALABILITY	Very High 				
EVIDENCE BASE	High 	Long-Term ↓		✗	Programme Cycle Typically 0.5 year

Expense: \$9-\$24 per treatment

## Impacts Addressed: Malaria

Indoor residual spraying programmes rate highly in co-benefits, scalability, and cost-effectiveness (\$32 per DALY). Recent cross-country comparisons of economic growth indicate that eliminating malaria – which residual spraying directly addresses – has a strong positive impact on economic development. A 10 percent reduction in malaria has been associated with 0.3 percent higher economic growth per year.

Technical specifications, guidelines, and several training programmes on applying the insecticides are already available, including Roll Back Malaria and WHO implementation programmes.

Indoor insecticide spraying has a consistent impact where it can be applied, although frequent applications are necessary.

Effectiveness will depend on the length of the malaria-transmission seasons and on the insecticide used. The programme has been evaluated by several WHO studies in Africa, the Americas, Asia, and Europe and by empirically based, well-documented assessments. The cost to implement such a programme may be out of reach for many low-income countries, and successful implementation can require extensive planning, coordination, infrastructure, and skills and high coverage levels. Communities may also develop environmental problems due to the toxicity of the insecticide.

The effect of a spraying programme is instantaneous, but most insecticides are effective for just 2-6 months, requiring constant reapplication.

**MDG BOOST** ↑4, ↑5, ↑6

Sources: DCP, WHO (2006), Jamison et al. (2006)

# EXCESSIVE HEAT EVENT NOTIFICATION AND RESPONSE

10

Programmes combining meteorological forecasts and other data to trigger public health interventions to reduce heat-wave illnesses and deaths.

<b>ASSESSMENT</b>	High	
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		EFFECT	IMPLEMENTATION TIMEFRAME		
<b>COST-EFFECTIVENESS</b>	High 	Immediate 	✓	Quick Start	✗
<b>CO-BENEFITS</b>	High 				
<b>FEASIBILITY</b>	High 	Short-Term 	✓	Implementation Lapse	Typically after 6 months
<b>SCALABILITY</b>	High 				
<b>EVIDENCE BASE</b>	High 	Long-Term 	✓	Programme Cycle	Typically 2-5 years

Expense: \$200,000

## Impacts Addressed: **Cardiovascular and respiratory diseases**

Excessive heat event notification and response programmes rate highest on co-benefits. The programme can be cost-effective and easily implemented where advanced public health and meteorological systems are in place, which is the case for many of the worst affected areas, such as Europe and North America.

The programme demands reliable meteorological data and established communication channels that may not always be available or adequate in low-income settings, particularly in remote communities. It is also difficult to guarantee that communications will reach the appropriate groups/persons. While clear technical specifications and guidelines exist, the

programme has lower relevance for low-income countries, since heat waves cause most damage in regions where extremely hot weather is relatively infrequent. Local coping methods are already common in areas that regularly experience high heat, such as many low-income countries in Africa and Asia.

Several peer-reviewed studies exist on the subject. However, there is no standard way to estimate the impact in different countries. It can take weeks to more than a year to implement such a system. Once established, such programmes are easily maintained into the long-term, provided supportive public and other services are also functioning.

**MDG BOOST**

↑4, ↑5

Sources: Kovats & Ebi (2006), U.S. Environmental Protection Agency (2006), Ebi et al. (2004)



Bush fire close to the Italian city of Genoa in September 2009. Source: Wikimedia Commons/Janurah.