Jamaica and the Fight against Malaria
by Kadian Christie

Introduction

The target of the Millennium Development Goal (MDG) 6 is to by 2015 have halted and begun to reverse the incidence of malaria and other major diseases. Jamaica is a proponent of this objective and as such has joined in the fight to eradicate malaria in the country. Evaluation of the country’s progress in achieving the MDG showed that prior to late 2006, Jamaica had achieved the goal’s target. The status was, however, reversed with the recent outbreak of malaria.

Malaria is an infection caused by a parasite called Plasmodium that is transmitted by the female Anopheles mosquito. One is susceptible to malaria, if bitten by a female Anopheles mosquito carrying the parasite or if the Anopheles mosquito bites a carrier of the disease then bites you. There are four main types of malaria that affect humans. These are associated with the four types of Plasmodium parasites that spread the disease:

- *Plasmodium falciparum* (P. falciparum)
- *Plasmodium vivax* (P. vivax)
- *Plasmodium ovale* (P. ovale)
- *Plasmodium malariae* (P. malariae)

The most severe kind of malaria is plasmodium falciparum. Death from the other three types is very rare, however, proper diagnosis and early treatment is strongly recommended.

Malaria Symptoms

The impact of the disease in humans resulting from this infection can be devastating. The parasite spreads rapidly through the bloodstream to the liver, emerging once again in the bloodstream where it settles in the red blood cells, multiplies and develops into new organisms. This leads to serious damage to the nervous system, liver, kidney and in some cases death. Malaria symptoms can appear flu-like and are therefore sometimes overlooked by patients and caregivers alike. Some common symptoms of malaria:

- headache
- joint pain
- fever
- sweating

(Continued on page 3)
Innovation Infrastructure in the last of a two-part feature.

Beginnings extends special thanks to Mrs. Kadian Christie, The Ministry of Health and Mr. Richard Kelly for their contribution to this issue.

As we approach the festive season let’s do so with moderation, with a spirit of peace, reconciliation and respect for each other. Merry Christmas and a Happy New Year from the Beginnings team.

Nadine Jones
Editor/Desktop Publisher

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Send us your input on sustainable development related websites, events, projects, articles, workshops etc. and we will gladly include them in our publication.

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Hurricane Affected Communities Map (Page 13) - Office of Disaster Preparedness and Emergency Management
Research & Development Expenditure Map (Page 8) (worldmapper.org)

PLANNING INSTITUTE OF JAMAICA
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The Hurricane season did not go unnoticed this year with Jamaica being hit by the “mean” Hurricane Dean. Although the hurricane did not make landfall, damage was extensive especially along the southern coast of the island. Despite the widespread damage, the recovery period for the restoration of public utilities such as electricity and water was much shorter than in previous times. This was largely due to comprehensive business continuity plans and collaboration among the major utility providers. More details of the effects of Hurricane Dean can be found in the In Focus section of this issue.

We continue to explore our progress in achieving the targets under the Millennium Development Goals with our focus on MDG 6—to by 2015 have halted and begun to reverse the incidence of malaria and other major diseases. Our feature article examines the history of malaria and the measures taken to control the spread of the disease in Jamaica. A recent release (Ministry of Health, Ministry Paper 62-68/2007—2006-2007) stated that Jamaica remained at risk for the reintroduction of malaria because of its climate, rainfall and other conditions conducive to the transmission of the disease with an average of 5-10 imported cases of malaria identified each year. It is therefore important that sustainable measures be taken both on the part of the government and the “man in the street” to ensure containment of the disease, ultimately towards returning Jamaica to “malaria free” status.

Further coverage of MDG 6 is contained in our MDG Watch and Did You Know? features, highlighting the progress of the countries of the world concerning malaria and HIV/AIDS.

We complete our focus on Jamaica’s Innovation Infrastructure in the last of a two-part feature.
(Continued from page 1)

- loss of appetite
- diarrhoea
- nausea and vomiting

The incubation period for the symptoms to appear is between 7 and 14 days. Failure to make the correct diagnosis and give the appropriate treatment, can lead to coma and/or death. Other common symptoms of malaria may include back pain, chills, dry cough, enlarged spleen, impaired function of the brain or spinal cord, seizures and loss of consciousness.

**Malaria - International Focus**

Each year, there is an estimated 350-500 million cases of malaria, resulting in over one million deaths. The vast majority are among children under five years old with more than 90 per cent of all malaria deaths occurring in sub-Saharan Africa. Pregnant women are more susceptible to malaria infection than non-pregnant women. During a malaria epidemic, they are also up to three times as likely to develop serious malaria as other adults (DFID Malaria Fact Sheet, November 2006).

Malaria can cause an immense burden on health systems. For example, in sub-Saharan Africa, malaria is estimated to account for 25-35 per cent of all outpatient visits, 20-45 per cent of hospital admissions and 15-35 per cent of hospital deaths.

**History of Malaria in Jamaica**

Malaria is not new to Jamaica, it has been around since the early 1900 when recording of the disease began. ‘Ague’, ‘intermittent fever’, ‘remittent fever’ were some of the terms used to describe the disease until the beginning of the 20th century when the term malaria was introduced. A 1965 study by the Pan-American Health Organization (PAHO) in collaboration with the World Health Organization (WHO) stated that ‘malaria had been one of the most important causes of illness and death in Jamaica’ and had been a ‘major concern for health authorities since the beginning of the century’. According to official records kept at the time (1900-1963), the number of deaths from malaria was between 400 and 700 per annum.

Since the beginning of the 1900s, a number of studies have been conducted by foreign and local malariologists in an effort to control the disease in the island. An Insect Control Service was established in 1943 and antiviral measures such as drainage and laviciding with oil were undertaken. Other methods such as residual house spraying with DDT and land reclamation were also introduced in selected malarious areas with encouraging results.

In 1965, Jamaica was declared malaria free, with the last case of P. falciparum being reported in June 1961 (Register of Malaria in Jamaica: 5, PAHO, 1965), and remained so for over four decades. However, in November 2006 an outbreak of malaria changed Jamaica’s malaria-free status.

**Outbreaks/Deaths**

Since 2006, the Ministry of Health has placed malaria on its watch list of communicable diseases. In a recent release (Ministry of Health, Ministry Paper 62-68/2007 - 2006-2007), the Ministry stated that Jamaica remained ‘at risk for the reintroduction of malaria because of its climate, rainfall and other conditions conducive to the transmission of the disease with, an average of 5-10 imported cases of malaria identified each year’.

In November 2006, three cases of malaria were confirmed in some inner-city communities in Kingston with other cases being detected in St. Catherine and St. Elizabeth. These were determined to be locally transmitted in Jamaica thus bringing to attention the latest outbreak of malaria in the island. Notwithstanding, the government is expecting that Jamaica will, in short order, be declared a non-epidemic country for malaria.

A year later (October 2007), the Ministry of Health and Environment confirmed two new cases of malaria. Since then,
Control Methods

The Anopheles mosquitoes breed in places where water collects naturally. Breeding increases dramatically in the rainy season when bottles, tins, tender coconut shells, buckets, tyres etc., that are thrown out in the open collect water and these provide ample breeding ground. Wells, ponds, water tanks also act as breeding grounds. It is recommended that breeding places such as these be destroyed or kept properly covered to prevent breeding. The egg of the mosquito usually takes about two weeks to develop to adulthood.

According to the Ministry of Health, the 'overall aim of the Malaria Prevention and Control Programme is to decrease morbidity and mortality caused by malaria and to return Jamaica to a malaria-free status' (7). Some of the strategies employed in the eradication process are:

- Early case identification
- Prompt treatment of cases
- Continuous vector control
- Public education
- Personal and individual protection
- Inter-sectoral collaboration and partnerships at the national, regional and international levels

(Continued from page 3)

P. FALCIPARUM MALARIA OUTBREAK - LOCAL CASES

As with the 2006 cases, Kingston was the location of critical detection in 2007. The Ministry of Health reported that two new cases of locally contracted malaria were diagnosed - one in a 26-year-old male from Waterhouse (October 9, 2007) and the other in a 15-year-old female from Riverton (October 15, 2007). The detection and confirmation led to a rash of testing over a one-month period. Kingston and St. Andrew submitted 809 samples between October 7-20 of which 421 samples were from Waterhouse and 45 were from Riverton.

The Ministry has indicated that as at October 27, 2007 the total number of locally acquired malaria cases was 372. All cases have been epidemiologically linked to the KSA outbreak. Three hundred and forty-four (344) reside in KSA and the remaining 28 were from: St. Catherine 21, St. Thomas 3, Clarendon 2, Westmoreland 1 and Hanover 1. Treatment has been completed for all 372 cases.

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**Fight against Malaria...**

![Graph showing confirmed P. Falciparum malaria cases by week of onset of illness, September 2006 - October 27, 2007 (n=359).](image)

**Eradication**

Public education remains critical in the fight to eradicate the disease. The Ministry of Health, while updating the public on new cases of the disease, have also given advice on how to avoid becoming infected. This includes encouraging residents to keep away from areas or activities that can lead to exposure to mosquitoes and ensuring that their surroundings are kept in a manner which discourages the breeding of mosquitoes.

**Conclusion**

The control and eventual eradication of malaria in Jamaica is of concern to everyone. Jamaica is a tropical country with a climate, rainfall and conditions that are conducive to the transmission of the disease, especially with the free movement of persons to and from malaria endemic countries. As can be seen from the September 2006 outbreak, the disease can be transmitted locally or imported. The Ministry of Health, through its surveillance systems, collects data on all communicable diseases and as such is able to detect an outbreak which usually triggers the appropriate response. The containment of malaria and treatment of the disease puts pressure on the health system to provide the necessary screening, vector control, public education and response to geographic areas where outbreaks occur.

Impacts of climate change such as increase temperature, frequent storms and severe floods create an environment for the rapid reproduction for carriers of the disease. Added to this is the inappropriate management of solid waste which threatens human health through the generation and proliferation of pathogens and disease causing vectors resulting in a number of communicable diseases including malaria.

**References**


The Daily Gleaner April 7, 2007:32

Kadian Christie is the Secretary of the Sustainable Development & Regional Planning Division at the PIOJ
Making the Money Work

- Twenty-five years into the epidemic, AIDS has become one of the defining issues of our time. A truly global problem, AIDS affects every region and every country of the world, challenging health systems and undermining the capacity to reduce poverty, promote development and maintain national security. Since 1981, 65 million people have been infected with HIV and 25 million have died of AIDS-related illnesses. Today, 39.5 million people are living with HIV—half of them women and girls.

This annual report reveals new opportunities that are greatly enhancing the potential to respond to AIDS in the immediate and the longer term. These include:

- Growing political commitment and leadership on AIDS
- Increase in funding levels from some US$ 300 million in 1996 to US$ 8.9 billion in 2006.
- Increased impact of HIV prevention and treatment programmes

Keeping Score. AIDS Responses in the Caribbean

- The 2006 Report on the Global AIDS Epidemic, published by the Joint United Nations Programme on HIV/AIDS (UNAIDS), clearly shows we have reached a defining moment in our collective response to this devastating pandemic. The Caribbean, as a region severely affected by HIV, squarely faces this defining moment. Reports submitted from this region for inclusion in the global report 2006, illustrate with hard evidence that the Caribbean is well placed to set feasible, ambitious targets for the provision of key services to Most-At-Risk Populations.

Lessons learned and recommendations drawn from this consolidated report on AIDS responses in the Caribbean clearly demonstrate that governments in this region have the will, the means, and the knowledge to keep this pledge.

A Short History of Malaria

- Malaria sickens hundreds of millions of people -- and kills one to three million -- each year. Despite massive efforts to eradicate the disease, it remains a major public health problem in poorer tropical regions. But malaria has not always been concentrated in tropical areas. The Making of a Tropical Disease explains how other regions control malaria and discusses reasons why the disease still flourishes in some parts of the globe.

Randall Packard puts forward that war, land development, crumbling health systems, and globalization -- coupled with climate change and changes in the distribution and flow of water -- create conditions in which malaria's carrier mosquitoes thrive. The combination of these forces, Packard contends, makes the tropical regions today a perfect home for the disease.

The Making of a Tropical Disease: A Short History of Malaria (Johns Hopkins Biographies of Disease) by Randall M. Packard

Part 1 of this article in our previous issue, explored Jamaica’s innovation infrastructure and included a comparative analysis of innovation in Jamaica and selected first world countries. It explored the differences among the countries based on their approach to education and intellectual property rights and patents. Part 2 will discuss the barriers to innovation in Jamaica and make recommendations to how these barriers can be overcome.

Barriers to Innovation in Jamaica

High impact innovations occur in Singapore and Norway where commitments to R&D are strong, political and macroeconomic stability exists, barriers to starting new businesses are relatively low and intellectual property rights are adhered to.

Research has shown that in spite of the various initiatives to boost innovation, Jamaica lags far behind both Norway and Singapore when variables for education, R&D and Intellectual Property Rights are examined. This largely reflects the fact that there are a number of barriers stifling the creative potential of Jamaicans. Some of these barriers relate to the need for a science, technology and innovation (STI) culture, science education and R&D financing. These issues are discussed below.

Culture

While the Jamaican culture has achieved global prominence through our music, dance and athletic abilities and these areas epitomize the creative energies and talent, Jamaica has yet to create diversity in innovation and engender a scientific culture. The country still suffers from low initiatives in scientific and technological effort and to a large extent the prevailing organizational management model remains mechanistic. This might be related in part to the historical roots of the Jamaican economy founded on primary production in bauxite and agriculture. In addition, in a lot of public and private sector organizations, enough is still not being done to encourage innovative thinking (UNCTAD, 1999). This is compounded by an element of secrecy and mistrust which pervades the society and where information is often kept rather than disseminated.

Science Education

The number of students being exposed to scientific knowledge is increasing in Jamaica from the primary to the tertiary level. However, at the primary level science teaching is considered to be of a low quality although there have been attempts to improve this (UNCTAD, 1999). There has been an increasing trend in the number of students pursuing science subjects at the secondary level. For example, between 2004 and 2005, the number of students pursuing studies in core S&T subjects in the Caribbean Examination Council’s May-June examinations increased by 33.8 per cent and there was a 14.2 per cent increase in the pass rate for the similar period. However, performance in core S&T subjects was comparatively low (Economic and Social Survey Jamaica, 2005).

Similarly, an increasing trend is evident in enrollment in S&T courses at the tertiary level. Notwithstanding Jamaica’s good

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tertiary education system, only a small percentage of the population has access to it (UNCTAD, 1999). The engineering research capacity of the country is limited because although there are undergraduate engineering programmes only a limited number of Jamaican students pursue graduate studies. For instance, the number of Jamaican students enrolled in the Faculty of Engineering University of the West Indies (UWI) in Trinidad and Tobago for higher degrees in the 2003/04 and 2004/05 academic years were 26 and 25 respectively (Economic and Social Survey Jamaica, 2005). One of the most important components of education and research to boost innovation in most countries is intense engineering research (UNCTAD, 1999). University of Technology (UTech) has embarked on a number of initiatives to build its engineering education and research capacity.

The R&D intensity in Caribbean tertiary institutions is constrained by the availability of funding although some improvement has been made. The UNCTAD report also highlights the limited relations of tertiary institutions with industry and the economy at large. There are also very few mechanisms in place to amplify and commercialize results from R&D.

Funding for R&D
The government still bears the weight of R&D funding in Jamaica although tertiary institutions manage to obtain grants from different sources to complement their research funding. However, it is
difficult to obtain funding for research given the high risks involved. It is difficult to carry out high impact and intensive R&D which leads to innovation without adequate funding. Private funding for R&D is weak—typified by the low level of R&D activities in the private sector.

Recommendations

In order to address these barriers the following recommendations are being made:

1. Jamaica must create a scientific and technological culture where technology is not only consumed but created. Scientific and adventurous thinking must be encouraged in homes, communities, schools, work places and even in churches. Exposure of students to practical scientific solutions to everyday problems must be an integral component of the education system. Public and private sector agencies must encourage creative thinking, readily adapt to change, and support and award creative talent to boost innovation. The country should also be tolerant and open to diversity and create the right environment to attract and retain creative talent.

2. Intensive R&D in sync with societal and industry needs must be a critical component of the curricula. There should be strong links among research bodies, tertiary institutions and industry to stimulate innovation and boost economic development.

3. Government funding for R&D should be increased to at least one per cent of GDP, the average for developing countries, (Table 1) in the medium to long term and eventually be increased to at least two per cent in the long term to be on par with developed countries. The Jamaican private sector must play a leading role in stimulating R&D and no longer depend on heavy government subsidies to drive innovation.

4. Forging strong, sustainable public–private sector partnerships is essential for stimulating, funding and maintaining R&D. In addition, the continued emphasis on stimulating the growth of small and medium enterprises and entrepreneurship should continue as these enterprises, if given the support, can execute significant R&D.

Conclusion

Although significant strides have been made, Jamaica’s current innovation environment is still inadequate to catalyze and support sustained innovations in order for the country to be competitive and achieve first world status. The country should focus on creating comprehensive policies that promote the improvement of science education, which is the key plank in building the capacity for innovation for economic development. The high levels of innovation within Norway and Singapore has had significant impact on their social and economic development. The CSM, of which Jamaica is a member, requires openness, new skills, innovation and creation, and transfer of technology which will allow countries to successfully compete globally and enjoy high standards of living.

References


HIV & AIDS

Millennium Development Goal 6: To combat HIV/AIDS, malaria and other diseases.
Target 7: By 2015 to have halted and begun to reverse the spread of HIV and AIDS.

Are we on track to meet the target?
Off Track: Several countries report success in reducing HIV infection rates, through interventions that promote behaviour change. However, rates of infection overall are still growing. The number of people living with HIV has continued to rise, from 36.9 million in 2004 to 39.5 million in 2006. There were 4.3 million new infections in 2006. Young people aged 15 to 24 accounted for 40% of new infections among adults in 2006. The number of AIDS-related deaths also increased, to 2.9 million, despite greater access to antiretroviral treatment and improved care in some regions.

The epidemic remains centred in sub-Saharan Africa. With just over 10 per cent of the world’s people, the region is home to 63 per cent of HIV-positive people. The most striking increases in HIV prevalence over the past two years have been in East Asia, Central Asia and Eastern Europe. Numbers of people living with HIV in these regions was over one fifth higher in 2006 than in 2004.

The Malaria Map Project in Google Earth

Researchers from Kenya and the UK have been conducting a project to map cases of the mosquito borne parasite which causes the disease known as malaria. Check out the web site for the malaria atlas project (MAP) for more details. The project has published two Google Earth files. The GE files contain placemarks of the data and they are colored according to how recent the cases were reported. Most recent cases (2001-2006) are colored red, oldest cases are colored green (1984-1990).

http://www.gearthblog.com/blog/archives/2006/12/the_malaria_map_proj.html

Malaria

Millennium Development Goal 6: To combat HIV/AIDS, malaria and other diseases.
Target 8: By 2015 to have halted and begun to reverse the incidence of malaria and other major diseases.

Are we on track to meet the target?

Progress Lagging: It is impossible to make an accurate assessment of whether the incidences of malaria is growing or declining due to lack of reliable and comprehensive data. However in selected areas of Senegal, household ownership of Insecticide-Treated Mosquito Nets (ITN) increased from 11 per cent in 2000 to 41 per cent in 2004. ITN coverage for children under 5 years of age has also increased in 2004 in countries like Eritrea (65 per cent) and Malawi (36 per cent). Twenty-three African countries have also changed their national drug policy and adopted Artemisinin-based Combination Therapies (ACT).
Damage and losses in the productive sector represented the greatest portion of impact accounting for over 50.0 per cent of the estimated total (see Figure 1). Most of the cost was incurred within the agricultural sector and is related mainly to projected loss of revenue associated with damage to traditional export crops such as bananas, sugar and coffee. Domestic agriculture, particularly ground provisions, vegetables and pulses, and fruit crops experienced significant impact. While damage to road infrastructure was relatively minimal, there were instances of severe erosion of sea defence which led to the damage of coastal roads in St. Thomas, Portland and St. Andrew and disruption of social and economic activities.

On Sunday, August 19 the eye of Hurricane Dean, a strong category 4 hurricane passed along the south coast of Jamaica. Most parishes were affected by heavy rainfall, severe flash flooding and landslides. Storm surge flooding of 1.5-3 metres (7-9 feet) above normal tide levels along with large and dangerous battering waves also affected southern coastal areas.

In an effort to quantify and assess the damage caused by the hurricane, the Planning Institute of Jamaica has prepared a Socio-Economic and Environmental Impact Assessment of Hurricane Dean. The report documents the impact on the affected population; estimates costs of damages and losses; identifies geographically affected areas; and identifies the financial priorities for rehabilitation and reconstruction. The assessment was prepared in close collaboration with the Office of Disaster Preparedness and Emergency Management (ODPEM), and the National Environmental Planning Agency (NEPA). Data and information were provided by various ministries and agencies of the Government of Jamaica as well as several non-government institutions and private sector entities. The following is a summary of the content of the report.

As at October 26, 2007 the preliminary estimate of the damage and losses incurred by the Jamaican economy due to the passage of Hurricane Dean on August 19, 2007 was $23.05 billion (US$329.34 million).

With the effect of Hurricane Dean, the economy is expected to grow by 1.1 per cent for 2007 instead of the 2.1 per cent forecast prior to its passage. This will result from losses in output flows primarily in the Agriculture, Forestry & Fishing; Mining & Quarrying and Electricity & Water sectors. However, the Construction & Installation and Distributive Trade sectors are estimated to be impacted positively by the effects of the hurricane. The Construction & Installation sector is expected to benefit from reconstruction activity. An expansion in activity in the Distributive Trade sector is predicated on projected higher gross sales associated with preparations prior to the hurricane and reconstructive work in the aftermath of the passage of the hurricane.

The social cost of the hurricane was fairly substantial. Approximately 6.7 per cent of the total population or some
**DID YOU KNOW?**

**GOAL 6: COMBAT HIV/AIDS, MALARIA AND OTHER DISEASES**

The MDG calls for a halt to begin reversing by 2015, the spread of HIV/AIDS, malaria and other major diseases. This goal has been achieved for malaria and other contagious diseases, but the country is “lagging” with respect to HIV/AIDS. In the case of malaria, there have been no indigenous cases in Jamaica for the last ten years, all recorded cases are imported. No deaths attributable to malaria have been reported over this time.

In relation to HIV/AIDS, the National response is guided by the National Strategic Plan on HIV/AIDS 2002-2006. Implementation of the plan is supported by the National AIDS Committee, NGOs and IDPs. Some achievements in this area include:

**Infrastructure**

Improved Laboratory facilities (blood bank and public health lab)
Expansion of facilities geared at the Prevention of Mother To Child Transmission (pMTCT) of the virus;
Expansion of facilities that provide Voluntary Counselling and Testing (VCT)
Expansion of facilities that provide ARV treatment (public access programme); and
Renovation of the Caribbean HIV/AIDS Regional Training Centre.

**Policy and Standards**

The development of a National HIV/AIDS Policy
The development of a National Workplace Policy
The development of five sector policies on HIV/AIDS and the workplace
The development of a National Policy on OVCs
The development of a National policy on the Management of HIV/AIDS in Schools; and
Effective multisectoral response.

**Treatment and care**

The provision of condom vending machines;
The expansion of general STD services;
The expansion of pMTCT;
The expansion of VCT;
Training of thousands of health staff (public and private);
Provision of a safe blood supply;
Continued public education on prevention of transmission;
Targeted intervention for high risk groups;
Improve STI control;
HIV testing in ANC and STI clinics; and
Training workshop and community-based initiatives.

**Other Priority areas**

Generally, there is a lack of a comprehensive monitoring and evaluation system in the health sector. This greatly limits the ability to measure the effectiveness of the various initiatives and impact on planning and policy activities. The design and implementation of an effective M&E system is therefore a priority for the MOH at this time. In support of this, the issue of data availability and data quality must be addressed.

Another priority area is that of skilled human resources. Implementation of projects within the MOH is often limited due to the inadequacy or unavailability of skilled persons. There are also deficiencies relating to infrastructure and acquisition and maintenance of equipment. Given the impact of globalization and the subsequent increase in international travel, the issue of surveillance is another priority. The new and emerging diseases globally call for nations worldwide to be on the lookout for new illnesses and changes in disease patterns.

In addition to operational issues identified above, the MOH has specific health related priority areas other than those mentioned in the MDG report and these are:
- Chronic Illnesses
- Trauma and Violence-Related Illnesses
- Child Nutrition

*Source: Millennium Development Goals Status Report 2006*
179,552 persons from 169 communities were directly affected by the natural disaster (see Figure 2). At the peak of the event, a total of 213 shelters were opened across all parishes housing 5,169 persons. The parishes with the highest number of persons in shelters were Portland, Kingston and St. Andrew, and St. James with 914; 714; and 555 persons respectively. Up to seven days after the event, 11 communities in the parishes of St. Thomas and Kingston and St. Andrew were still marooned and over 500 persons remained in emergency shelters islandwide. However, by August 26, electricity had been restored to approximately 80 per cent of customers and water supplies to close to 90 per cent.

Some 518 schools and public educational institutions and an estimated 70,000 houses were damaged. At the time of the preparation of this report, it was indicated that over 55 per cent of houses assessed had experienced major damage and over 39 per cent were totally destroyed. Most of these were in poor and vulnerable coastal communities such as Old Harbour Bay, Rocky Point and Portland Cottage along the south coast.

The impact on livelihood is considered significant as some 56,537 food crop and 7,170 livestock farmers, and over 3,500 fisher folk were directly affected. The income of some 3,000 banana workers was also affected. The negative impact on crop losses and timing of the hurricane was particularly bad in farming communities as many families which lost crops and income would have been preparing for back to school expenditures.

The Ministry of Health confirmed six deaths due to Hurricane Dean, four males and two females, resulting from a falling concrete block, flying debris, wind effects and roof collapse and two indirect deaths from electrocution. Hospital and sentinel surveillance sites reported 628 injuries between August 19 and 25.

Lessons Learnt

The impact of Hurricane Dean highlighted issues relating to continued improper land use, building practices, and design and construction of coastal roads. A considerable portion of the impact resulted from inappropriate location of settlements, for example, communities such as Portland Cottage, Rocky Point in Clarendon, and Caribbean Terrace, St. Andrew. The areas affected in Clarendon, St. Catherine, Kingston, St. Thomas and St. Elizabeth are below the 10 metres threshold and are therefore prone to flooding.
Planning and design defects were evident and were also contributory factors cited with respect to damaged housing in Rocky Point, Clarendon, Portland Cottage, Clarendon, Old Harbour, St. Catherine and White Horses, St. Thomas. In the past, building practices incorporated more mitigation measures and the housing stock were better able to withstand the impact of wind and flooding. Older buildings were likely to be built on stilts with a finish >2ft above ground level compared with newer buildings with a finish of < 1 ft above ground level.

Coastal Roads: A common feature of coastal roads in Jamaica is that they are constructed in low lying areas and are therefore prone to flooding and subsequent damage. As evidenced, roads such as Roselle and Palisadoes have been subjected to frequent flooding. The imperative of engineering coastal roads with adequate height (above sea level), drainage, central slope and protective structures to minimize effects from coastal hazards was again underlined.

The report can be accessed at the Documentation Centre at the PIOJ’s office. A copy of the Executive Summary can also be obtained from the PIOJ’s website at www.pioj.gov.jm.

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Sustainable Development Events

NOVEMBER 2007

Climate Change and the Millennium Development Goals: Meeting the Development Challenge
New York, New York, United States of America
Nov 1, 2007

Twentieth World Energy Congress
Rome, Italy
Nov 11, 2007 to Nov 15, 2007

Integrating Climate Change into National Sustainable Development Strategies
United Nations (UN) headquarters, New York, United States of America
Nov 12, 2007 to Nov 13, 2007

CSD Regional Implementation Meeting (RIM) for Latin America and the Caribbean
Santiago, Chile
Nov 28, 2007 to Nov 29, 2007

DECEMBER 2007

Thirteenth Conference of the Parties to the UNFCCC and Third Meeting of the Parties to the Kyoto Protocol
Bali, Indonesia
Dec 3, 2007 to Dec 14, 2007

Forest day: Shaping the global agenda for forests and climate change
Bali, Indonesia
Dec 8, 2007

Third Global Knowledge Conference
Kuala Lumpur, Malaysia
Dec 11, 2007 to Dec 13, 2007

International Conference on Sustainable Forest Management and Poverty Alleviation: Roles of traditional forest-related knowledge
Kunming, China
Dec 17, 2007 to Dec 20, 2007

For details on these and other conferences visit: http://www.sdgateway.net/events/, http://www.conferencealerts.com/sustain.htm