
*Vulnerability assessment of health
effects of climate change –
Malta's experience so far*

Karen Vincenti
Consultant in Public Health Medicine

Public Health Regulation Division
Ministry for Social Policy (Health)



DIPARTIMENT GHAL SAHHA AMBJENTALI

DEPARTMENT FOR ENVIRONMENTAL HEALTH



ocean

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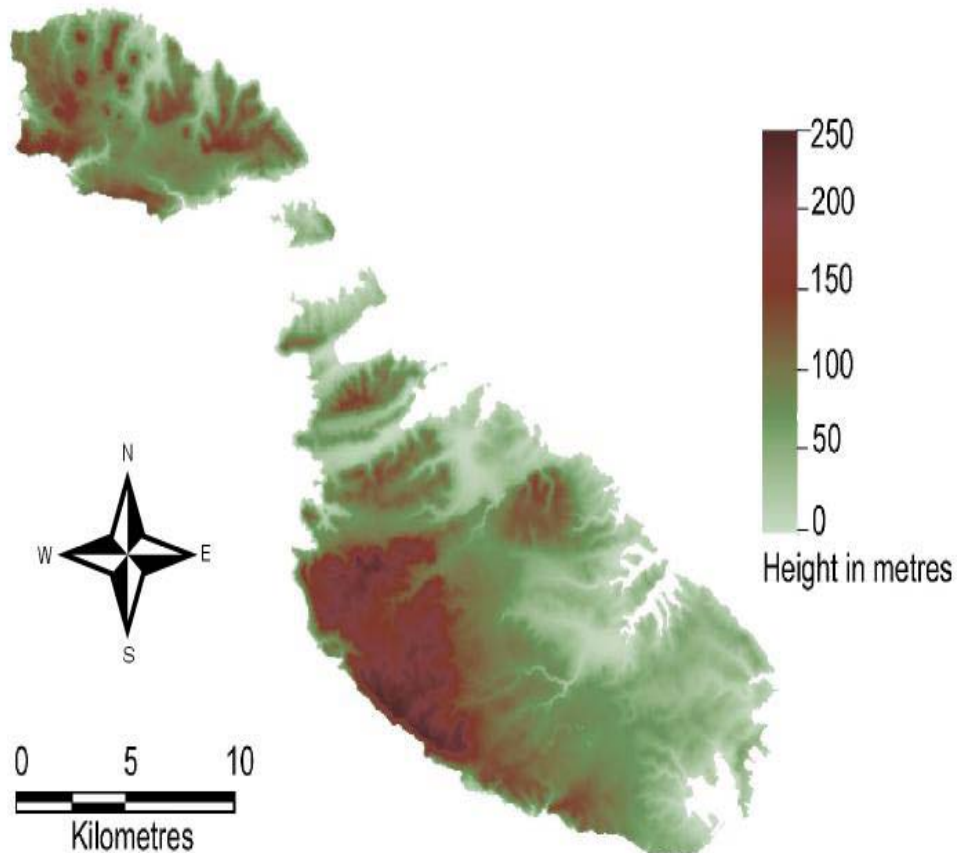
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Eye alt: 5425.66

41°02'41.99" N 17°31'39.92" E

The Maltese archipelago

Population: 413,609 (2008)
Land area: 320 km²
Coastline 140km
Population density (2006):
1297/km² (EU27: 114/km²)
Life expectancy (2006):
77.0 (males), 81.9 (females)







Climate



- Typically Mediterranean - moist, mild winters and dry, hot summers
- Average annual precipitation 530 mm
- Air temp range 9.5° - 33°C (extremes rare 1.4°/43.8°C)
 - mid-July to mid-Sept hottest
 - Jan-Feb coldest months
- Mean annual sea temp varies 20°C.
- Humidity >40% little variation

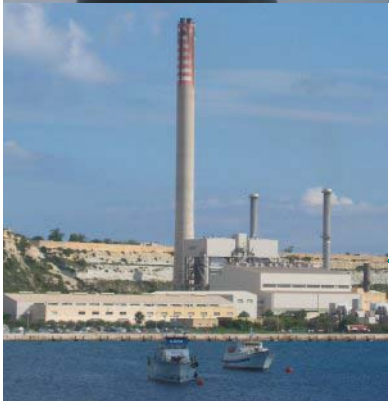
Agriculture & Fisheries, Economy & Industry



- < 40% of total land area suitable for agriculture
 - fishing limited role in the Maltese economy
 - economy highly dependent on foreign trade & services
 - Limestone, human resources
 - Tourism, electronics, ship construction & repairs, food, textiles, footwear, clothing, tobacco
-

Energy

- production fossil fuel based
- ↑ national energy consumption due to rapid economic growth
- Monopolistic distribution network
- 2 inter-linked power stations supply all areas
- electrical power consumption by sector:
domestic (36%); commercial (30%);
industrial sector (25%); water production (9%)
- Draft National Energy Policy,
National Energy Efficiency Action Plan
(adopted Dec 2008)



Malta & Climate Change – Institutional Set-up

- Ministry for Resources and Rural Affairs (MRRA) coordinates activities associated with climate change
 - Malta Environment and Planning Authority (MEPA) maintains the national GHG inventory and reporting (UNFCCC & EU)
 - National Board on Climate Change oversees & coordinates initiatives among sectors of government & NGOs
 - MRRA/MEPA links with Physics Department at UoM compiled first national GHG inventory, FNC (2004) , SNC (2009) to UNFCCC
-

The First Communication of Malta to the United Nations Framework Convention on Climate Change

April 2004



- 1988 – Malta’s role towards setting up of UNFCCC.....Kyoto protocol
- Malta ratified UN Framework Convention in March 1994 as non-Annex 1 country and Kyoto protocol in 2001
- FNC in 2004
- SNC in Oct 2009
- Recent bid by Maltese govt as EU Member State, to amend Annex 1 to include Malta (April 2009) – Copenhagen Dec 2009

Vulnerability and adaptation to climate change (FNC, 2004)

50% probability that:

- Temperature will increase by 3°C by 2100.
 - Annual total precipitation will decrease by 17% by 2100, with a relative decrease in autumn and an increase in spring
-

First National Communcation, 2004

Expected impacts on environment and socio-economic activities

- ❑ deterioration of potable water supplies and quality;
 - ❑ more frequent extreme weather events;
 - ❑ changes in soil erosion and an accentuated desertification process;
 - ❑ **threats to public health;**
 - ❑ changes in sea water mass characteristics and effects on fish stocks;
 - ❑ sea level rise, leading to coastal erosion and inundation;
 - ❑ reduced biodiversity;
 - ❑ moderate to moderately high economic vulnerability
-

First National Communication, 2004

- National Action Plan: implementation framework to favour multi-sectoral policies (energy, transport, agriculture) – integrate environmental considerations within measures aimed at CC abatement and adaptation strategy
 - policies and measures to address mitigation and adaptation
-

Health (FNC, 2004)

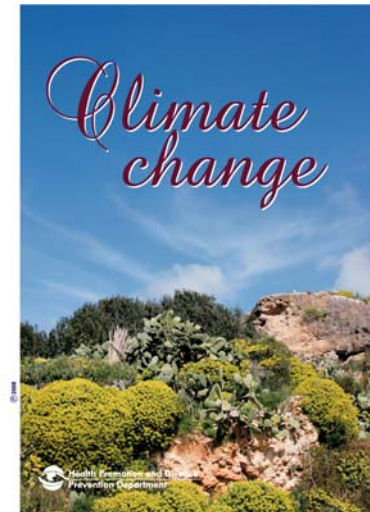
- √ hot weather contingency plan;
 - √ industry specific guidelines for working in hot climatic conditions;
 - √ identification of persons at risk and establishment of communication channels;
 - √ information gathering, analysis (including epidemiological studies) and dissemination of the results and conclusions;
 - √ awareness and education campaigns aimed at sensitising the public to health risks and protective measures associated with adverse effects of climate change
 - √ enhancement of resources in primary health care and health surveillance in areas where climate change poses the most severe threats to human health.
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Public Health Regulation Division & CC

- National board on CC member
- CIRCE Workshop on CC Impacts and Adaptation in the Mediterranean (June 2008)
- DEH and DHPDP initiatives:
 - WHD 2008: *“Protecting Health from Climate Change”*
 - leaflet for public, tree-planting at MDH; TV interviews and clips re CC and health, newspaper articles
 - National seminar on Health Effects of CC in April 2009 and publicity
 - SNC consultations
 - Joint WHO/DEH Publication



Health Promotion and Disease Prevention Department
 5A, The Boulevard, C/o HealthPart SA, Suite 402/1421 Helms, Tel: 0204 6600, Fax: 0204 6574, www.healthpart.gov.za



Climate change

What is climate change?

Climate change is a long term change in the average weather and it is occurring now. It is mainly the product of fossil fuel burning by power stations which supply us with electricity in our homes and drinkable water in our taps, and transport vehicles such as cars and aeroplanes.

The burning of fossil fuels produces greenhouse gases (GHGs), like carbon dioxide (CO₂), which accumulate in the atmosphere and cause global warming.

Health impacts

Climate change is having a bad effect on health. If global warming continues at this rate the effects on health can be:

- ▶ Direct effect of rising temperatures on humans
- ▶ Unintentional injuries from rising sea levels, storms and floods
- ▶ Food borne and waterborne illness
- ▶ Infectious diseases transferred by vectors
- ▶ Emergence of new or previously eradicated infectious diseases
- ▶ Food and water shortages leading to malnutrition
- ▶ Loss of homes and livelihoods leading to other health problems

What am I doing to mitigate the effects of climate change?

Answer the questions below and see how much you are helping to do in the right ways. (Score 0-10)

Which one of these is your main mode of transport?

- (Please only one)*
- Cycle or walk to places (3 points)
 - Use public transport (2 points)
 - By car (1 point)
 - Do you drive a car? **yes** (please read question) **no** (0 points)

If you drive a car, which one of these applies mostly to you?

- (Please only one)*
- I have an electric car (3 points)
 - I bought a car with low fuel consumption (2 points)
 - I use my car the least possible (1 point)
 - None of the above (0 points)

For each of these tick yes or no:

- My house is insulated **yes** (1 point) **no** (0 points)
- I have solar panels installed **yes** (1 point) **no** (0 points)
- I use energy saving bulbs **yes** (1 point) **no** (0 points)
- I have planted trees in my garden **yes** (1 point) **no** (0 points)
- I like to wash with the bath tub filled up to the brim **yes** (0 points) **no** (1 point)
- I leave lights on unnecessarily **yes** (0 points) **no** (1 point)
- I leave air-conditioning on when I'm outside **yes** (0 points) **no** (1 point)

Score:
 11-10 Excellent you've contributed to mitigate the effects of climate change in 100% of ways. You are an example to the rest of society.
 9-10 Good your contribution to mitigate the effects of climate change is good, however there is still a lot you can do.
 8-7 Fair you need to think up your own ideas as well as those you can improve you if you are not putting enough effort in the fight against climate change.
 6-4 Poor Change your lifestyle before it's too late!

The Times of Malta, Monday, 27th April 2009

'Climate change will affect health in Malta', Cynthia Busuttill



“.....Climate change, which for Malta meant longer heat waves and an increase in intense weather, could have serious repercussions on people's health, Bettina Menne, an expert in the subject said.....”

Dr Menne was in Malta to address a seminar on the health effects of climate change, organised by the Department for Environmental Health last week.....”

National Seminar on Health Effects of Climate Change

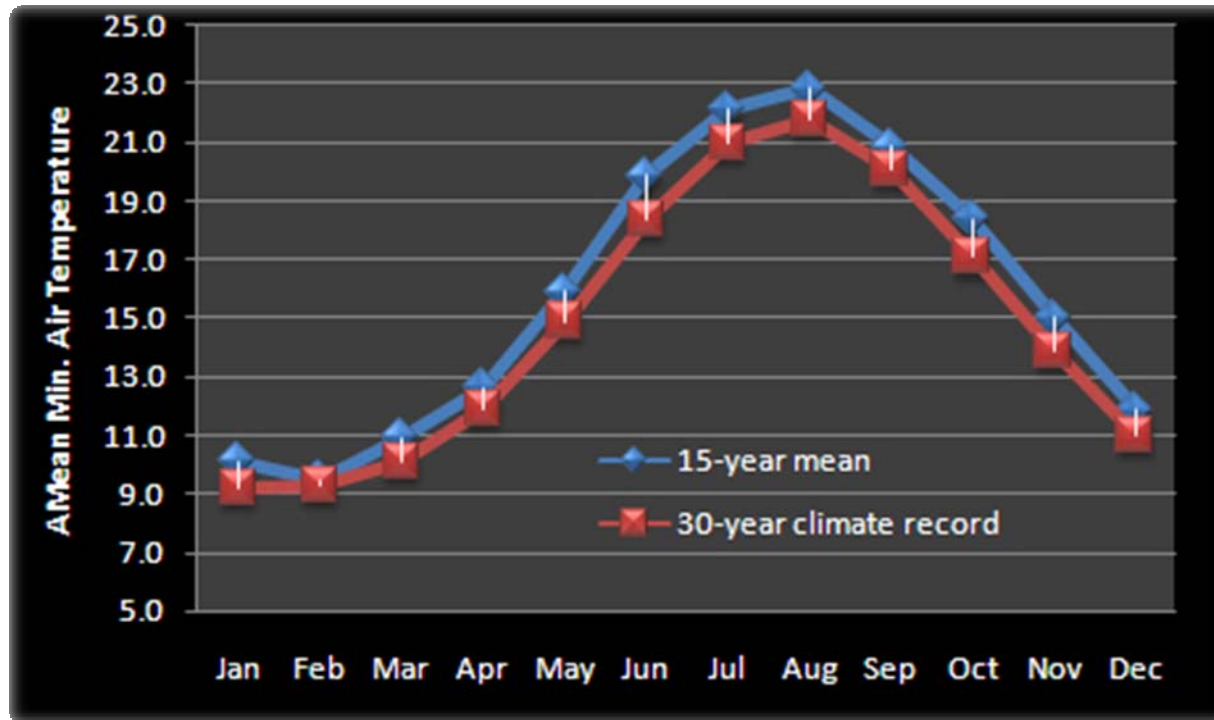
- 1 day national seminar in April 2009 (DEH/WHO-EURO)
- Scope: Awareness raising and capacity building
- Well attended by 100 persons from various entities
 - Intro by Former Exec. Secretary UNFCCC and Maltese Ambassador for CC
 - Politicians – Parliamentary Secretary for Health, Spokesperson on CC for Opposition
 - Environment, Resources, Health, Met. Office, Civil protection, etc..
 - Presentations on health effects, adaptation
 - Working groups



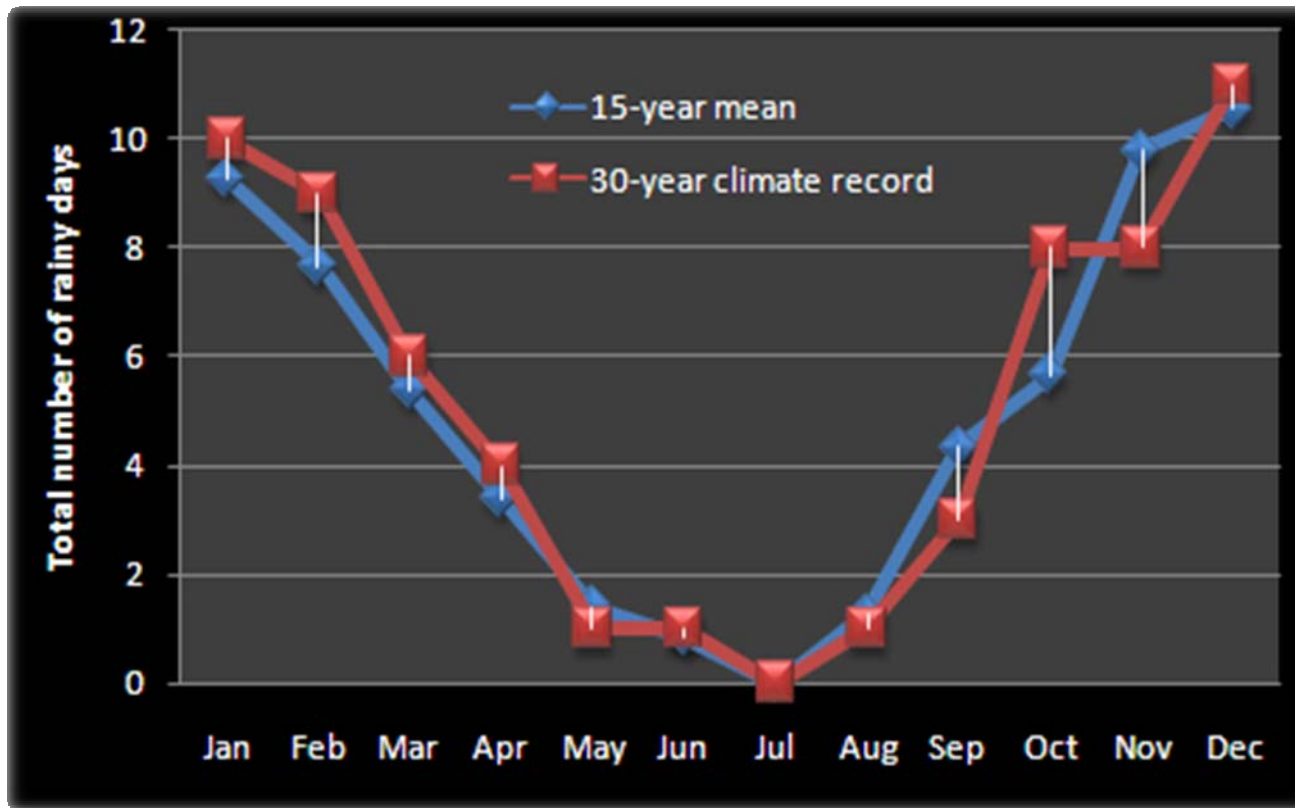
National Seminar - Health Effects

- Malta's Climatology – Trends and anomalies
 - Climate change and vector borne diseases. How much of a threat to Malta?
 - Possible effects of climate change in food and waterborne illness
 - Extreme weather events – response to flooding
 - Effect of ambient temperatures and humidity on mortality
 - Water stress
-

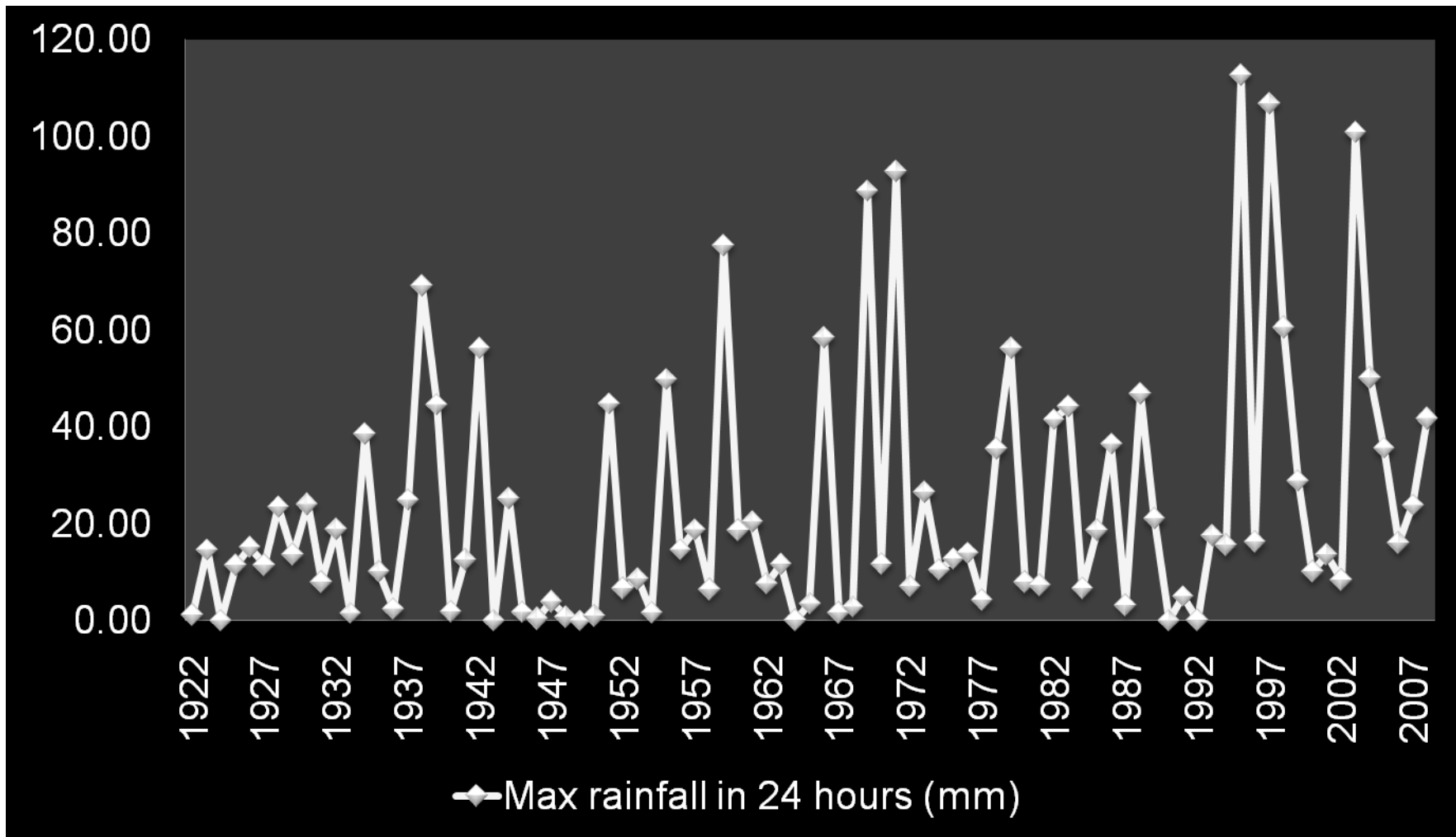
Malta's climatology – trends and anomalies



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www.maltairport.com/weather



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Month: September

Dust events



Sahara dust over Malta

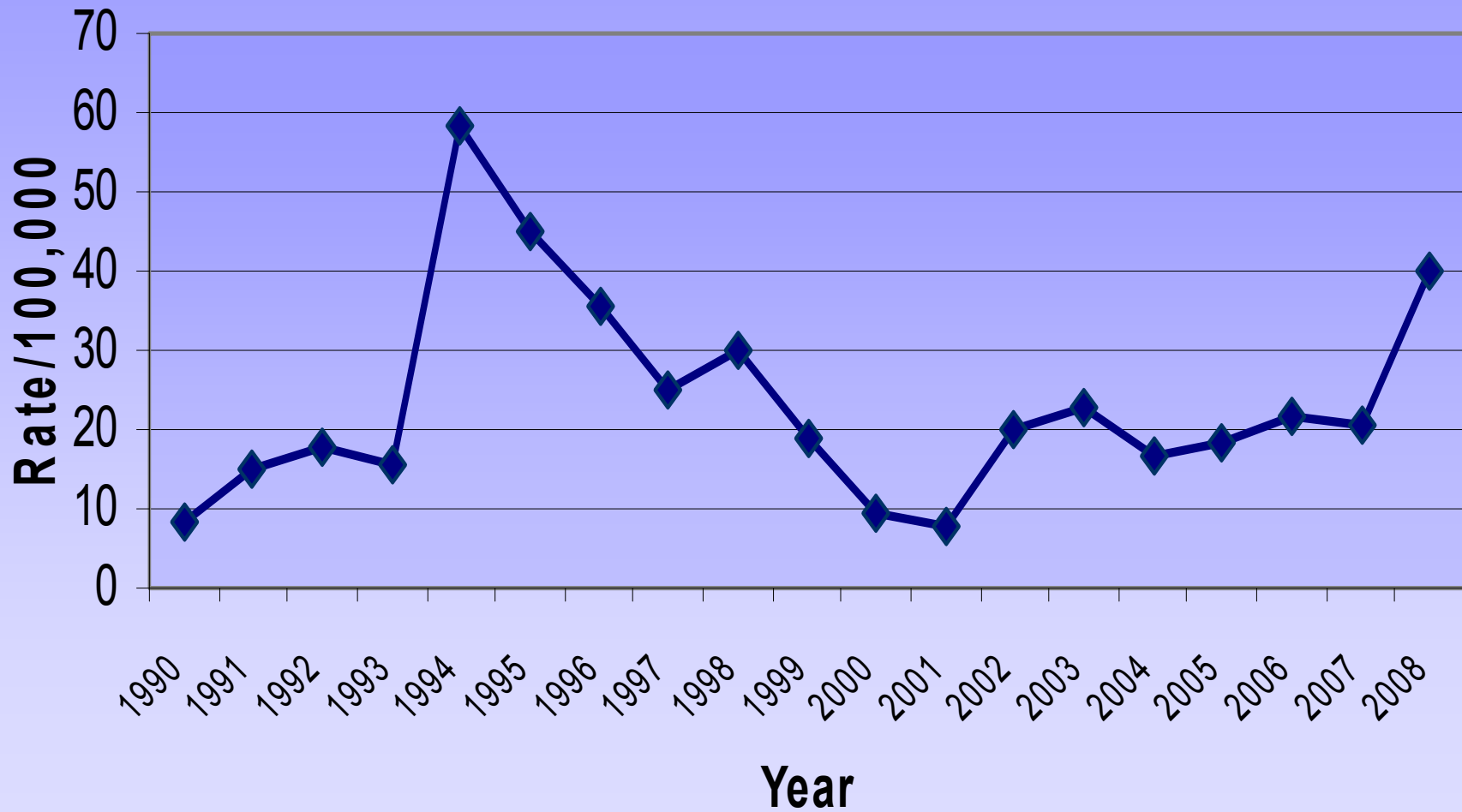
- Desertification in African Sahel region - increased airborne dust over Mediterranean
 - Dust – possibility of opportunity to study correlation between dusty weather and meningitis
-

Possible effects of climate change on food & water borne illness

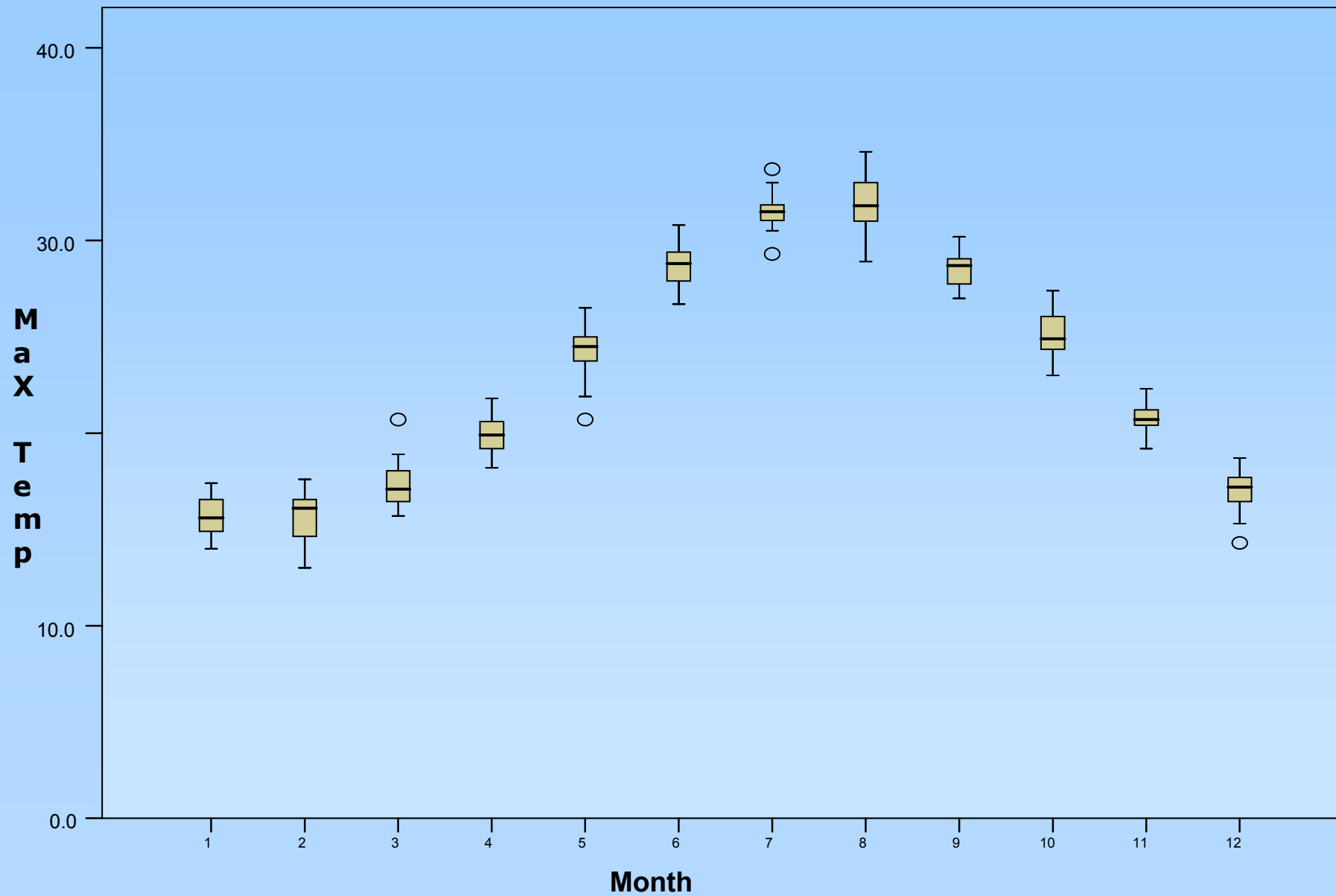
- Trends for salmonella
- Comparison of time series data of temperatures and salmonella cases for any association and correlation



Reported Salmonella Cases in Malta 1990-2008⁹



Salmonella Cases (aggregates 1990-2008) per Month with Maximum Temps.



Association Between Cases & Ambient Temperatures

	Cases		Cases		Cases
Average temp	0.5124	Min temp	0.5238	Max temp	0.5029
Average temp: 1 month lag time	0.4936	Min temp: 1 month lag time	0.4807	Max temp: 1 month lag time	0.5003
Average temp: 2 month lag time	0.3302	Min temp: - 2 month lag time	0.3032	Max temp: 2 months lag time	0.3490

- Pearson's correlation values. Stat 2 package

Possible effects of climate change on food & water borne illness

- Higher & sustained temperatures for longer periods of time likely to lead to ↑ salmonella cases
 - time lag of 1 -4 weeks of rising salmonella cases suggests that temperatures might be influential earlier in production phase!
 - new and sustained strategies needed to combat rising salmonellosis
-

Relationship of Ambient Temperature and Humidity with Mortality in Maltese Islands

- England et al. - unpublished study
 - Time-series analysis
 - Daily mortality data, ambient temp, humidity 1992-2005
 - Summer and winter analysed separately
 - J-shaped relationship between crude mortality and apparent temp: 'deaths per degree drop' rise linearly with lower temps and 'deaths per degree rise' rising exponentially with higher temps
 - Lowest mortality 25-27 deg C
 - One day lag in summer and 4-8 day lag in winter
 - More deaths in winter but exponential rise in deaths with rise in temp in summer months
 - Minimum mortality temp in Malta higher than for EU counterparts
 - Recommendation for health warnings in summer AND winter
-

Climate Change and Vector-borne diseases

- Climate change and Vector-borne disease
- How could climate change affect VBDs already present in Malta?
- Could climate change increase the range of VBDs in Malta? (leishmania, typhus, ?WNF)
- Current work
- Future risks (malaria, Chikungunya)



Climate change and vector-borne disease

- Risk assessment on vector borne diseases led by European Centre for Disease Control – April 2009
- Entomologists and public health experts looking at mosquitoes in Malta and current risks
- Starting point for improved surveillance – summer 2009
- Linking environmental and epidemiological data
- Serve as foundation for assessing risk of climate change



Working groups



I - Water stress and Flooding

II - Temperature extremes

III - Ecosystems and Infectious Diseases

Working groups

Group 1: Flooding



- What are the main health risks from flooding?
- To what extent is Malta presently prepared to face such eventualities? Is it sufficient?
- Are there any plans or programs in the pipeline which tackle such problems?
- Which are the entities responsible?
- Shortcomings and recommendations



Group 1: Flooding

According to the IPCC Assessment Report 4, in Europe

“Negative impacts will include increased risk of inland flash floods...”

“In S.Europe, climate change is projected to worsen conditions (high temperatures and droughts) in a region already vulnerable to climate variability, and to reduce water availability,summer tourism, and, in general, crop productivity”



Flooding – group work

Health effects

- Direct
- injuries from high-speed water currents leading to casualties
- hypothermia in old people if they get wet and are unattended to
- overloaded sewage systems from the waters which would lead to sewage backflow into houses, a direct source of microbial infection
- the above compounded by difficult access to casualties by ambulances and health professionals because of flooded streets.

Indirect

- health effects from contaminated water reservoirs with contaminated over-running water, which would then be used for potable and agricultural use.
 - Health effects from long-standing damp buildings following a flooding event leading to aggravation of respiratory conditions such as asthma.
 - A combination of humid conditions, together with uncontained sewage being fertile ground for epidemics of infectious diseases.
 - Contaminated seafood (filter-feeders) from sewage overflowing into the sea.
 - Damage to agricultural land and crops could have negative health effects on specific groups of people such as farmers.
-

Flooding – group proposals

- set up of inter-ministerial committee needs with the role of coordinating a plan for preventing floods and delegating a shared responsibility to different entities.
 - more research to study association between flooding events and disease (small numbers)
 - code of good practice on the construction of buildings; enforce legislation on the construction of wells with buildings – which would have a buffering effect on flooding events.
 - better regulation on the use of sewage systems.
 - storm water capture evaluation in the scenario of a higher incidence of flooding events coupled with decreased precipitation in the coming years.
-

Water stress – group work

- What are the main health risks arising from water stress?
 - To what extent is Malta presently prepared to face such eventualities? Is it sufficient?
 - Are there any plans or programs in the pipeline which tackle such problems?
 - Which are the sectors affected?
 - Shortcomings and recommendations.
-

Group II: Temperature extremes

- Is Malta adequately prepared from a health point of view to deal with heat waves and cold spells?
 - What additional actions can be done by the health sector?
 - What else can be done outside the health sector (such as building design and tourism trends....)?
 - Who would be responsible to increase Malta's preparedness?
-

Group III: Ecosystems and Infectious Disease

- What are the risks that these vector organisms increase in these ecosystems?
 - Will the efforts to increase the resilience of these ecosystems be in conflict with the health concerns?
 - How can they be managed to avoid such conflict?
 - What about the increase in incidence of infectious diseases related to activities such as increase use of air conditioners, food preparation?
 - How well prepared is the health sector in this regard?
 - What are the problems envisaged regarding the Tourism sector?
-

After the seminar.....

- Health given more prominence
 - Links consolidated with other sectors and new ones made
 - Health effects to be priority in National Adaptation Strategy (report by early next year)
 - Work in progress also towards publication
-

Mitigation and Adaptation Strategies

- National Committee on Mitigation
 - “National Strategy for Policy and Abatement Measures Relating to the Reduction of Greenhouse Gas Emissions” (2008) lays down a number of measures that would need to be implemented to mitigate the effects of climate change
 - National Committee on Adaptation appointed in August 2009 – to submit adaptation strategy report by March 2010 for public consultation
 - To include **health**, socio-economic policy, water and flooding, biodiversity and agriculture
-

**E-mail:
karen.vincenti@gov.mt**

