Climate Change Impacts on Agriculture – Examples from Lebanon

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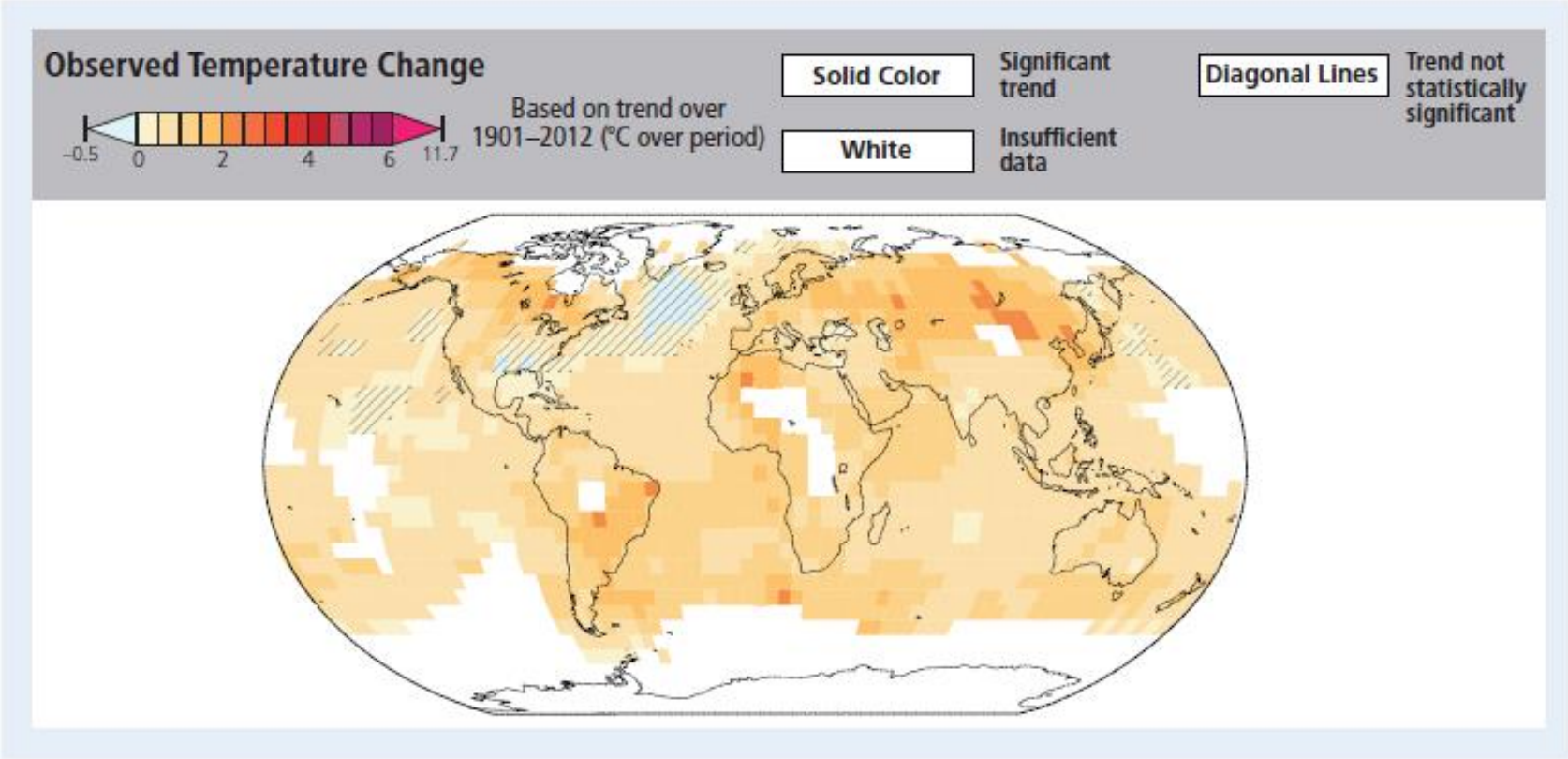
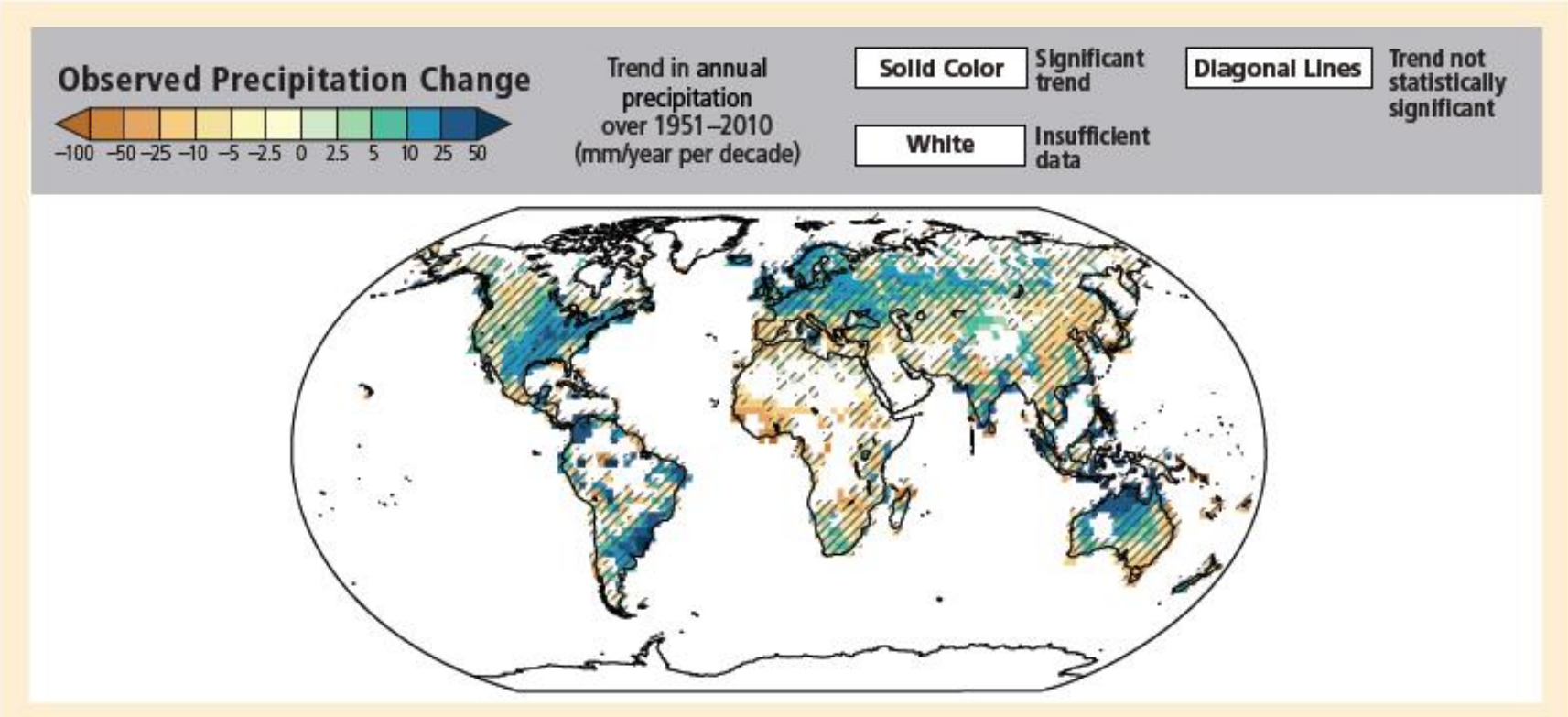
Impacts – Temperature Increase



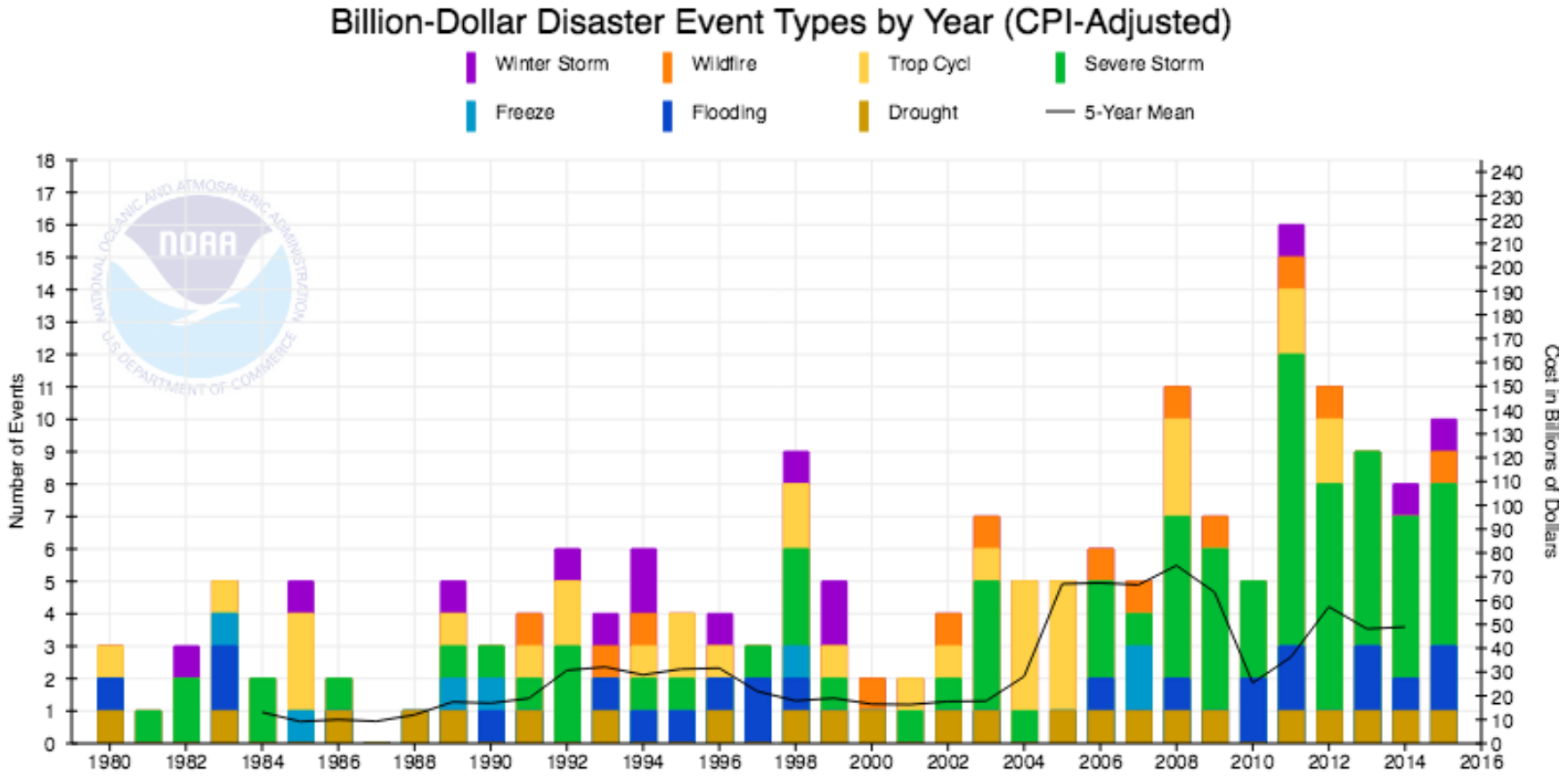
IPCC 5th Assessment Report

Impacts – Precipitation Changes

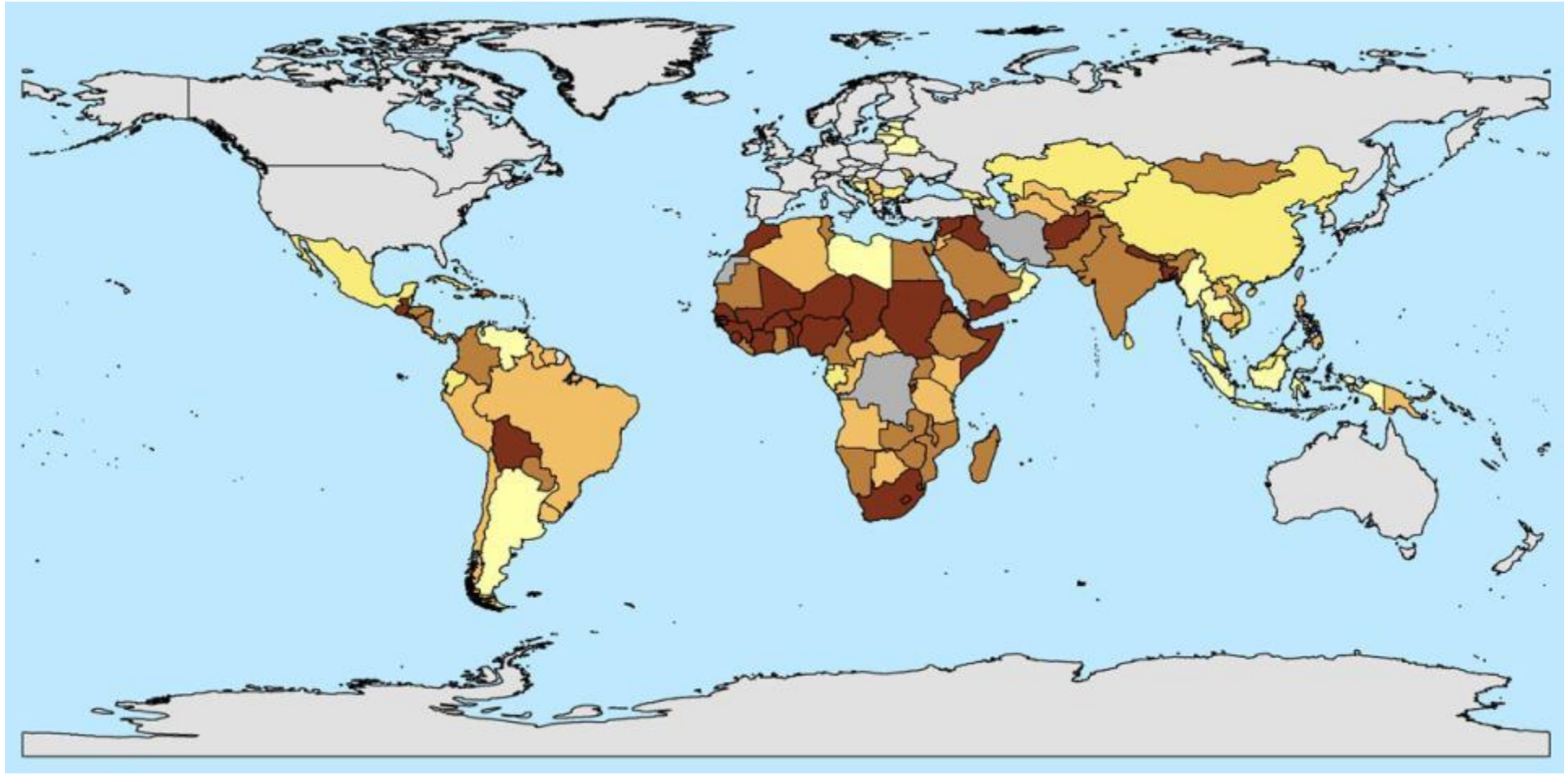


IPCC 5th Assessment Report

Trends in Major Disasters Worldwide



Poor countries are least capacity of adapting



Adaptive Capacity

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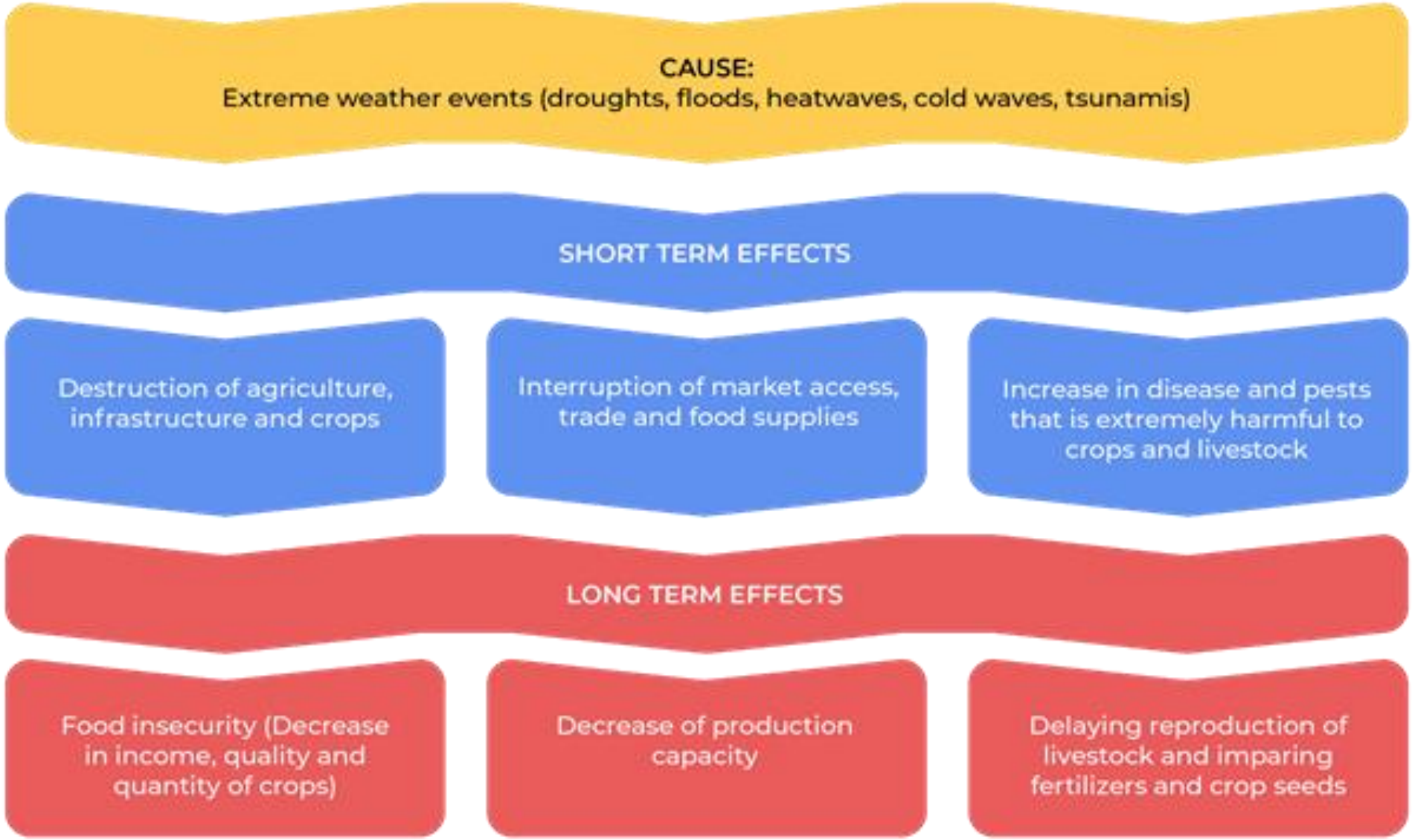
Projected Climate Change Impacts on the Region

Temperature	Mean annual temperatures are likely to exceed 2° degrees Celcius (°C) with maximum projected increases up to 6°C by the year 2100
Precipitation	Is projected to decrease by 40% in the Arab region, especially North Africa, directly affecting crop production
Sea Level Rise	By the end of the century, climate change is likely to cause global mean sea level to rise by 26 to 82 centimetres. Combined with an increased frequency of storm surges and saltwater intrusion into rivers and aquifers it is likely to affect water quality and agricultural productivity in the low-lying coastal regions
Heat Waves	Were recorded across the Arab region with the hottest temperature in the World recorded in Kuwait and are expected to increase reaching record highs
Droughts	Droughts that used to occur every six to eight years now take place every one to two years, and the Horn of Africa recently experienced its most severe drought in 60 years

RICCAR. 2017. *Arab Climate Change Assessment Report*


CAUSE:
Extreme weather events (droughts, floods, heatwaves, cold waves, tsunamis)
SHORT TERM EFFECTS
Destruction of agriculture, infrastructure and crops
Interruption of market access, trade and food supplies
Increase in disease and pests that is extremely harmful to crops and livestock
LONG TERM EFFECTS
Food insecurity (Decrease in income, quality and quantity of crops)
Decrease of production capacity
Delaying reproduction of livestock and imparing fertilizers and crop seeds


Nahr Al Kabir
Flood effects,


Storm effects on Greenhouses,
19/1/2018


Flood

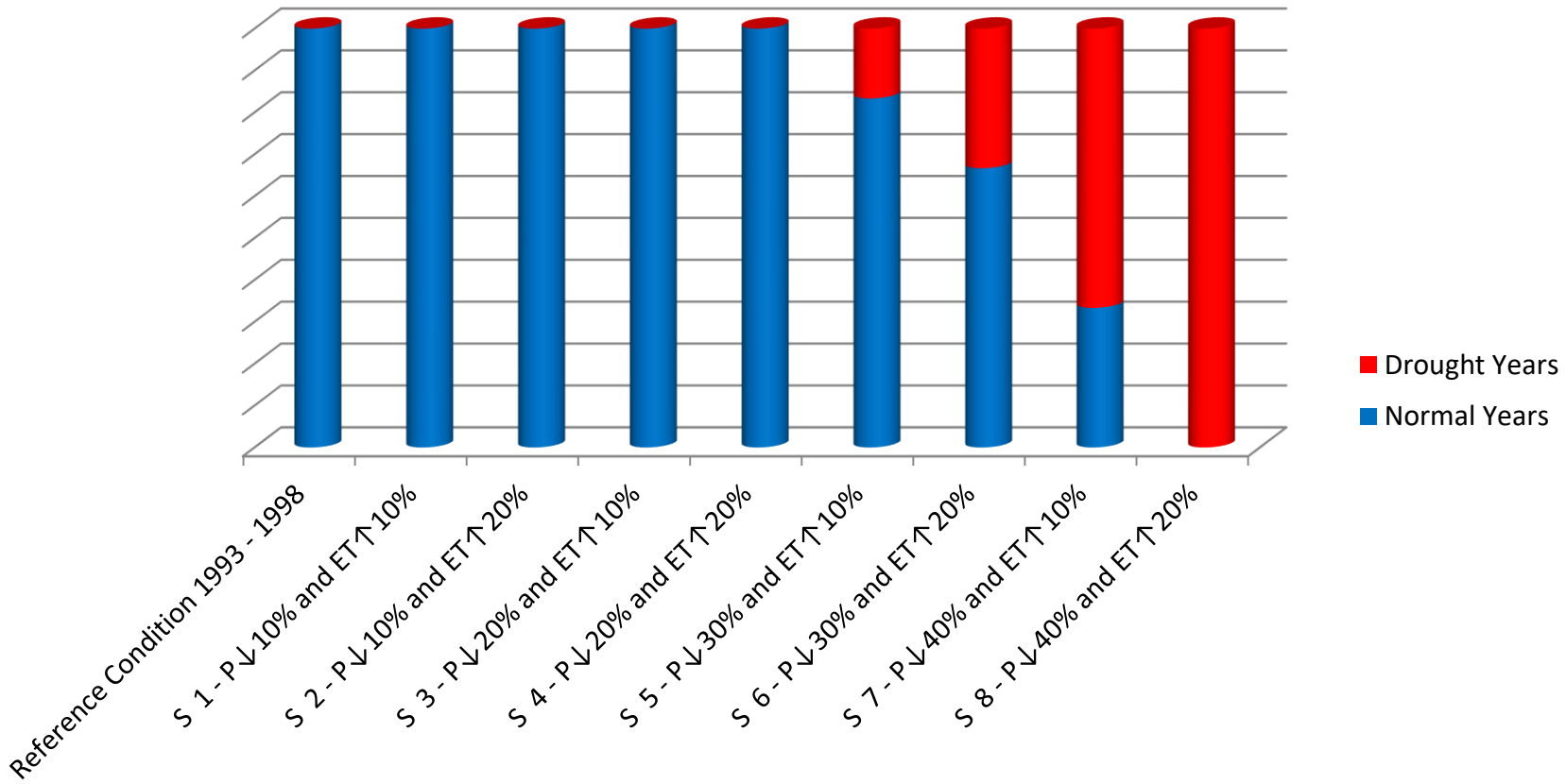

torm effects on Greenhouses,
9/1/2018

Worst Case Scenario Assessments from Lebanon

Event	Estimated Cost of Damages (USD millions)
Floods	330
Cold waves	241
Winter storms	212
Heavy rainfall	177
Heat waves	149
Wildfires	125
Strong wind	93
Landslides/land erosion	74

Modeled Drought Occurrences

Increase in the occurrence and frequency of droughts



Some Results from a Study on Impact of Climate Change on Food Production in Two Regions in Lebanon

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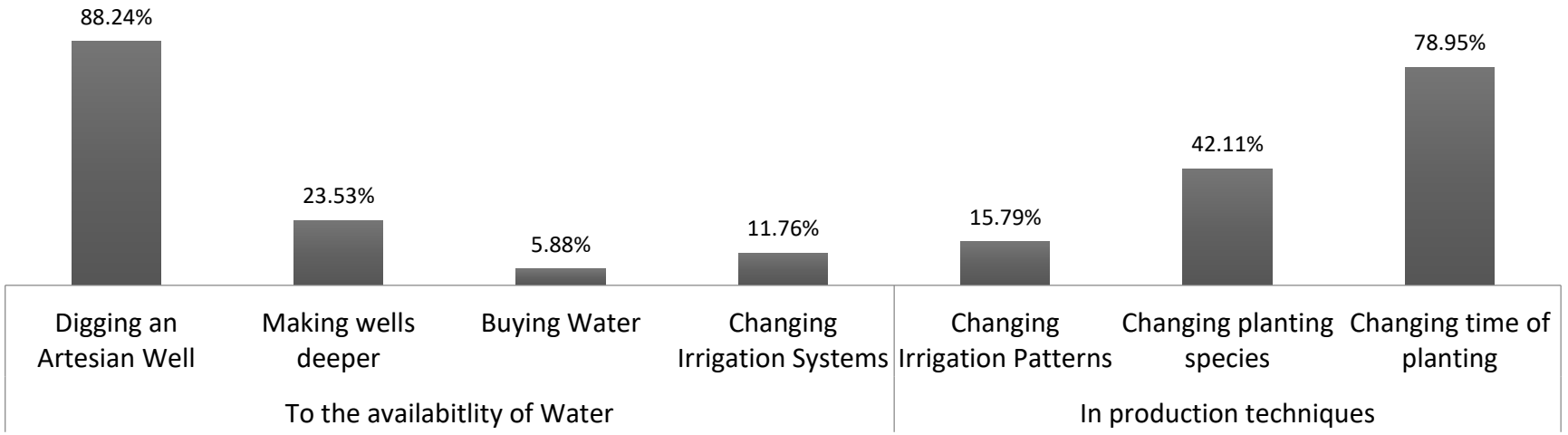
- Agriculture:
  - Various crop varieties that are drought and heat tolerant are available on the market and some farmers are starting to use them
  - Changing cultural practices (such as dates for planting and harvesting) is an approach that may be used as an adaptation measure to a changing climate – farmers in Lebanon are known to have practiced this
  - Selecting different crops to cultivate is another adaptation major that is known to have been used in Lebanon

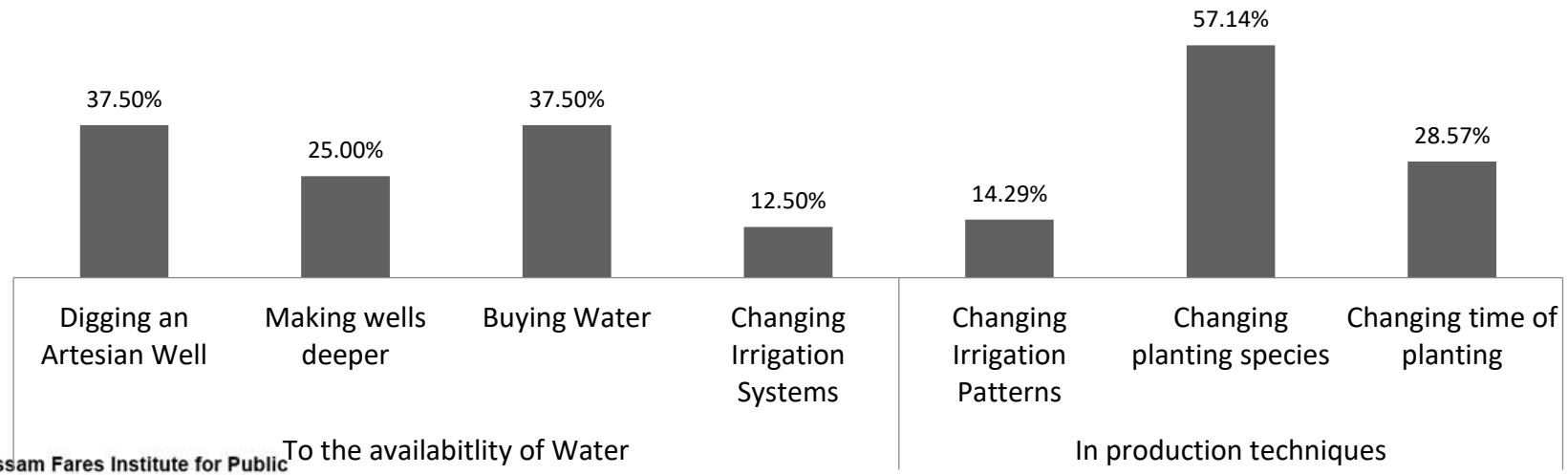
- Water Resources

  - There is a general complaint country-wide about the change in rainfall patterns
  - Snow cover is changing – becoming more restricted in extent – thus affecting groundwater recharge.
  - Farmers are known to be seeking alternative water sources due to a decrease in water availability
  - More land is being brought under irrigation with reliance on surface irrigation (flooding, furrow, etc.) ebbing in favor of sprinkler and drip systems

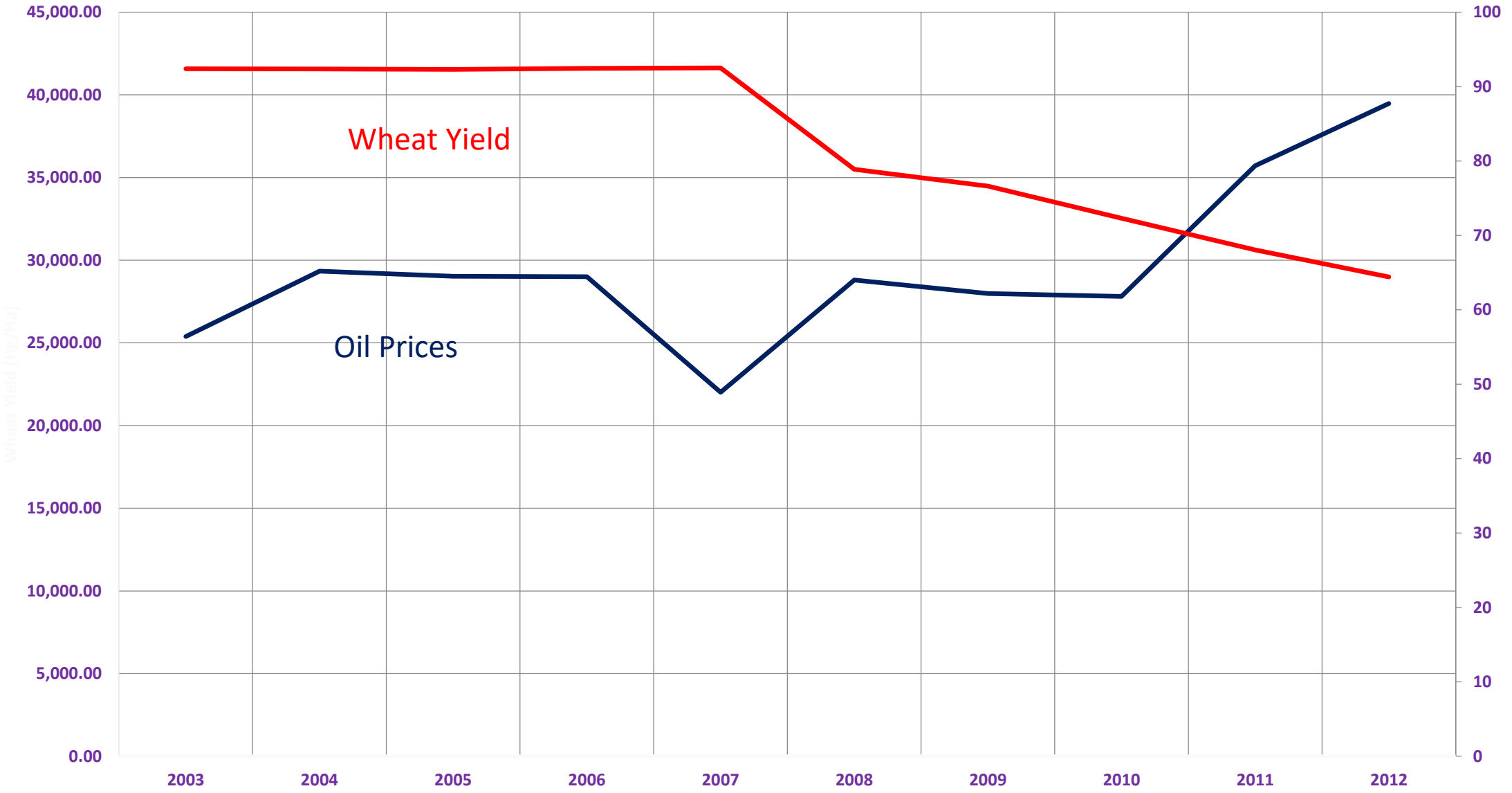
Percentage Distribution of Adaptation Methods Followed in Bekaa



Percentage Distribution of Adaptation Methods Followed in Kfardebian



Energy – Food


Crude Oil Prices vs. Lebanon Wheat Yield
Wheat Yield (Hg/Ha)
Oil Prices ($/barrel)
45,000.00
40,000.00
35,000.00
30,000.00
25,000.00
20,000.00
15,000.00
10,000.00
5,000.00
0.00
100
90
80
70
60
50
40
30
20
10
0
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Wheat Yield
Oil Prices

Yet another study….

Climate Change Impact in Lebanon – Higher-order Regional Impacts from Agriculture

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Region	Accumulated Productivity Change 2010 – 2030 (%)
Mount Lebanon	-5.72
North Lebanon	-8.44
Bekaa	-3.10
South Lebanon	-9.66
Nabatiyeh	-9.98

	Discount Rate		
	0.5	1.0	3.0
GDP (% of 2010)	-7.75	-7.22	-5.50
Per Capita Consumption (% of 2010)	-4.28	-4.00	-3.10

Noting that:

- Agriculture's contribution to Lebanon's GDP – 5.0%
- Budget of the Ministry of Agriculture < 0.5% of total

Thank You

If you want to know more please contact me at:

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