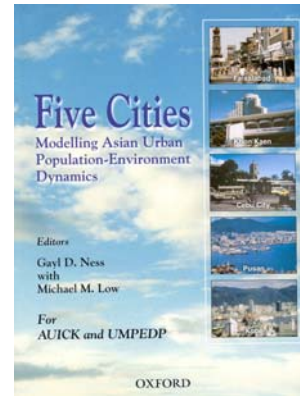


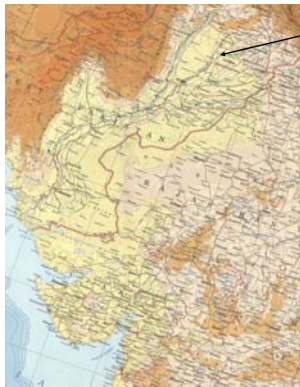
An AUICK Project: Modelling Asian Population Environment Dynamics



1



2



Faisalabad

Pakistan is a great arid plain lying between India and Afghanistan. Though rainfall is a mere 2-3 inches per year, the country is well watered by the great Indus river system that brings huge amounts of waters from the high Himalayas through the plain, to debouche into the Arabian sea near Karachi.

Under British colonial and independent Pakistani governments, canals and dams have brought these waters to vast expanses of land, making Pakistan one of the world's most irrigated countries.

The waters produce grains, fruits and cottons, bringing considerable wealth to the country. Is it sustainable??

3

Faisalabad: the life-giving Chenab Canal: is irrigated agricultural sustainable in an arid climate?



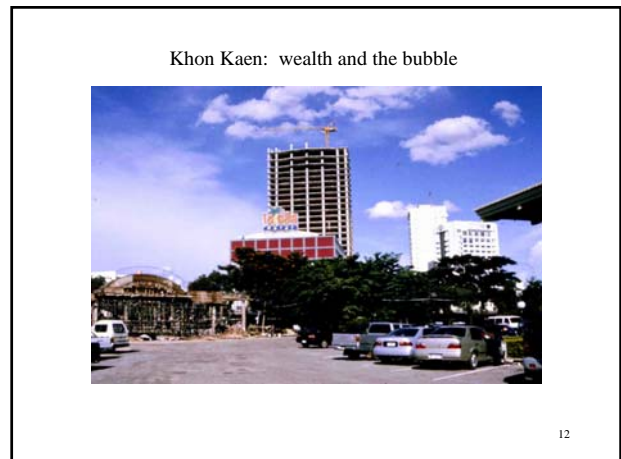
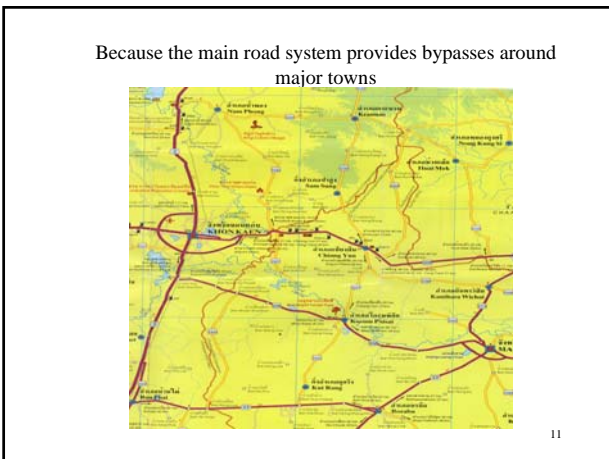
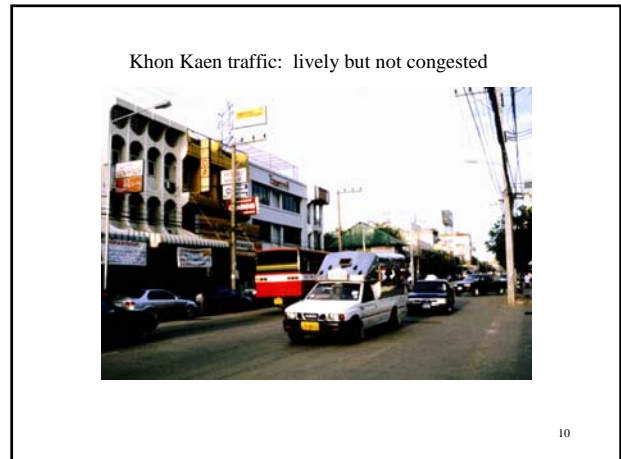
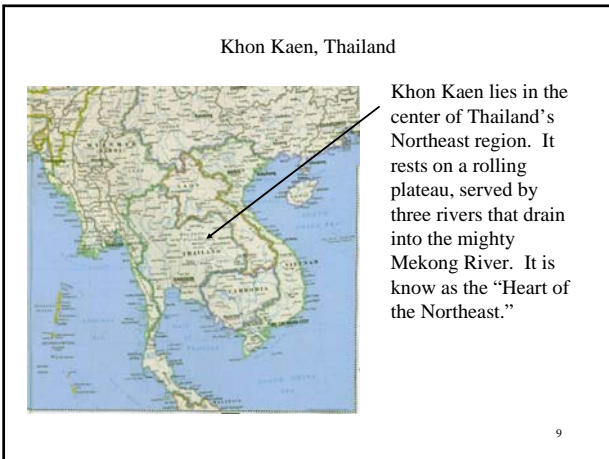
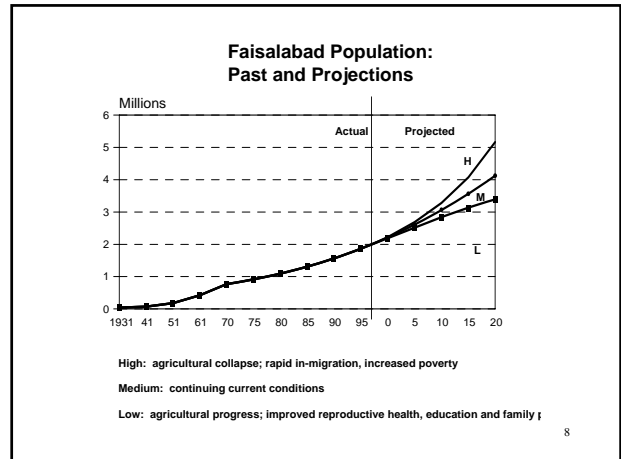
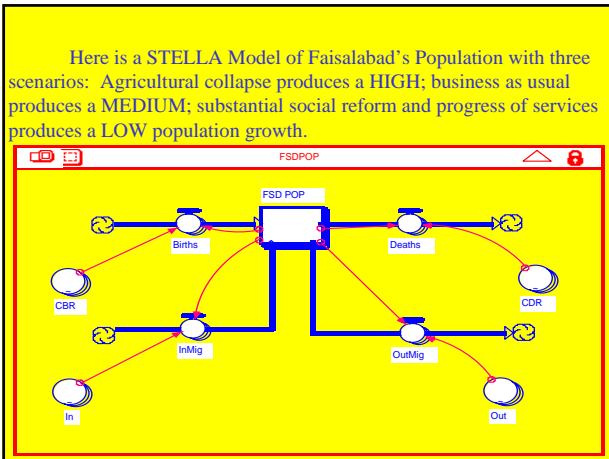
Traffic: a mixed bag



Extensive animal transportation



6

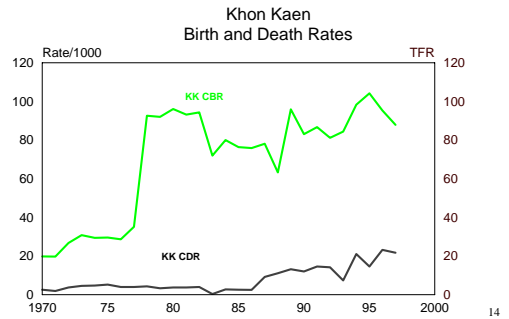


Khon Kaen: children, the new migrants



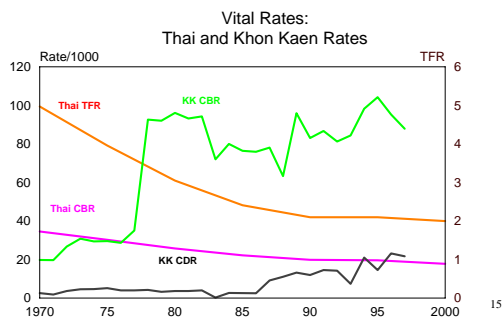
13

Crude Birth and Death Rates for Khon Kaen. Do they look strange?



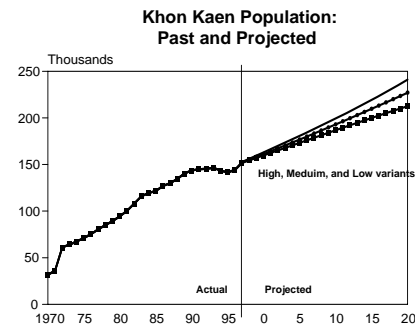
14

They are very divergent from the overall Thai rates. What is happening?



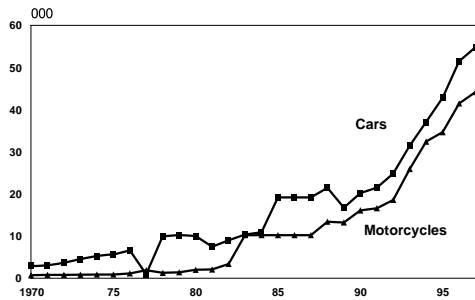
15

To get around the problem, we modeled the population, which everyone agrees gives a more accurate picture.



16

Khon Kaen Vehicle Growth 1970-95

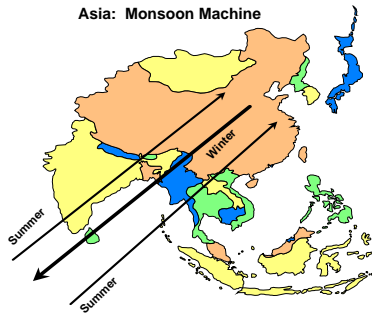


17

That vehicle growth raises questions about.....

Air Quality

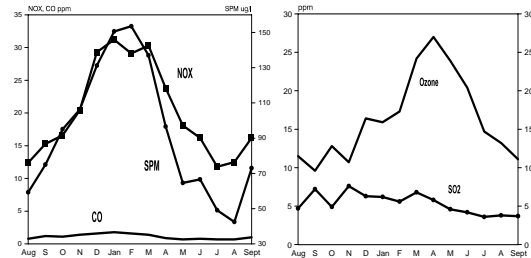
There is an Asian Monsoon Machine that produces specific patterns of rainfall in different countries. Look at Khon Kaen's location. (Also consider the location of Vietnam and other countries)



19

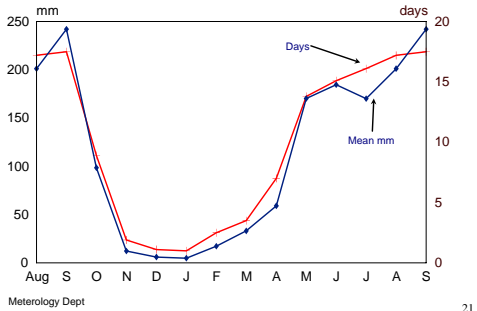
A dramatic seasonal variation in air quality, that comes from...

Khon Kaen Air Quality: The Monsoon Impact



Dramatic seasonal variation on rainfall. Population environment dynamics are location-specific.

Khon Kaen Rainfall (mean) 1966-1995

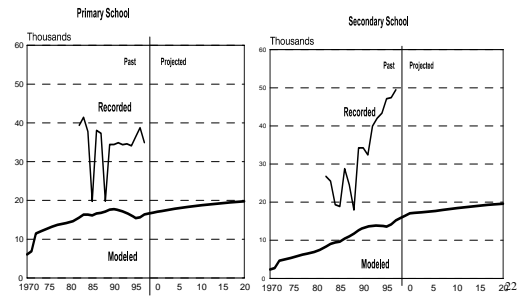


Meteorology Dept

21

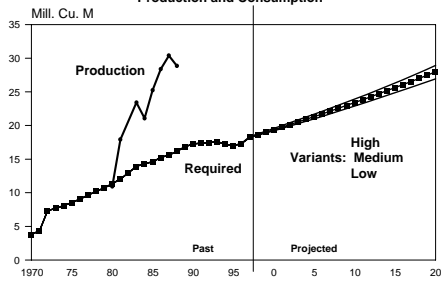
Modeling helped us smooth out questionable official data and suggest strategies for the city government. The extra school population is rural kids coming to town for better education.

Khon Kaen School Populations: Recorded and Modelled



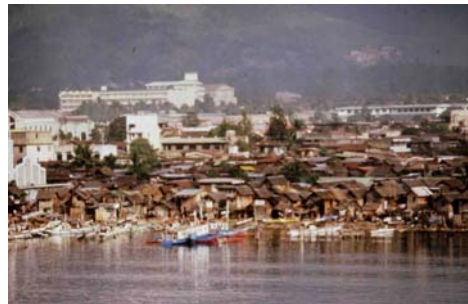
Water quantity posed no problem (though measures of quality were found grossly deficient).

Khon Kaen Water: Production and Consumption



23

Cebu: a polluted waterfront



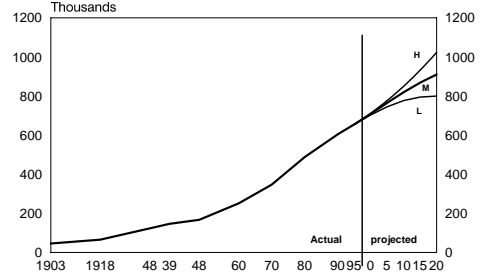
24

Cebu City: The Cathedral



25

Cebu City Population Growth



26

Cebu City Major Problems:

- Fragmented urban administrations weaken regional planning.
- Receding fresh-salt water line; aquifer depletion; no control of private wells.
- Increasing water pollution from inadequate sewage
- Deteriorating air quality:
 - weak transportation planning
 - class differences in consumption and pollution
- Education is the one bright picture.

Pusan is South Korea's major seaport



It is a modern, well developed cities that has emerged like a phoenix from recent near total destruction. It provides a high quality of life for its people, but has some problems lurking in the future.
Is it
SUSTAINABLE?

28

Pusan: high density and wealth crowd the beaches



29

Shoe manufacturing: wealth and change



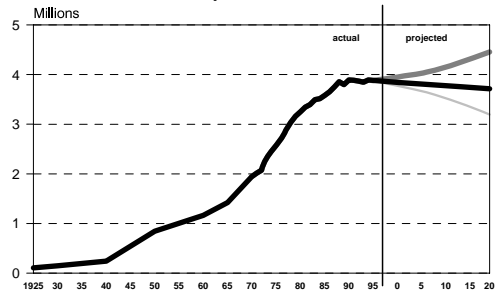
30

Pusan's busy streets



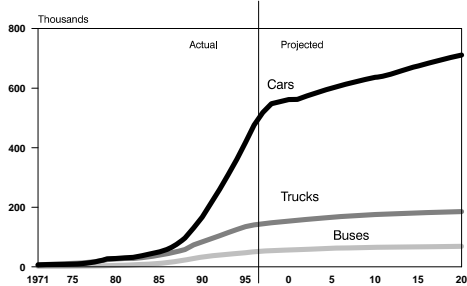
31

Pusan Population Growth



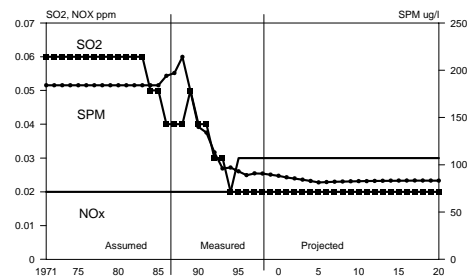
32

Pusan: vehicular growth



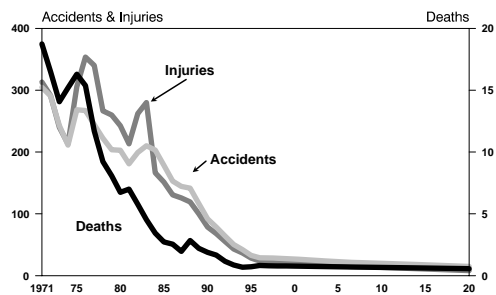
33

Pusan Air Quality



34

Pusan: vehicular accidents per 1000 Vehicles



35



Kobe is Japan's major seaport. It lies on the north edge of Osaka Bay. The Japanese current runs outside the bay from SW to NE, pulling pollutants out of the bay into the sea.

An effective government at national and city levels helped turn environmental challenges and advantages into high quality of life for Kobe's citizens.

36

Kobe's favorable winds move air pollution away.
Again specific locations bring challenges and advantages



Kobe's geographic limitations led to the great innovation the of "mountains to the sea" project, creating new islands for ports.



Kobe: a view from Port Island



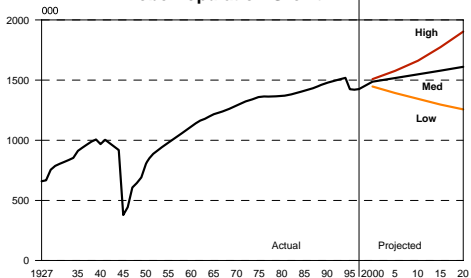
39

Kobe's fully automated "Port Liner"



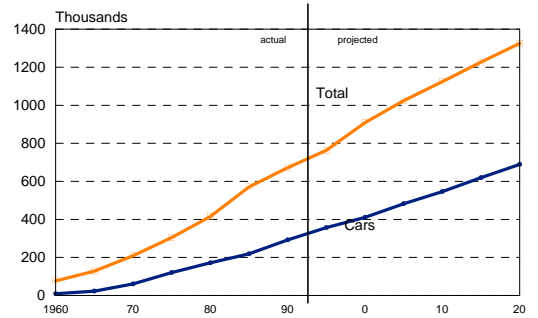
40

Kobe Population Growth

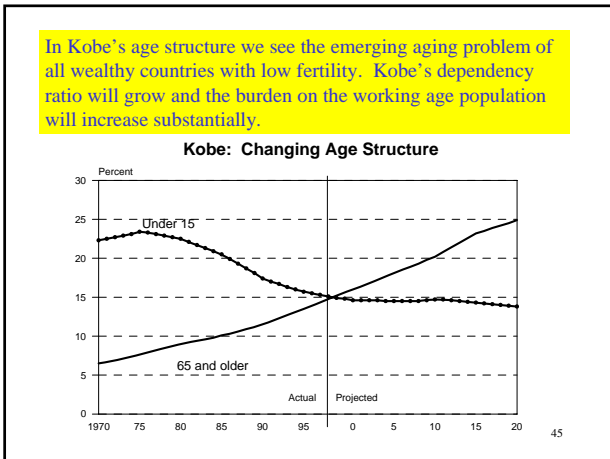
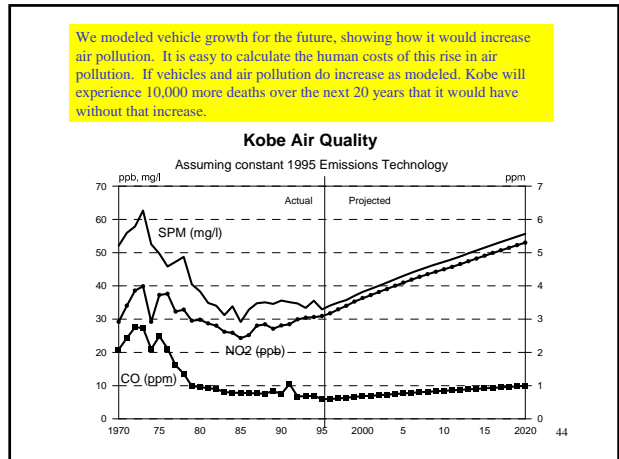
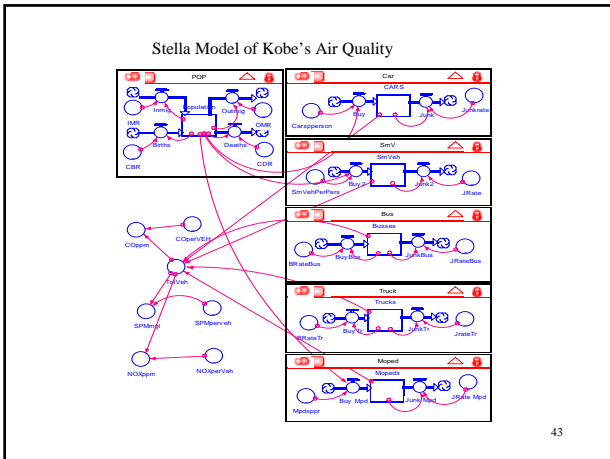


41

Kobe Vehicle Growth: 1960-2020



42



General Lessons from the Five Cities

Wealth pollutes, but also promises environmental protection;
Slowing population growth pays large dividends;
Quality of life is the major outcome

*Wealth is the major determinant
But something like political culture plays a role
SPECS vary, affecting the capacity of a city to transform
wealth into welfare.*

All population-environment dynamics are location specific.
*Analyses and action must be done at the local level
One size does not fit all!*