Environmental Data Interpretation and Use

Creating a Framework for Better Environment through Collaborative Efforts

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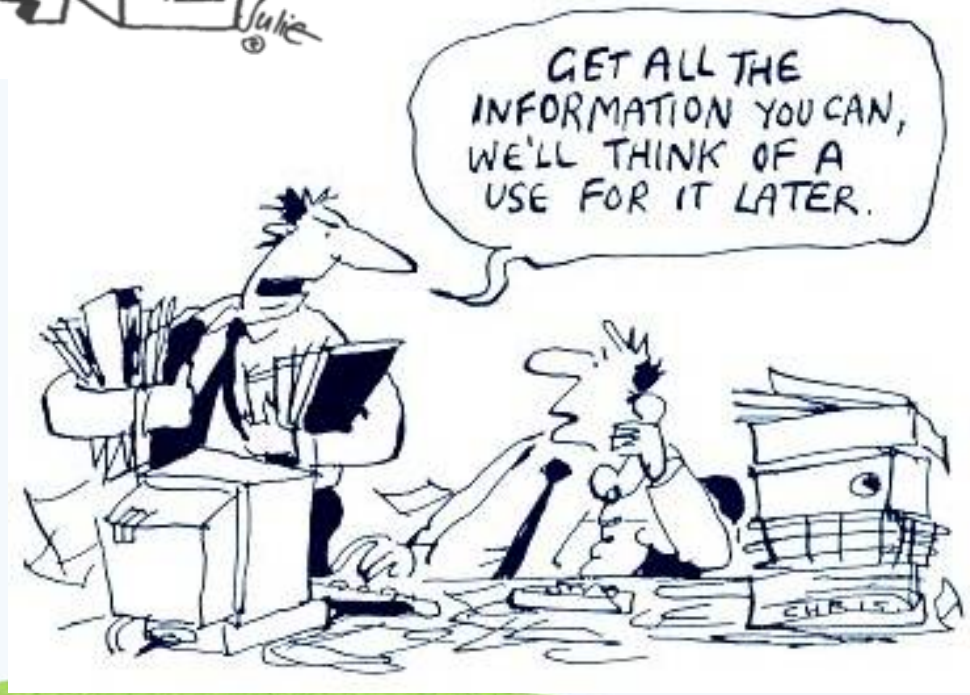
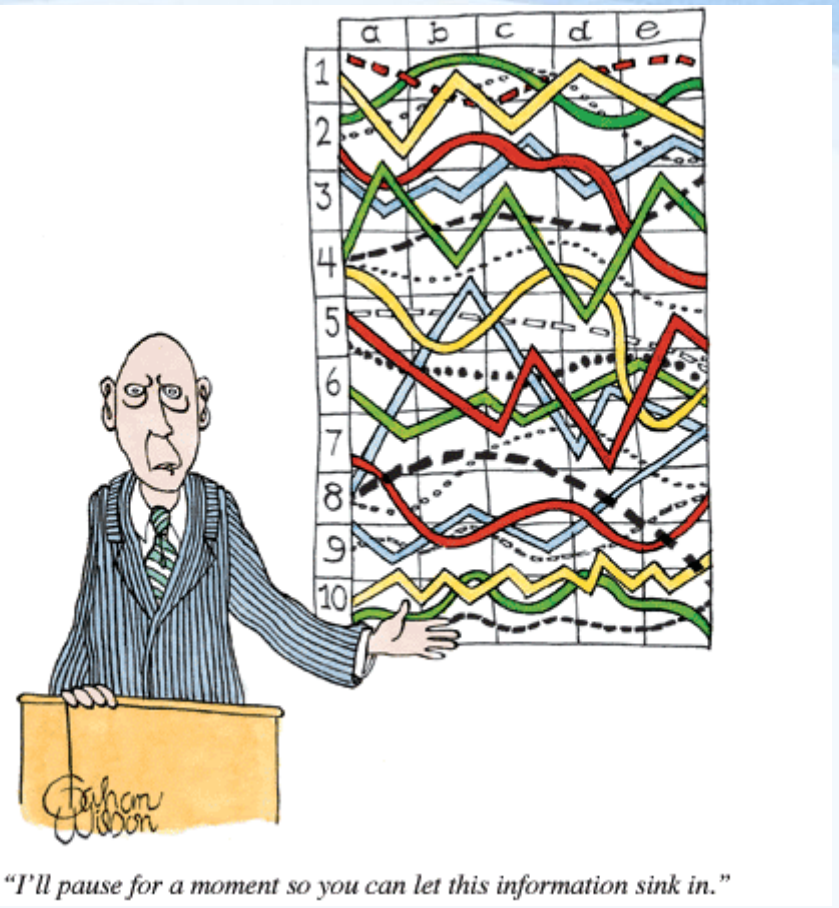


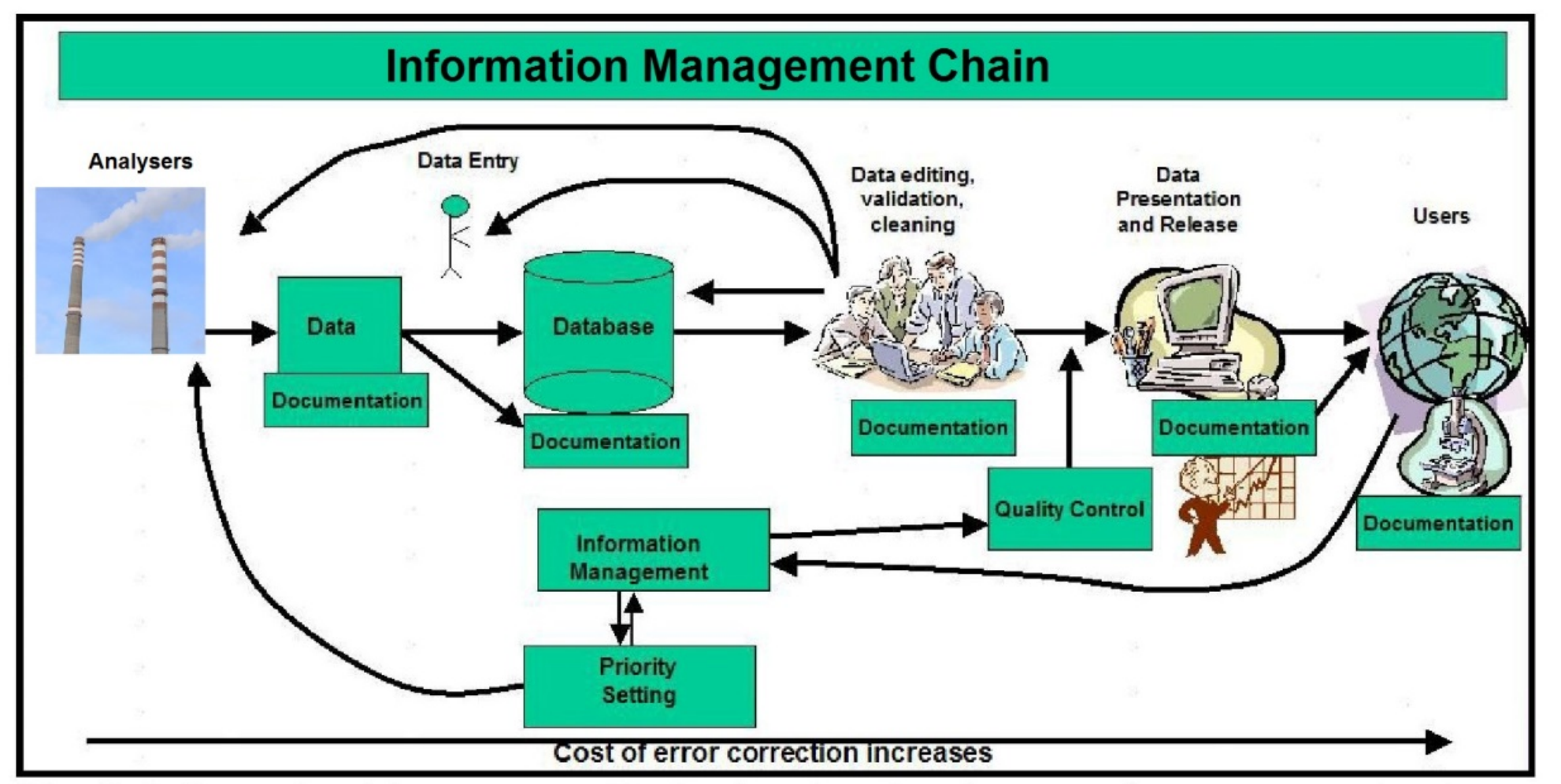


"I'll pause for a moment so you can let this information sink in."

Agenda

1. Flow of Information
2. Summarizing, Analysis and Interpretation
3. Use of Environmental Data
    a) By Regulators
    b) By Industries
    c) Others Uses

Flow of Information



Assign responsibility for the quality of data to those who create them.
If this is not possible, assign responsibility as close to data creation as possible. (Redman 2001)

Summarizing

Analysis

Interpretation

Summarizing, Analysis & Interpretation

There is no well-defined distinction as such between summarizing, analysis and interpretation. The only fundamental difference between summarising and analysing on the one hand and interpreting on the other hand is that, while summarising pertains to the manner in which the data are summarised and analysed to compute the required parameters, interpretation pertains to the significance of the results.

Summarizing, Analysis & Interpretation

Summarizing may be done by various statistical and geographical summarising tools like mean, median, range, frequency distribution, histograms etc.

Analysis is carried out by data distributions, finding out standard deviations, deriving normal and lognormal curves, charting out time-series and by correlation and regression techniques etc.

Summarizing, Analysis & Interpretation

Interpretation is the process of attaching meaning to the data.

Interpretation demands fair and careful judgement. Often the same data can be interpreted in different ways.

In general, when data is interpreted, it is attempted to explain the patterns and trends uncovered through analysis, bringing all the background knowledge, experience and skills to bear on the question and relating the data to existing scientific ideas.

Summarizing, Analysis & Interpretation

Date / Time	SO_2 Emission Conc. (microgram/cubic meter)					
	04:00	08:00	12:00	16:00	20:00	00:00
30-Jul	6	8	9	12	13	15
31-Jul	7	11	14	18	18	16
01-Aug	8	11	13	15	17	17
02-Aug	9	11	12	13	16	18
03-Aug	12	17	21	25	25	21
04-Aug	14	19	24	30	28	23
05-Aug	13	15	17	20	21	22

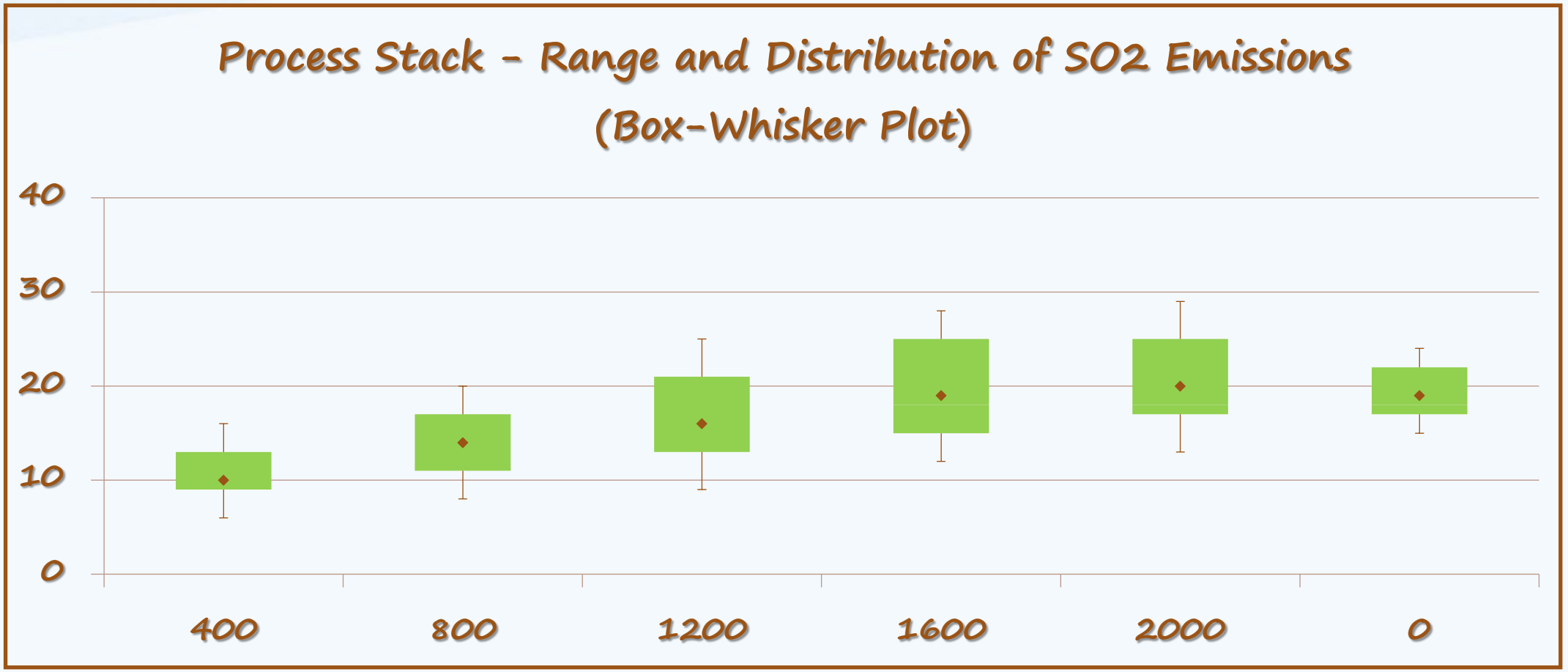
Summarizing, Analysis & Interpretation

Date / Time	SO_2 Emission Conc. (microgram/cubic meter)					
	04:00	08:00	12:00	16:00	20:00	00:00
Total	69	92	110	133	138	132
Count	7	7	7	7	7	7
Mean	10	14	16	19	20	19
SD	3	4	5	7	5	3
Max	14	19	24	30	28	23
Quartile -3	13	17	21	25	25	22
Median	9	11	14	18	18	18
Quartile - 1	9	11	13	15	17	17
Min	6	8	9	12	13	15

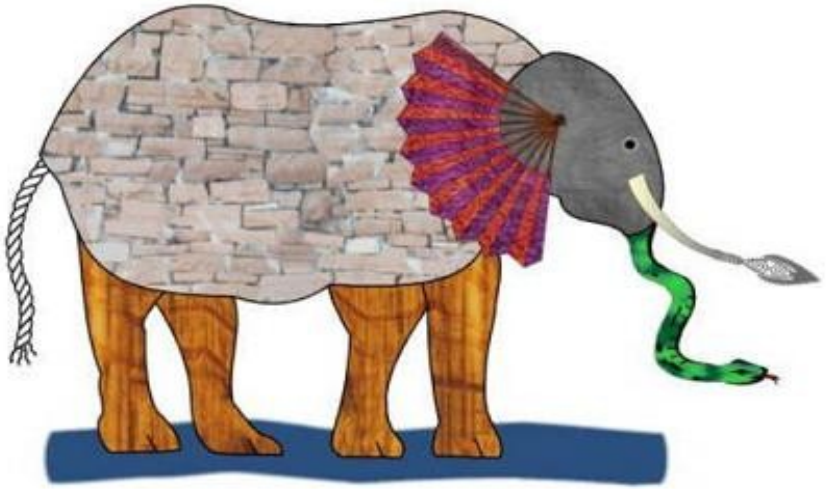
Summarizing, Analysis & Interpretation

Date / Time	SO_2 Emission Conc. (microgram/cubic meter)					
	04:00	08:00	12:00	16:00	20:00	00:00
Bottom	8.75	11	12.75	14.5	16.75	17.75
2Q box	0.25	0	1.25	3.5	1.25	0.25
3Q box	4	6	7	7	7	4
Whisker -	2.75	3	3.75	2.5	3.75	2.75
Whisker +	1	2	3	5	3	1

Summarizing, Analysis & Interpretation



Summarizing, Analysis & Interpretation



Blind men and an elephant

- Indian fable

Things aren't always what we think!

Six blind men go to observe an elephant. One feels the side and thinks the elephant is like a wall. One feels the tusk and thinks the elephant is a like a spear. One touches the squirming trunk and thinks the elephant is like a snake. One feels the knee and thinks the elephant is like a tree. One touches the ear, and thinks the elephant is like a fan. One grasps the tail and thinks it is like a rope. They argue long and loud and though each was partly in the right, all were in the wrong.

Use of Environmental Data

The User Community

- **Researchers, faculty, graduate students in a variety of disciplines of Environmental Science :**
  - make scientific observations such as the changes in environmental patterns and its effects on other pollutants and parameters over the years
- **Policy Makers and Implementers :**
  - query various critical parameters such as ambient air and water quality and visualize the results in a graphical form
  - gain help in the evaluation and formulation of environmental policies
- **The Public :**
  - learn information about their county, community, home on such issues as environment, health, and infrastructure

Use of Environmental Data

Use of Environmental Data

By Regulators

A
- Regulatory Compliance
- Pollution Prevention and Control

B
- Planning
- Mitigation and Response

C
- Cleanup and Remediation Science
- Harmful Substances

Use of Environmental Data

By Regulators

Regulatory Compliance

Government agencies use Environmental Data to create and enforce environmental legislation.

In addition, cooperation between agencies is simplified by the use of a central database that can be leveraged for cross purposes such as financial information, ownership, improvements, and plans.

Correct Environmental Data allows both operators and inspectors to manage, coordinate and report non-compliances to the regulating agency.

Use of Environmental Data

By Regulators

Pollution Prevention and Control

Efficiently create and organize, analyze, manage, and maintain pollution databases. From storm water runoff to animal waste pollutants, show complex relationships of different types of contaminants and a range of environmental features.

This data can be used to perform complex modeling to include factors such as absorption rates, natural filtering, weather forecasts, and soil erosion.

Use of Environmental Data

By Regulators

Planning

Environmental planning scenarios using Environmental Data include :

Correct Siting of Industrial Estates and Units considering the existing Pollution Levels in the area

Waste Water management plan for best treatment and disposal site location considering the ???, most efficient routes for fleet, and analysis of impact on public and land

Use of Environmental Data

By Regulators

Mitigation and Response

Mitigating the effects of pollution hazards and providing potential risk analysis for communities are is one of the upcoming application areas Environmental Data. Information from a central database can be visualized and analyzed to mitigate areas that are environmentally at risk.

This allows the visualization of an emergency or disaster situation and helps decision makers base decisions on data they can see and judge for them.

Use of Environmental Data

By Industries

To Avoid Non-Compliance

Real-time Data Acquisition & Analysis Tools

Market Trading Systems

Responsible Corporate Citizenship

Leveraging Enterprise + ERP Systems

Use of Environmental Data

By Industries

To Avoid Non-Compliance

Due to increased cost of non-compliance(eg. losses incurred due to penalty actions like closure), more and more industrial units are moving towards Continuous Monitoring Systems.

Hence the industries are trying to stay ahead of the game with respect to compliance in order to avoid costly litigation and fines by utilising environmental data.

Use of Environmental Data

By Industries

Real-time Data Acquisition and Analysis Tools

Acquisition and analysis of real time environmental and process data has matured in recent years. What was previously impossible or unfeasible is now simpler thanks to improvement in monitoring technology. Equipment, stacks, and outfalls can be scrutinized directly and the data analyzed immediately minimizing accidental releases, quickly identifying equipment operating out of tolerances, and ensuring that equipment is operating optimally, which ultimately is advantageous to the industries.

Use of Environmental Data

By Industries

Market Trading System

Due to the implementation of air pollutant based marketing / selling / buying systems, many companies now have an asset that must be managed.

Usually if the total pollution for a period of time is less than a capped value, then the unused pollution units can be sold or banked for later use. Therefore it has become more important to have and use reliable emission data..

Use of Environmental Data

By Industries

Responsible Corporate Citizenship

Many companies have determined that there is a value to the company if it is considered to be a "GREEN" company.

Consumers have access to an overwhelming amount of information about companies and their actions via television, radio, and the Internet. The increased availability of news and information has raised public expectations of corporate social performance.

There is a value associated with an environmental approach to environmental regulations.

Use of Environmental Data

Other Uses

Integration of Environmental Data with GIS

Environmental problems are spatial problems, environmental data can almost always be geo-referenced. GIS is therefor an appropriate tool for environmental analysis.

Given the increasing ease with which environmental data is available and can be anaylsed, GIS technology wil become increasingly integrated in environmental management.

Use of Environmental Data

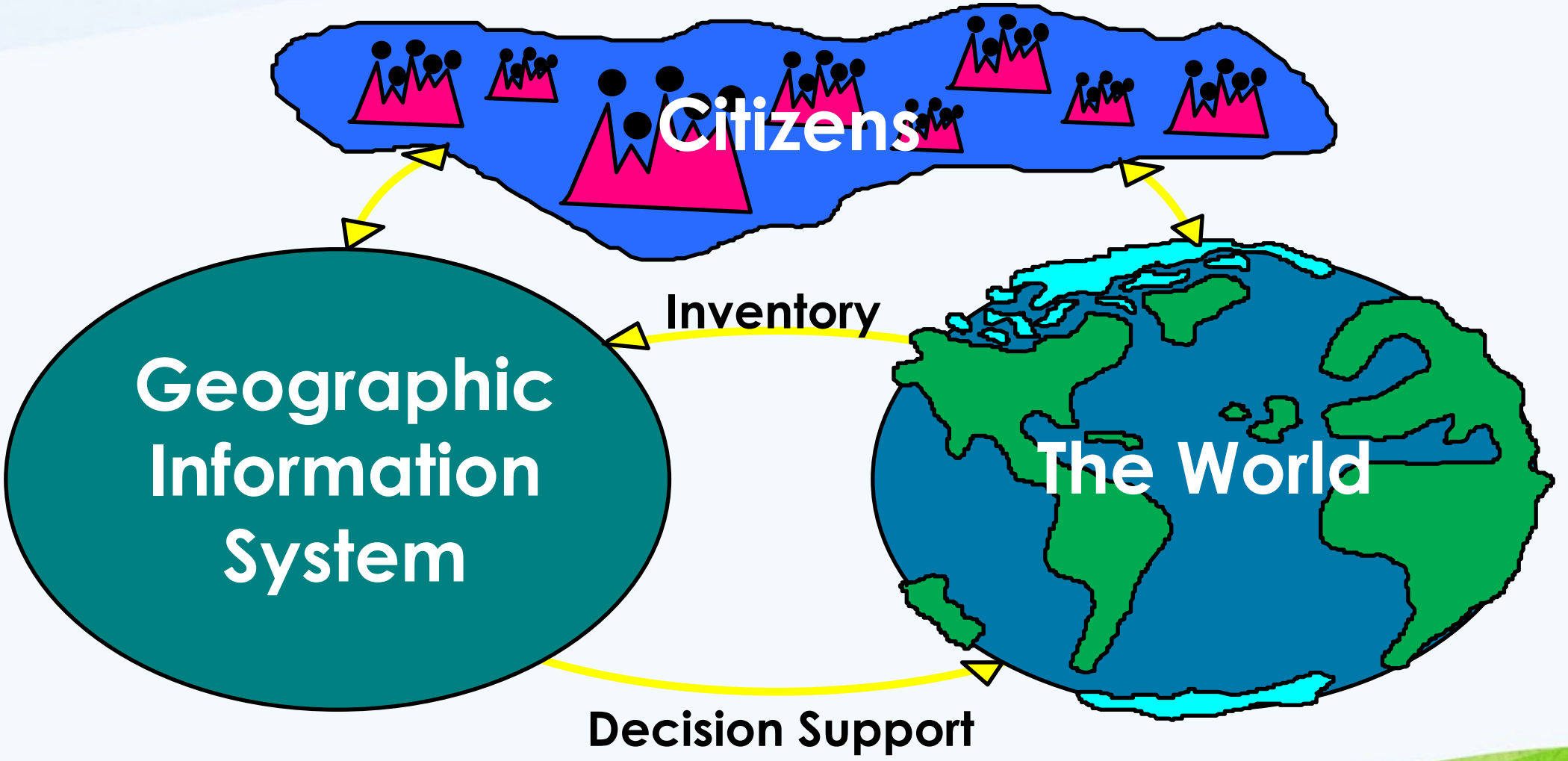
Other Uses

Uses by Scientists, Researchers etc.

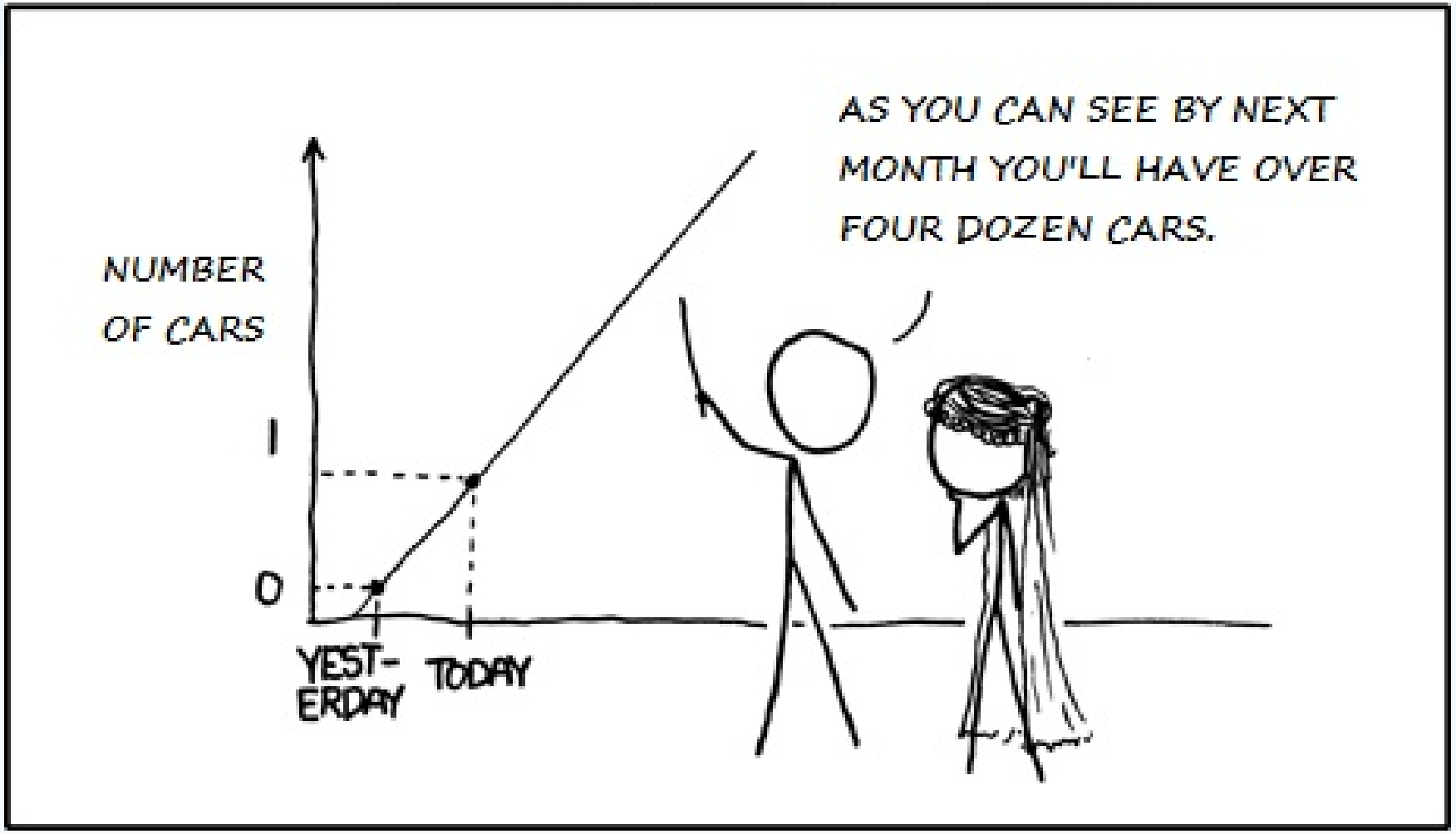
Environmental data once easily available can be used by scientists to research on various environmental and industrial issues because the trends and historical data make it easy to have statistical analysis and arrive at some solution.

With access to geo-referenced environmental databases, researchers can identify specific factories and their environmental effects, and assess the people and communities affected.

Use of Environmental Data



MY HOBBY: EXTRAPOLATING



THANK YOU

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