

# Safeguarding children from pesticide exposure

Lessons from the Endosulfan tragedy  
in India

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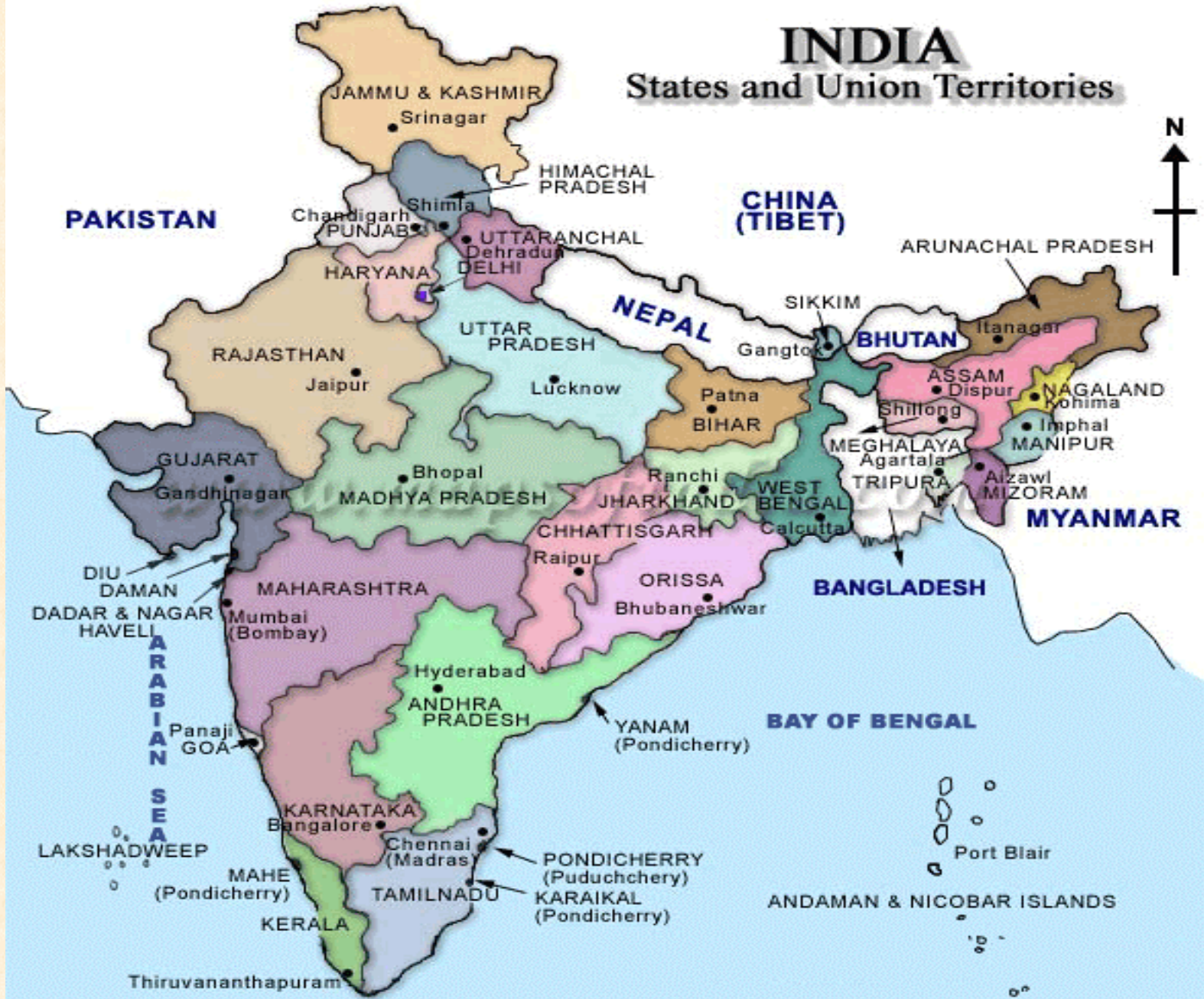
3<sup>rd</sup> ICCHE 2004, London

# Objectives

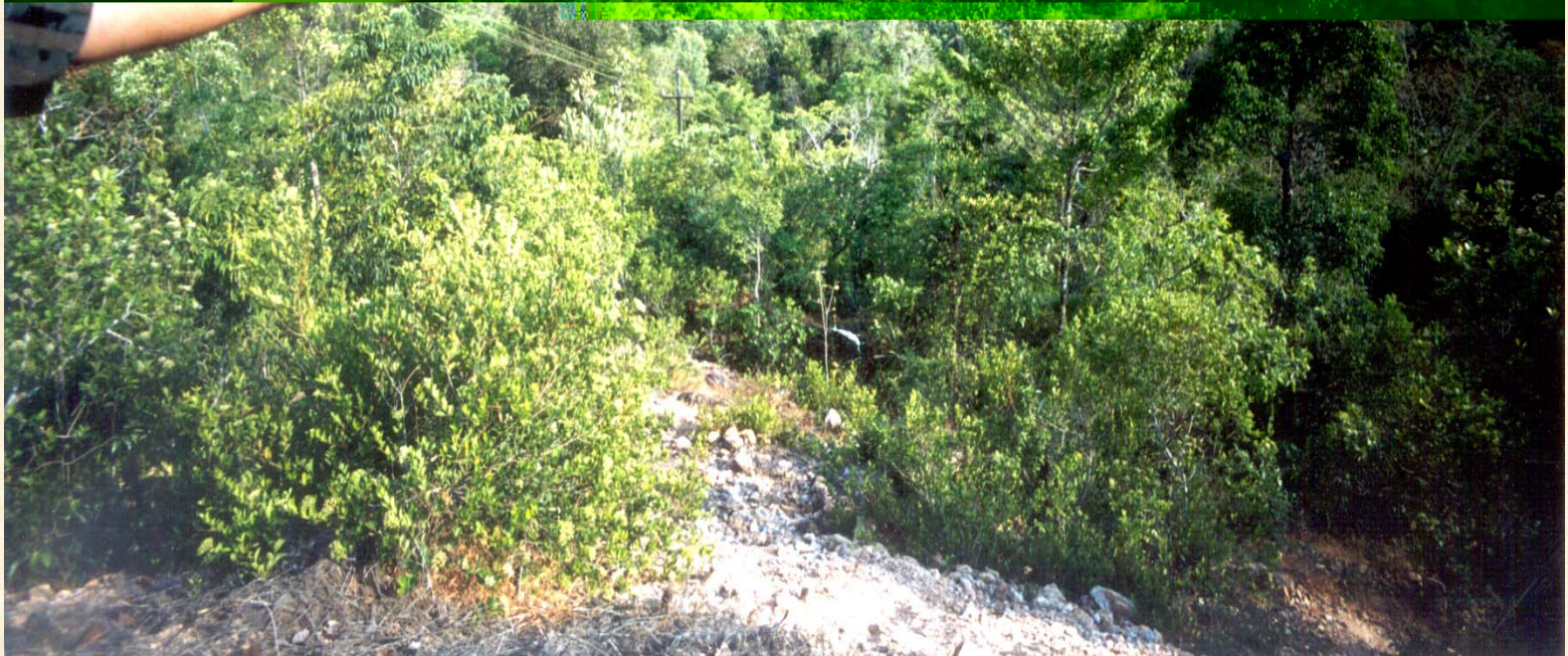
- Review the incident of Endosulfan spraying and vulnerability of children to pesticide exposure in Kasaragod district, Kerala in India.
- Review the environmental protection system in India to safeguard people's health from pesticide exposure in terms of
  - **A. Legal and constitutional provisions,**
  - **B. The implementation and monitoring mechanisms of pesticide use in agriculture .**
- Review the policy implications for safeguarding children's right to healthy living.

# INDIA

## States and Union Territories



# Picture of cashew plantations



# The incident – Endosulfan spraying

- Aerial spraying of Endosulfan, was done in cashew plantations spread over 4500 hectares around 15 villages in the northern part of Kasaragod district in the state of Kerala since 1976.
- The cashew plantations belong to the state owned public sector company – Plantation Corporation of Kerala (PCK).

- Since 1979, the local community have noticed health effects in the animals and also among the people.
- Significant neurological impairment among people aged <20 years.
- School children – physical and mental development affected (School Annual meeting 2000)
- The first ban on aerial spraying – sought by an affected mother
- People's movements against spraying and ban on use of endosulfan.

## Investigations by

1. Media
2. Environmental organisations -THANAL and Centre for Science and Environment
3. Kerala Sasthra Sahithya Parishad
4. Kerala Agricultural University
5. Plantation Corporation of Kerala
6. Government of Kerala –Achuthan committee
7. National Institute of Occupational Health
8. Pesticide Action Network-Asia Pacific (PANAP)
9. Department of Health, Kerala
10. Central Committee-Dubey committee

Conclude on two important findings:

## **1. Long term exposure to Endosulfan**

Exposure is continuous and long term. Residues of Endosulfan were found in the water, soil samples ( more than the MRL) taken 10 months after the last aerial spray in Dec 2000.

Favourable watershed characteristics for endosulfan to persist in soil and water.

## **2. Excess morbidity among the people**

Case studies

Department of health study

National Institute of Occupational Health

# Epidemiologic evidence

An epidemiological study was conducted by the NIOH to explore the effect of Endosulfan on the growth and development of school children (10-19).

*Study group:* School children residing in the Endosulfan sprayed areas

*Comparison groups:* School children from an area 25 km north of the sprayed plantations; similar socio-economic background. This area also grew cashew but did not have any streams or aerial spraying.

# Methodology of the study

1. Estimation of mean weight, height, skin fold thickness and body mass index of the two groups
2. Assess reproductive development by
  - a. Sexual Maturity Rating (SMR) using the Marshall and Tanner's classification
  - b. Estimation of serum levels of Testosterone, LH and FSH.
3. Assess the neurobehavioral development by reported learning ability by teacher and objectively by a screening test (Draw a Man) for IQ
4. Estimate the prevalence of congenital abnormalities by clinical examination by Paediatrician.

# Relationship of environmental endosulfan exposure and reproductive development in male children and adolescents (10-19)

EHP 111 (16); (Dec 2003) 1958-1962

Parameters	Control (n=90)	Study (n=117)
Age (years)	13.10 $\pm$ 2.12	12.80 $\pm$ 2.07
Height (cm)	141 $\pm$ 10.60	139 $\pm$ 13.30
Weight (kg)	30.70 $\pm$ 7.44	29.50 $\pm$ 8.93
Body Mass Index	15.30 $\pm$ 1.98	15.00 $\pm$ 2.11
Skin- fold thickness	7.31 $\pm$ 2.15	7.40 $\pm$ 2.28

# Sexual maturity of male school children

EHP 111 (16);(Dec 2003) 1958-1962

Multiple regression analysis :

SMR score, Age, Aerial exposure

Testosterone levels, age, aerial exposure

SMR score for pubic hair, testicular and penis development  
**lower** for study group for the same age .

Serum Testosterone levels of the study group were  
statistically **lower** than the control group for the same age.

# Endosulfan levels in blood

EHP 111 (16);(Dec 2003) 1958-1962

Serum endosulfan detected in 78% samples in study group as compared to 29% of control group.

Mean levels of Total endosulfan in study group is  $7.47 \pm 1.19$  as compared to control children  $1.37 \pm 0.40$  (  $p < 0.001$ ).

# Conclusion

1. Endosulfan is a known testicular toxin in animal studies
2. Children have been exposed –  
PRENATALLY -mothers of affected children who are residents in the sprayed areas.  
ENVIRONMENTALLY – water, playing in soil and inhalation during the spraying
3. Endosulfan exposure may delay sexual maturity and interfere with hormone synthesis in male children.
4. Biological plausibility is evident. No other causal factor identified.

Limitations : Small sample size

# The incident – Endosulfan spraying and the ban

- Due to media and public pressure, the State brought in a ban on endosulfan in August 2001
- Under pressure from industry, the State removed the ban in February 2002, finding excuse from the loopholes of the Insecticide Act.
- The High Court heard petitions from varied Environmental groups and ordered a temporary ban on Endosulfan in State of Kerala in December 2002.

# Review of the Environmental Protection System

- **Constitutional Provisions – Right to Life, Right to healthy environment**
- **Environmental laws – Air Act, Water Act, the Environmental Protection Act, Public Liability Insurance Act.**
- **The Insecticide Act, 1968**

# The Insecticide Act, 1968

## 1. **Regulates**

registration, licensing, manufacture, transport and storage of pesticides.

No stipulations on use of pesticide

- who can buy or procure and use.
- Inadequate rules on the preventive and safety mechanism for any pesticide use.
- No monitoring mechanisms for pesticide use.
- No precautions to prevent exposure of people indirectly exposed.

## 2. **Rules on aerial spraying**

# Violation of the Act !!

- The regulations were completely violated in Kasaragod (Achuthan Committee, 2001).
- Spraying had occurred at heights which aided wind drift and settling of the endosulfan chemical on soil surfaces.
- Adequate notice to the community before spraying was sparingly followed.
- Protection of water bodies was difficult to implement.
- The Insecticides Act and the Rules failed in protecting the people from exposure.

# Failure to Protect Public health

- In 1991 and 1999 government committees to review the continued use of pesticides [Banerjee 1991, R B Singh 1999, Interministerial committee 1999] have recommended the use of endosulfan in the country with a condition that it not be used near any water bodies. This part of the order was never implemented in any part of India.
- The Central Insecticide Board which reviews aerial spraying had not extended its recommendation to aerial spraying after 1993, but aerial spraying continued in the PCK plantation.

# The Environmental and other laws

- These Acts deal with industrial pollution than pesticide exposure in agri-business settings.
- Pollution from agri-business settings is not covered specifically under any law in the country.
- Even case laws do not exist to invoke these Acts for a pesticide exposure issue.
- Most of these laws are not preventive or precautionary in nature and enables justice through a weak regulatory mechanism of “penalties and restraints”.

# Constitutional Provisions

- Article 21 – Right to Life – “No person shall be deprived of his life or personal liberty except according to procedure established by law”.
- Article 32, 51(g), - Public Interest Litigation – These articles empowered a very useful tool in the country for the public to seek justice by increasing the accessibility of the judicial system.
- The Indian Judiciary has time and again resorted to invoking the fundamental rights to provide justice in environmental issues.

# The Endosulfan Ban

- The Local Court used the provisions in the civil law to protect the public property from poisoning by pesticides – stopped aerial spraying of pesticides.
- The High Court creatively used the “Precautionary Principle” and banned the sale and use of endosulfan in the State.
- Article 21 invoked inspite of lack of specific provisions in the Insecticides Act.
- Remarkable judgment clearly upholding the need to stop potential harm to public health over the need to profit through sale and use of endosulfan.

# Endosulfan –viewpoint of agricultural science and industry

1. Ban – Loss to the Industry. In India endosulfan is used in cotton, cashew, tea and vegetable cultivation.
2. Agriculture scientists propagated endosulfan as a ‘Safe chemical’ –effective against pests, less persistent and not known to cause health effects.
3. Department of Agriculture recommends the use of endosulfan and also subsidises its sale to farmers.

# The wrong prevails...dangerously

- Central Government – Failed to extend the ban to the whole of India or even start the process of the phasing out this persistent chemical
- The State Government - is ineffective in implementing the ban and sale of the chemical continues.
- The Central Government committee headed by an Agricultural expert, rejected all evidence on the health effects and causal link to endosulfan.

# The wrong prevails...dangerously

The Committee .....

- Allows the continued use of endosulfan in all crops (in India a major porportion of endosulfan is used in cotton cultivation)
- Suggests that the Plant Protection Division (under the Agriculture Department ) conduct a health study in the future !!

*(Clear case of Interests of the industry and bias of the agricultural scientists against the need to protect human health and environment from harm)*

# Children in the vulnerable world of pesticides

The Endosulfan case-study showed that

- Specific epidemiologic evidence of endosulfan affecting the reproductive development of children.
- Children are the most affected by the use of endosulfan.
- The Safeguarding mechanisms did not address public health and did not protect children from exposure.
- The Safeguarding mechanisms do not recognize enhanced vulnerability of children in pesticide exposure impacts.

# Children in the vulnerable world of pesticides...

- The Pesticide Regulation agencies refuse to recognize the availability of new scientific evidence regarding children's vulnerability – blatantly so because it challenges the very premise of “safe use of pesticides” propagated by agriculture scientists.
- Lack of Policy and laws– on Environmental issues of pesticide use, exposure, contamination and safeguarding human beings.
- Safeguarding Children from EXPOSURE to pesticides is not addressed in any policy or legislation.

# **The most important lesson from this tragedy**

Communities are led to believe that safe use of pesticides is possible and that accidents and poisoning incidents are an issue of regulation.

The scientific tools of MRL, ADI, LD50 have been developed to regulate the health impacts.

The different settings of exposure and health impacts of children show that the science and policy have not effectively addressed ground realities.

# Children's vulnerabilities

1. Children are involved in family based activities, like agriculture.
2. Child labour in agri-business settings
3. Living environment and activities of adults
4. Susceptibilities – Behaviour, Physical size, Metabolism, Intranatal exposure
5. Lack of political commitment to understand environmental threats and protect the environment for the future children.

# Community action for Pesticide Elimination ( CAPE)

Documentation and expose the different ways by which communities especially children are exposed.

Community monitoring of pesticide-related health effects.

Communicate the issue of pesticides and their impact on human health.

Develop strategies to eliminate the use of pesticides in house and in agriculture.

Reveal the interests of different stakeholders –industry and agriculture departments to the public.

To influence policy changes to eliminate the use of pesticides.

Thank You