Regulating Pesticide Use in Agriculture Produce

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Background

• Global food price surge (2007-08)
• Asia-Pacific region – vulnerable

• Green revolution
  ➢ Reaching limits
  ➢ Environmental degradation
• Needed – holistic approach
  ➢ Forestry and food security!
Where do the Hungry Live?

Total = 1.02 billion

- Develop Countrie: 642
- Near East and north Africa: 265
- Latin America and the Caribbean: 42
- Sub-Saharan Africa: 53
- Asia and the Pacific: 15
Food Security

Vulnerability to food insecurity of Sri Lanka: 2003

Boundary:
- Districts
- DS divisions

Vulnerability:
- Least/little vulnerable (148)
- Less vulnerable (82)
- Most vulnerable (93)

Produced by VAM Unit, WFP, Colombo
Date of release: 1st Jan 2003

Note: Boundaries of some DS divisions are approximate boundaries.
Agriculture in Sri Lanka:

- Livelihood for 70% rural population
- Contributes to about 12% of the GDP
- 32% of the employment
Agriculture has been Sri Lanka’s main livelihood from ancient times. However, the growth is sluggish.
Current situation in agriculture

- Low productivity due to:
  - High cost of cultivation
  - Pests and diseases
  - Post harvest losses
  - Low quality products

food security was greatly affected by

- Population increase
- Less land for cultivation
- Climatic changes

Need to increase productivity
Sri Lanka’s Agriculture potential & constrains

• Land
  - Total - 7 Mn Ha
  - Arable - 4 Mn Ha (Including Forest)
  - Agri Land - 1.64 Mn Ha
  - Padddy - 684,000 Ha
  - Sub Crop - 130,000
  - Tea - 180,000
  - Rubber - 151,000
  - Coconut - 400,000
  - Exp.Crops - 62,000

• Rain Fall – 1,706 mm, 93 Days

• Soil - Rich

Productivity

<table>
<thead>
<tr>
<th>Crop</th>
<th>Sri Lankan</th>
<th>Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>4 Mt/HA</td>
<td>10 MT/HA</td>
</tr>
<tr>
<td>Sub Crop (Maize)</td>
<td>1 Mt/HA</td>
<td>3 MT/HA</td>
</tr>
<tr>
<td>Tea (M)</td>
<td>1,645kg HA</td>
<td>3,000kg HA</td>
</tr>
<tr>
<td>Rubber</td>
<td>1,128kg HA</td>
<td>2,000kg HA</td>
</tr>
<tr>
<td>Coconut</td>
<td>2,300 nut/AC</td>
<td>8,000 nut/AC</td>
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</tbody>
</table>
Rapid Agricultural Productivity growth is fundamental for reducing poverty in Sri Lanka.

Therefore, rapid development in food production while protecting environment, water resources, and biodiversity needs to be given high priority in the Development Strategies.
Role of Pests and Diseases on crop productivity.

- Climatic changes
- Lack of resistant sources
- New pest and disease incidences (alien invasive species, biotypes/strains etc.)
- Wrong agricultural practices (continuous cropping, chemical application etc.)

These will lead to:

High losses – pre and post harvest levels
Current scenario

*Weedy rice* is a serious problem of cultivated Paddy

Alligator Weed threatens recreational lakes – Nuwara Eliya

Gorse (*Ulex europaeus*) - Horton Plains National Park
Current scenario

Panama wilt in banana

Waligama coconut leaf wilt disease

Potato late blight
Current scenario
Current scenario

Papaya mealybug

coconut mite

vegetable leafminer

Brown planthopper
- 25-30% losses in Agricultural products due to insect pests, diseases and weeds

- Therefore economically acceptable, ecologically sound, socially acceptable and sustainable alternative for chemical pesticides is needed
Present status

The expanding population can not be fed using purely “green methods”.

There is heavy overuse of agrochemicals in Sri Lanka.
<table>
<thead>
<tr>
<th>Year</th>
<th>Insecticides</th>
<th>Herbicides</th>
<th>Fungicides</th>
<th>Formulations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Volume (mt)</td>
<td>Volume (mt)</td>
<td>Volume (mt)</td>
<td>Volume (mt)</td>
</tr>
<tr>
<td>2001</td>
<td>90.25</td>
<td>270.40</td>
<td>5.30</td>
<td>848.50</td>
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<tr>
<td>2003</td>
<td>216.39</td>
<td>193.90</td>
<td>6.78</td>
<td>1468.01</td>
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<td>2005</td>
<td>222.14</td>
<td>259.6</td>
<td>7.98</td>
<td>1699.6</td>
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<tr>
<td>2006</td>
<td>128.38</td>
<td>207.94</td>
<td>0.40</td>
<td>1576.41</td>
</tr>
<tr>
<td>2007</td>
<td>115.65</td>
<td>88.3</td>
<td>1.5</td>
<td>1193.74</td>
</tr>
<tr>
<td>2008</td>
<td>199.3</td>
<td>178.12</td>
<td>0.9</td>
<td>1585.74</td>
</tr>
<tr>
<td>2009</td>
<td>107.43</td>
<td>274.78</td>
<td>0.25</td>
<td>1036.74</td>
</tr>
<tr>
<td>2010</td>
<td>144.38</td>
<td>1090.38</td>
<td>2</td>
<td>1843.95</td>
</tr>
<tr>
<td>2011</td>
<td>90.5</td>
<td>1118.94</td>
<td>0.4</td>
<td>1712.58</td>
</tr>
</tbody>
</table>

(Source: Pesticide Registrar's Office)
Do we need this much of Pesticide?
Over-use of pesticides

- Incorrect dose/dilutions
- Incorrect selection of pesticides
- Inappropriate application techniques
Use of Agrochemicals;

- Extensively applied to obtain higher yield
- Intensive application leads to several problems:
  - Leaching
  - Polluting water basins
  - Destroying soil micro-organisms, pollinators, parasites & predators
  - Increasing susceptibility of crops to pest & diseases
  - Reduction of soil fertility
  - Develop resistance

Damage to the Overall system & Environment
Alternatives to pesticides

- Cultural
- Biological
- Chemical
- Legislative
- Genetic & host plant resistant
- Mechanical
- Insect semiochemicals
- Sterile insect technique

INTEGRATED PEST MANAGEMENT
Biological pesticide is a good component in IPM programme

A number of ENTOMOPATHOGENS have been reported

- Local formulation of *Bacillus thuringiensis* is registered as a bio pesticide in Sri Lanka.
- TRI focused research on utilization of locally isolated *Beauvara bassiana* against Shot Hole Bore with promising results.
- *Metarhizium anisopliae* showed their potential to control insect pests under laboratory conditions.
- CRI use baculoviruses against the black beetle, *Oryctes rhinoceros*. 
Botanical Products

✓ Sri Lankan farmers have sound knowledge about the indigenous practices of utilization of plant products for pest management

✓ Plant products can be applied in several forms such as Powder, Ash, Volatile oil, Non volatile oil, Extracts etc.

✓ Many plant species with pest control properties were identified and used in small scale at village level

Eg: Neem products;

- Highly utilized in pest management
- Many research have been done to estimate their possible effects with fulfilled results
- Number of neem based commercial products are available in the market
Current Status of Biofertilizers & Biopesticides

- Organic farming - practicing over centuries
- Use of biofertilizer – traditional practice
  - Nitrogen fixation to generated nutrients
- Commercial formulation of biochemical pest control agents are available in pesticide market of Sri Lanka today
  Eg: semiochemicals, hormones like ecdysteroides & juvenile hormones, natural plant regulators and enzymes
- Micro organisms effective as pest management agents are available in the market
  Eg: bacteria, fungi, virus, nematodes or genetically modified micro organisms
RECOMMENDATIONS FOR FUTURE PEST MANAGEMENT STRATEGIES

National level Policy Development
  IPM, Organic farming

Implementations
  Breeding Programmes
  School level activities
  Education campaigns to public

Monitoring Programme

Research & Extension

Imposing Law
  Quarantine measures
  Pesticide usage
Adopting Integrated Pest Management as National Policy in Agriculture Production.

In view of extensive yield losses incurred by pests (insects and other organisms, pathogens and weeds) and detrimental effects of pesticides on natural balance, environment quality and human health, a need has arisen to develop and disseminate effective pest management methods that are safer, environment friendly and sustainable.

Therefore, it is suggested that Sri Lanka adopts Integrated Pest Management as National Policy in Agriculture Production.
• Development of a national level policy for correct pesticide usage

Imposing rules and regulations in issuing pesticides to the farmers for which they have to produce some kind of a written recommendation by a local authority (agrarian service, AI etc.).

Proper monitoring programs should also be efficiently operated at field levels to ensure proper usage of agro-chemicals.
Promoting production and utilization of organic agriculture, and bio pesticides

Sri Lanka Natural Agriculture Policy clearly promotes the production and utilization of organic agriculture and bio pesticides to reduce the use of chemical fertilizer. Bio fertilizers and biological pesticides are proposed to be incorporated into agricultural practices in Sri Lanka enabling food security and sustainability.
RECOMMENDATIONS FOR FUTURE PEST MANAGEMENT STRATEGIES

To minimum usage of pesticides

- Pesticide traders would be permitted to sell pesticides only through specially trained Technical Assistants
- Issuing pesticides to the farmers for which they have to produce some kind of a written recommendation by a local authority
- Introduction of new mechanism to dispose or recycle empty pesticide and weedicide bottles in collaboration with the Environment Ministry
- Laboratory-testing imported pesticides of by the Registrar of Pesticides at the entry-point to ensure that banned chemicals were not brought into the country.
- Implementation of trained core of people who can apply pesticides
- Education campaigns to train farmers, retailers, distributors, and public with the adverse effect of pesticide
- Maximum Residue Level (MRL) to reduce the consumer’s risk of exposure to unsafe levels
- Integrated pest Management and organic agriculture
RECOMMENDATIONS FOR FUTURE PEST MANAGEMENT STRATEGIES

To ensure the proper usage of agrochemicals by farmers.

- Education campaigns to train farmers, retailers, distributors, and public with the adverse effect of pesticide
- Strengthening the awareness of extension officers/AIs/and related parties in pest and disease diagnosis and management principles
- Proper monitoring programs efficiently operated at the field level to ensure proper usage of agrochemicals
Breeding programs for pest and disease resistance

- Establishment of new research stations devoted for plant breeding for disease resistance (fieldcrops, vegetables etc.)
- Exploration and conservation programs of important disease resistant germplasm
Implication and strengthening of strict plant quarantine measures

- Imposing strict plant quarantine laws at all ports of entries and changing laws suits with modern living strategies to reduce dissemination of pests and diseases
Imposing laws and introducing guidelines for postharvest handling of Agriculture produces

Introduction of some set guidelines for wholesalers and retail traders in transporting/storing and general handling of fresh produce is a must in reducing postharvest losses. Research focused on minimizing post-harvest losses due to pest and diseases is also important.
At University of Peradeniya where a group of scientists who have worked on CKDU since 2002 and the government should have a proper consultation with all stakeholders, before taking an important decision that will affect the future of the country.
GLYPHOSATE CONTROVERCY

- Glyphosate is a useful tool to poor farmers to overcome heavy cost of labor, and helps to help soil conservation and prevent soil erosion and a useful tool in tea industry.

- This group (UK/RU) got a boost recently when WHO declared that Glyphosate is causing cancer.

- In Sri Lanka a political decision has been taken to ban Glyphosate without giving serious considerations into its ramifications.
At UP where a group of scientists who have worked on CKDU since 2002 and the government should have a proper consultation with all stake holders, before taking an important decision that will affect the future of the country.
Thank you...!