



Bio-Based Eco Industrial Clustering in Dambulla Sri Lanka

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Country Profile – Sri Lanka

- ⊕ Population 19.9 million, growth rate 1.1%, with land area 65,000 km²,
- ⊕ GDP per capita: \$1,400 (2006)
- ⊕ GDP composition: agriculture 17.2%, industry 28.3%, services 54.5%
- ⊕ Labor force: agriculture 32.2%, industry 26.6%, services 41.2%
- ⊕ Main exports: garments, tea, agro products, gems
- ⊕ Top imports from Japan (22%), China (9.4%)
- ⊕ Foreign Assistance total Rs. 86,460 million, of which 26.2% is from Japan (2005)

- ⊕ Major Environmental Concerns;
 - Water pollution from domestic and factory wastes
 - Solid waste dumping
 - Air pollution from vehicle emissions
 - Deforestation
 - Soil erosion



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Industrial Development in Sri Lanka

- + Private sector involvement in industrial development started in 1950
- + With shifting to open economic policies in 1977, rapid expansion in industrial activities with majority being foreign investment

Industry type		S & M Sector	
Type	Number of units	Industry Sector	Number
Industrial estates	314 (18)	Wood & wood products	6,055
Export processing zones	272 (11)	Textile and Leather	7,306
S & M industries	30,252*	Food, Beverages & Tobacco	4,487
		Non-metallic Mineral Products	3,265
		Fabricated Metal Products	3,511

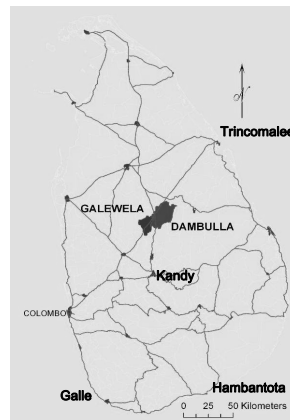
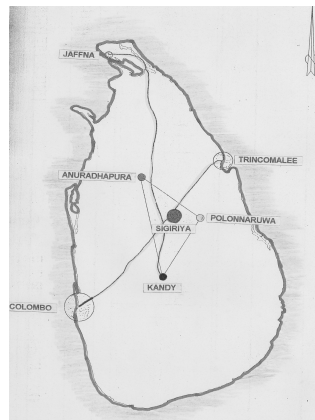
*Include some micro industries,
() number of estates/processing zones

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Study Area

- + Sri Lanka is divided into 9 provinces, 25 districts and further the districts into District Secretariat (DS) divisions
- + Study area - Dambulla & Galewela DS divisions are located in central province - Matale district - Greater Dambulla Development Zone



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Study Area Profile

- + Dambulla & Galewela population 60,679 & 61,842 with growth rates 2.7% and 3.7% respectively Country average 1.1%
- + Land area Dambulla 320 km² and Galewela 192.4 km²
- + Land use approximately 13% and 30% agricultural land
- + Employment 50% and 45% in Dambulla and Galewela are farmers
- + Socio economic – Dambulla & Galewela 50% and 55% are in poverty and rely on government subsidies Country average 23%
- + Paddy, Vegetables, Fruits, Seeds
- + Largest agro-based economic center – Dambulla Economic Center

Summary ; Dambulla and Galewela areas are bio-based, poverty ridden economies

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Environmental Status

- + Solid Waste
 - Municipal Solid waste around 1,500 MT/year each area
 - Vegetable waste from the Dambulla economic center 7,000 tons a year
 - Agricultural Residue: Rice husk, Straw
- + Wastewater
 - Wastewater from over 60 rice mills
 - Domestic sewage - high season groundwater table is very shallow
 - Fertilizer and pesticide runoff from agriculture lands
- + Air Pollution
 - Rice mills
 - Open burning and Vehicular emissions

Summary ; Main problems Vegetable solid waste, agriculture residues, fertilizer/pesticide runoff, wastewater

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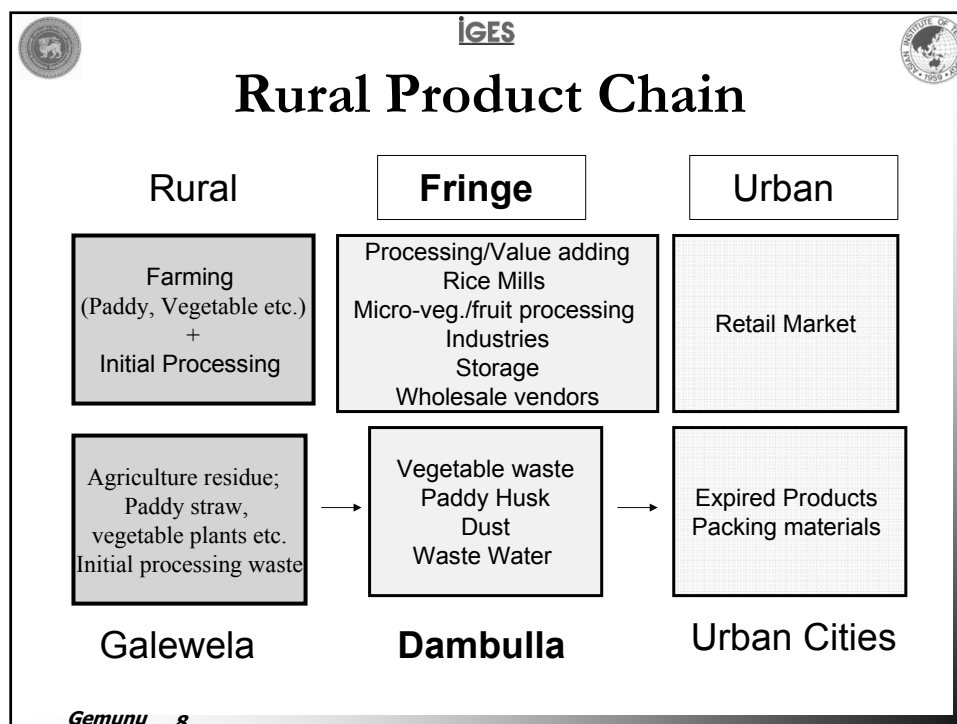
Agro Products

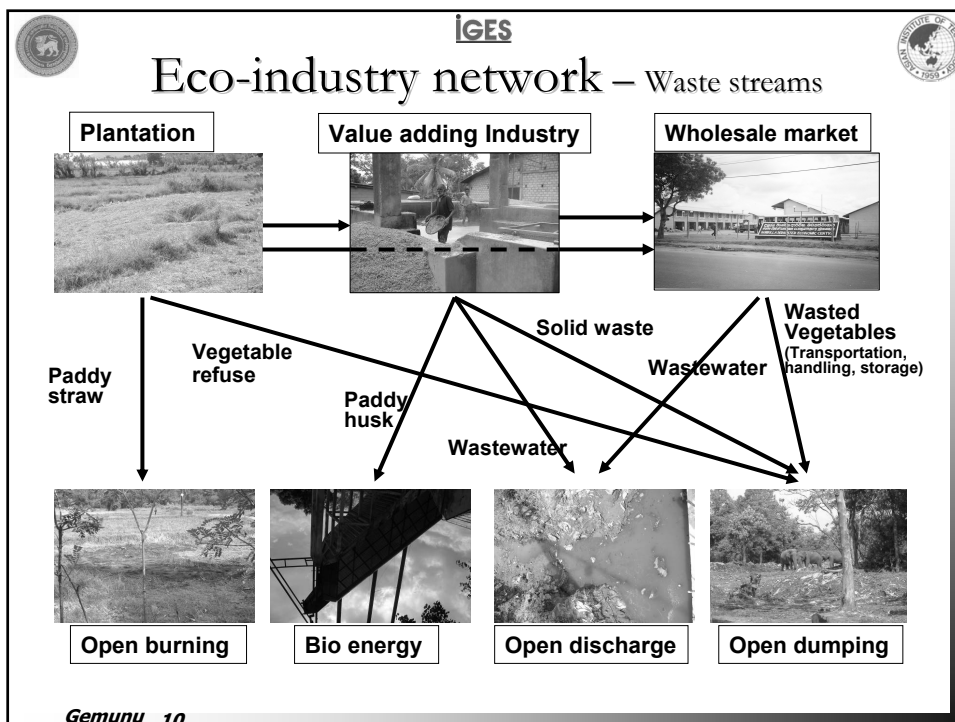
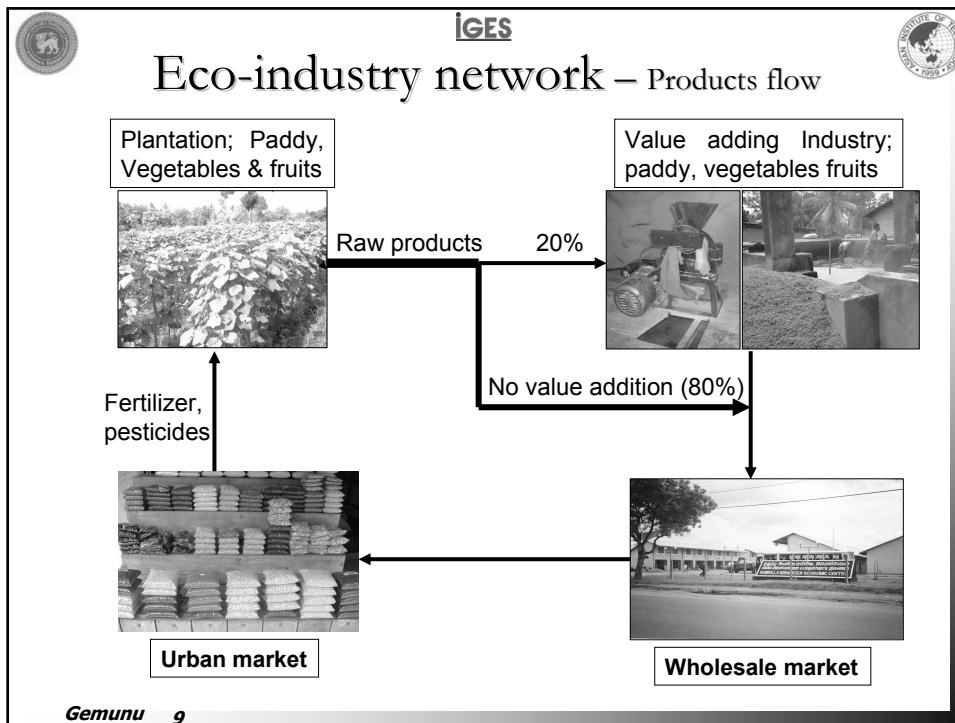
- Present earnings 18.6% of GDP,
- Total land under cultivation – 1,995,000 ha
- Export earnings from fruit & vegetable industry alone 150 million US\$ (2005)
- Agro based products overall growth overall 1.2% (2006)
- Post harvest losses – 40% in vegetable/fruit industry

Dambulla-Galewela

- Major crops Dambulla

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Strengths

- Well developed economic center (the biggest in Sri Lanka) for agricultural products in Dambulla
- Centralized location: connectivity to major cities, ports, and local markets
- Irrigation network
- Fertile flat land suited for agriculture
- Ample land availability
- Market for paddy husk for power generation
- Inflow of people

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Weaknesses

- Lack of proper infrastructure such as well developed road network
- Wastage due to poor post harvest technology and poor storage facility
- Lack of awareness on eco friendly waste recycling techniques and resource recovery in agro industry
- Poor waste management and indiscriminate disposal of agriculture residue
- Poor pollution control
- Lack of necessary infrastructure such as industries
- Variable market prices - no preserving, storage facilities
- produce more waste during low price periods

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Opportunities

- Establish collection centers
- Facilities for storage and processing of vegetables and fruits
- Invest on medium to large scale industries to process agro products. This will both give a good market price to farmers and also would reduce wastage
- Need for an efficient and cost-effective solid waste treatment and management programs

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Potentials

- Establishment of new industrial estates
- Seed packing, Processing & Canning of food products
- Organic farming practices - composting paddy straw etc.
- Introduction of modern - eco friendly technologies in agro product processing
- Introduction of vegetable/fruit preserving techniques
- Environmentally friendly business practices in agriculture waste management
- Infrastructure development

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Socio-Economic Impacts from EIC

- ✦ Reduce post harvesting losses and thus better price for the involved
- ✦ Increased local business opportunities
- ✦ Improved job opportunities and better income
- ✦ Poverty alleviation
- ✦ Increase in productivity
- ✦ Minimize environmental damage and clean bio fuel
- ✦ Food security

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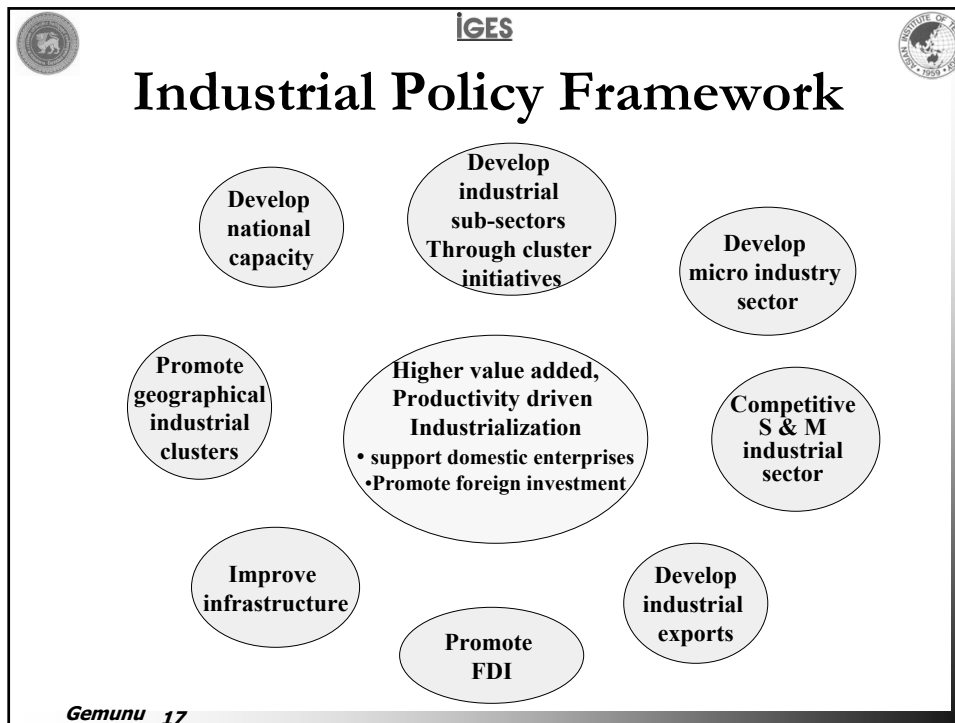
Agriculture Policy Objectives

“Mahinda Chintana” – 10 year plan 2006 to 2016

Shift from subsistence agriculture to a more Competitive agriculture

- Food security
- Minimize environmental degradation
- CBO involvement
- Technology dissemination
- Enhancing agricultural research
- Reduce post-harvest losses
- Providing Rural financing
- Stable Trade Policies
- Productivity enhancement

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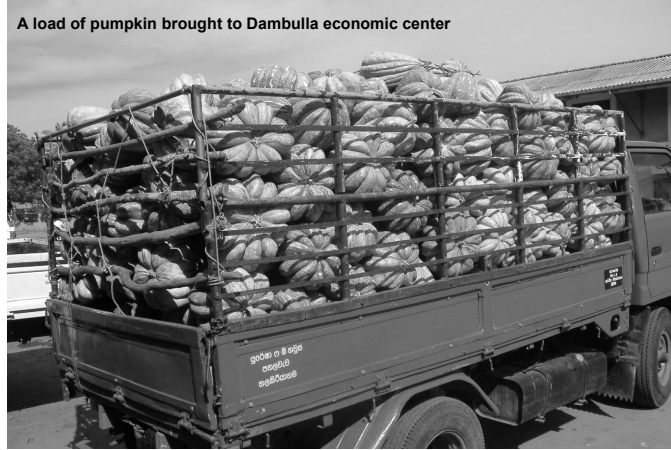
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- ## Conclusion
- Conditions necessary for EIC activation for bio-based industry are already exists among the;
 - Rural entrepreneurial spirit,
 - Locational urban fringe area - advantages
 - Potential urban markets
 - Present activities in the urban fringe area are constrained by lack sufficient infrastructure like roads and appropriate technologies.
 - Improvements will offer better employment opportunities, better prices etc. resulting in improved standards of living and thus alleviating the rural poverty
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A load of pumpkin brought to Dambulla economic center



Thank you

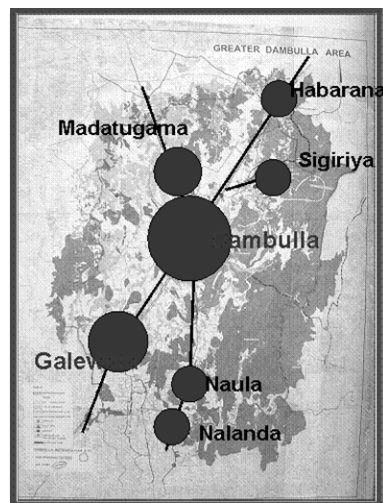
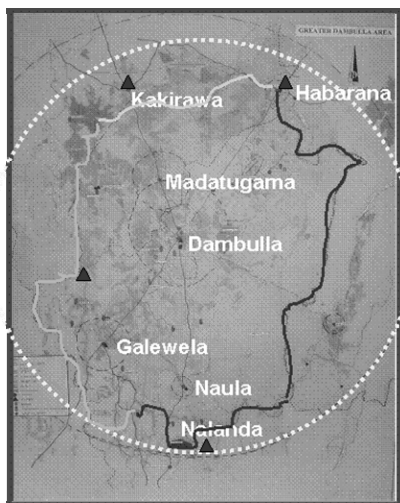
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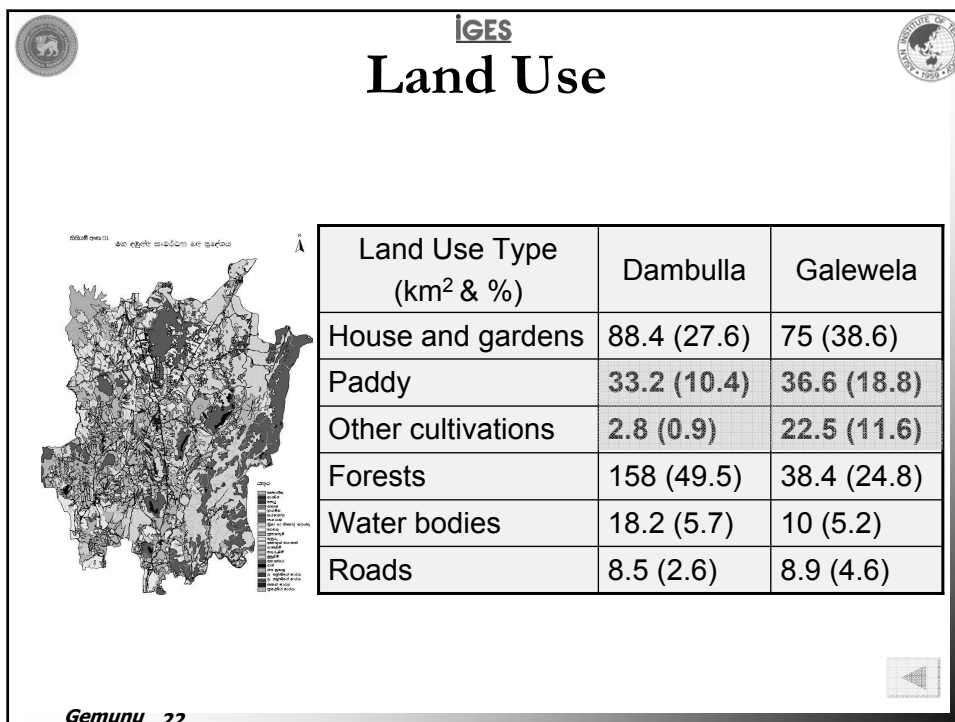
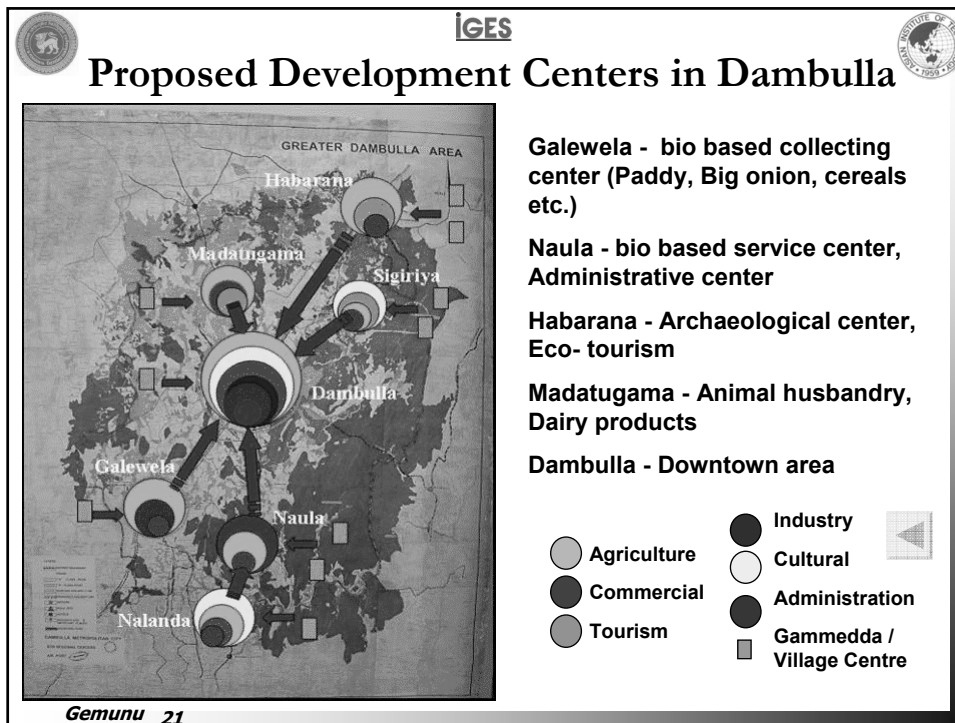
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Dambulla Development Zone (Possible industry clusters in Dambulla)




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Employment by Industry Sector (2001)

Employment Industry sector	DS Division (Number)		
	Dambulla	Galewela	District
Agriculture	13,408 (60.7%)	10,215 (55%)	61,436
Fishing	42	33	124
Mining and quarrying	113	104	1,695
Manufacturing.	1,891 (8.6%)	2,133 (11.5%)	16,556
Construction	665	636	5,372
Private traders	2,440	2,461	17,272
Public administration and services	1,839	1,203	12,657
Industry in elementary occupations	1,678	1,802	12,598




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Major Crops



Crop (cultivations)	Dambulla (ha)	Galewela (ha)
Paddy	2,500	2,150
Big inions	3,200	3,200
Cone	1,000	180
Banana	200	400
Tomato	200	85
Chili	150	180
Cucumber	150	150




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Dambulla Economic Center



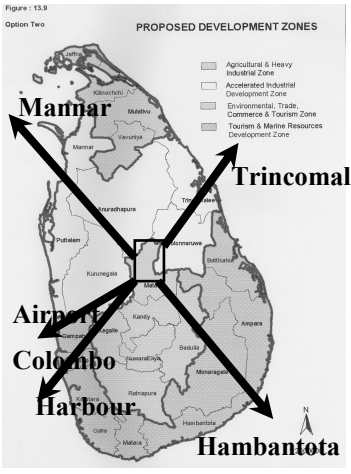
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Centralized Location

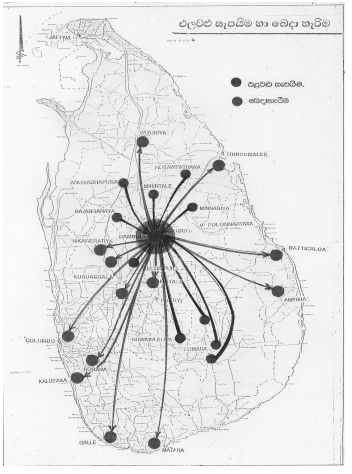
Figure : 13.9
Option Two

PROPOSED DEVELOPMENT ZONES





Major Export & Import Points

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Local Agro product supply network

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Poor Technology and Storage Facilities







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Lack of Awareness on Technologies for Resource Recovery





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Poor Waste Management and Pollution Control

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Need of Larger Industries

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Solid Waste Management

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Price Variation of food crops

Price variation in 2005 - TOMATOS

Price variation in 2006 - TOMATOS

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