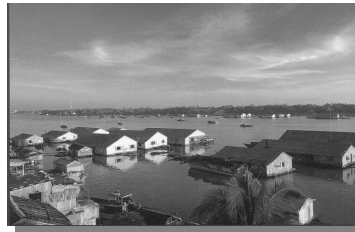
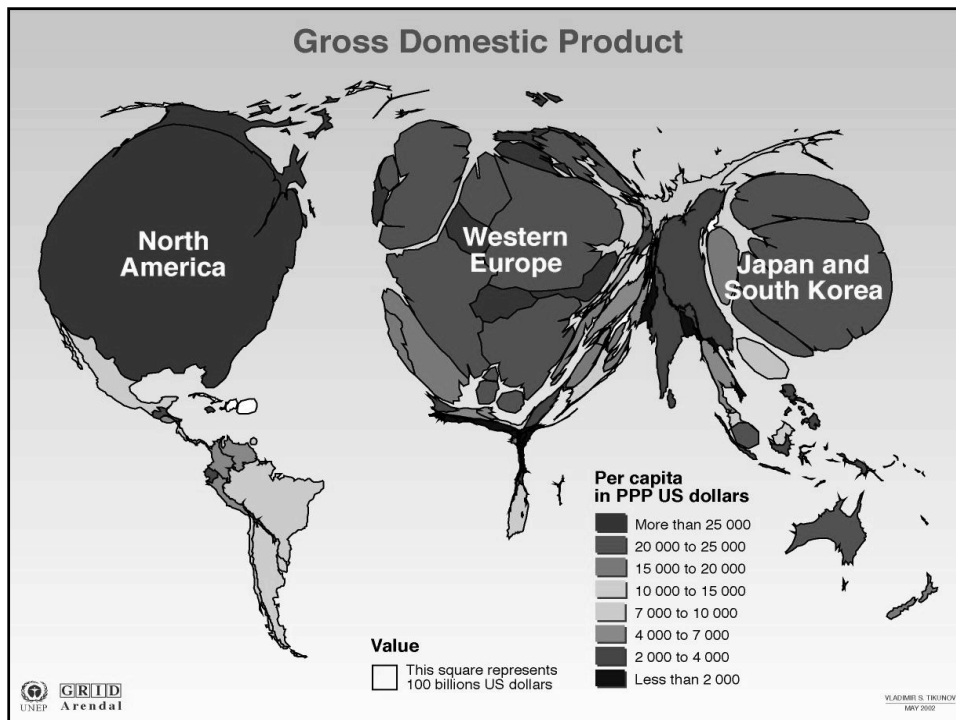


Eco-Industrial Clusters

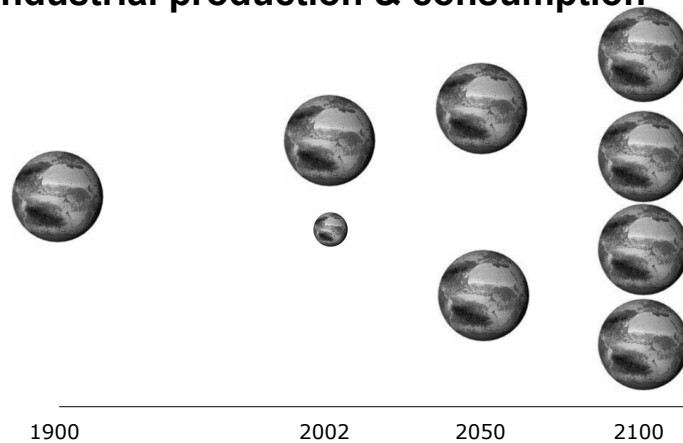
Enhancing Regional Economic Development through Environmental Linkages



V. Anbumozhi
 Kansai Research Centre
 Institute for Global Environmental Strategies



Two planets needed by 2050 If we all keep/adopt the western patterns of industrial production & consumption

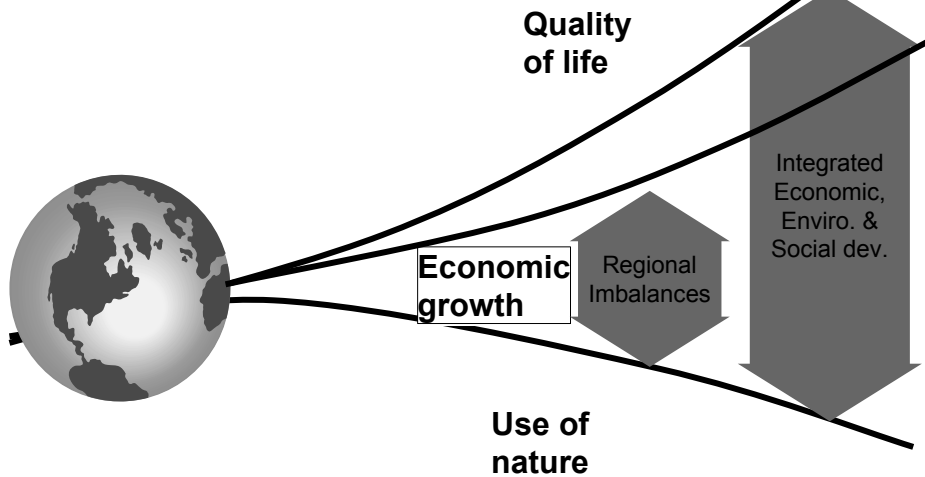


Inequalities in Production and Consumption

- ◆ The overall industrial consumption of the urban centres of the world is 26 times that of the small towns (UNEP).
- ◆ 1.3 billion people live on less than US \$ 2 a day – most of them in rural regions (UNCRD).
- ◆ More than 880 million – mostly in urban-fringe areas lack access to health and sanitary services (UNDP).
- ◆ In Vietnam, 19% of urban borrowers living above \$2 a day use their loan for investment rather than consumption, 55% of rural borrowers living less than \$2 a day invest in enterprises (IDE).



Sustainable Development Challenge



What can we do?

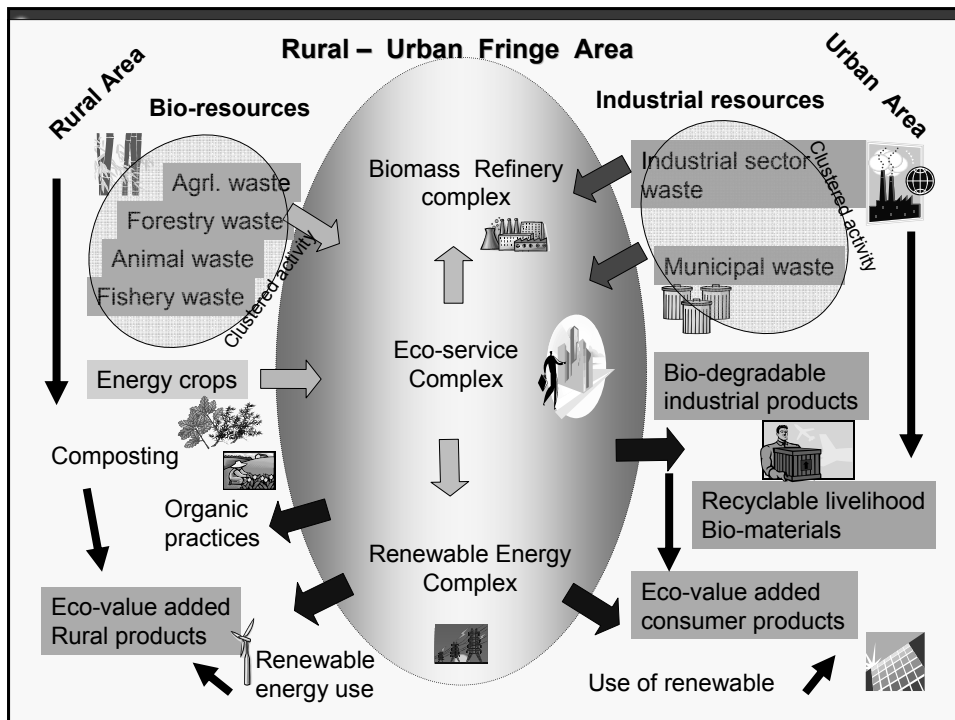
- Change industrial consumption in urban areas & production systems in rural areas
- De-couple economic growth from environmental degradation
- Increase the overall resource efficiency
- Up-shifting, Down-shifting



What is an EIC?

A community of business; geographic concentration of interconnected companies in a specialized field that cooperate with each other and with local community to efficiently share resources (materials, energy, water, infrastructure, information, finance, etc)-, leading to improved environmental quality, economic gains, and equitable enhancement of human resources for both the business and local community.

- EIC is about resource efficiency
- Inter-firm networks, active involvement of businesses .
- Cross-cutting in character,
- wide range of locally-adapted policy responses.
- Meeting the socio-economic needs of a region a sustainable manner
- Integrating economic growth with environmental preservation



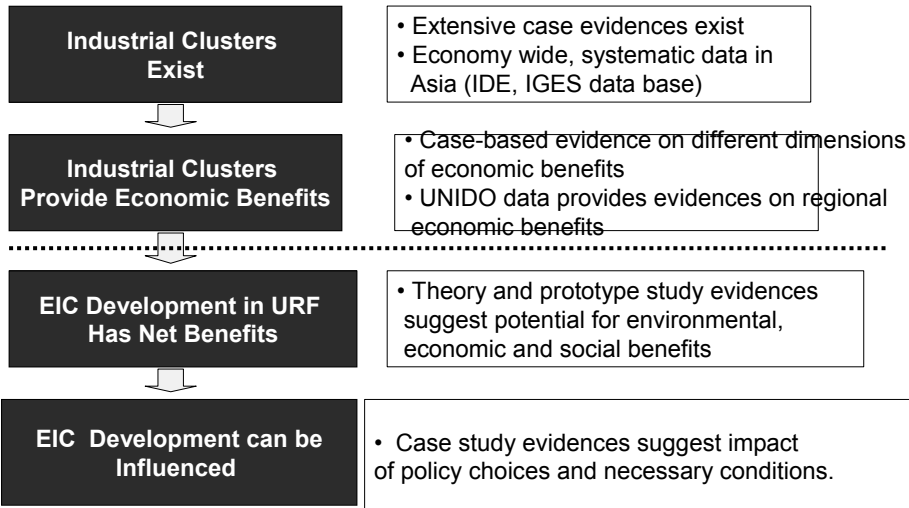


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Outline of the IGES Policy Brief #8

- 1 Industrial development, eco-restructuring and Sustainable Development issues
2. How EICs benefit local communities, environment and economy?
3. What are the challenges in establishing EIC?
4. How to promote EICs?
5. Policy Implications

EIC Based Regional Development (Key Hypothesis of IGES study)

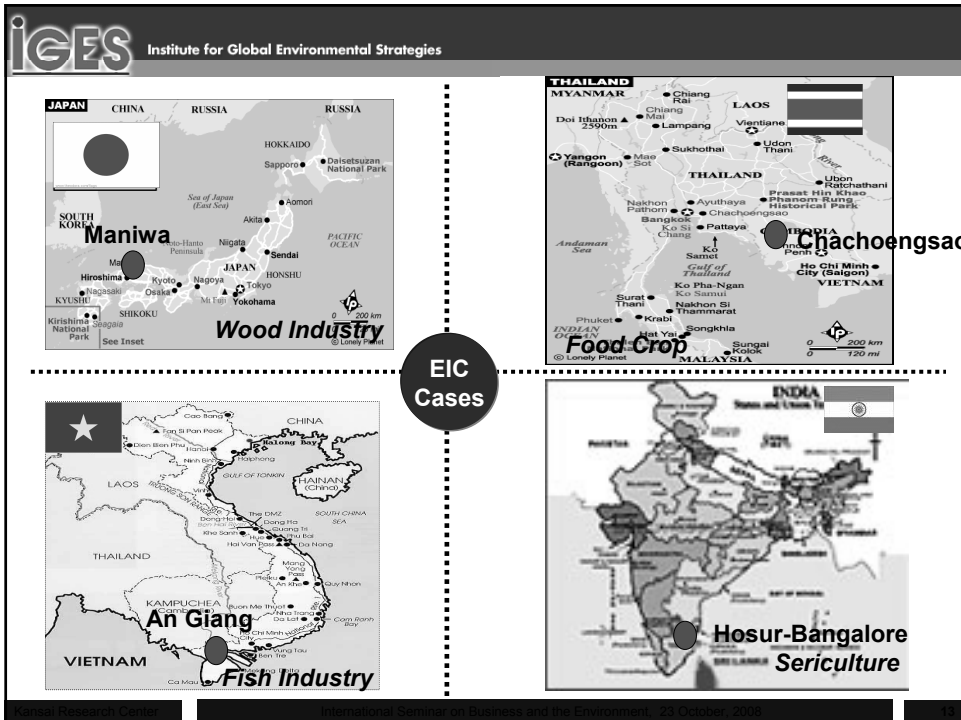


Asian Industrial Clusters & Economic Benefits

- Industrial clusters exist in automobile, electronics, high-techs, metal, machinery works etc.....

Do urban-rural fringe areas of resource rich regions in low wage countries have comparative advantages?

- Our answer is NO. These regions will never succeed in industrialization, if they focus on the development of inappropriate industries.

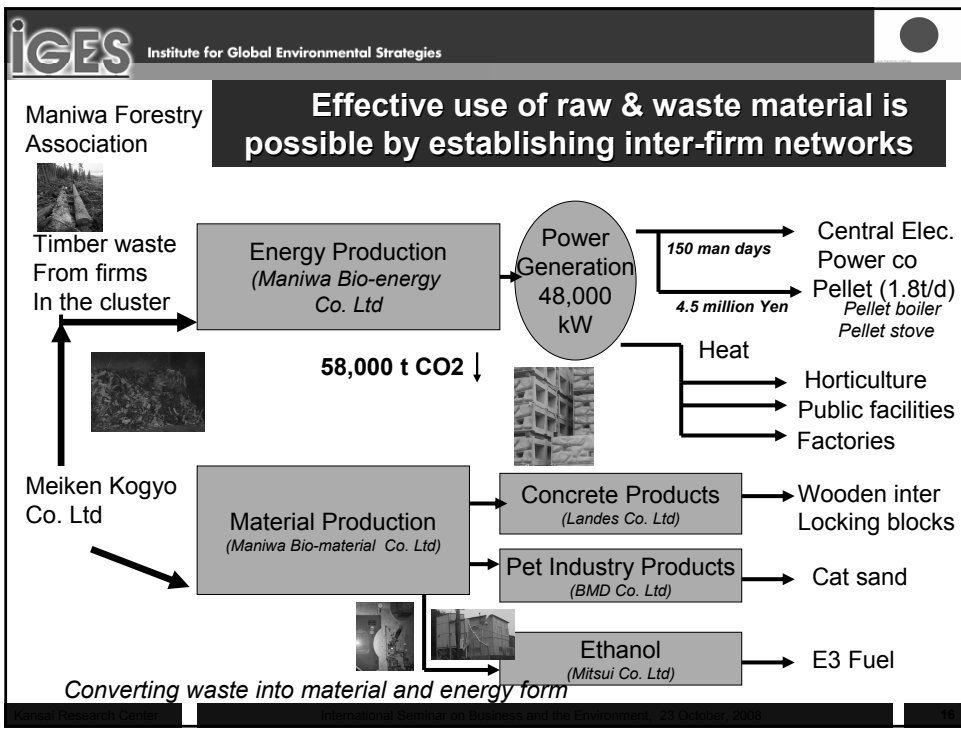
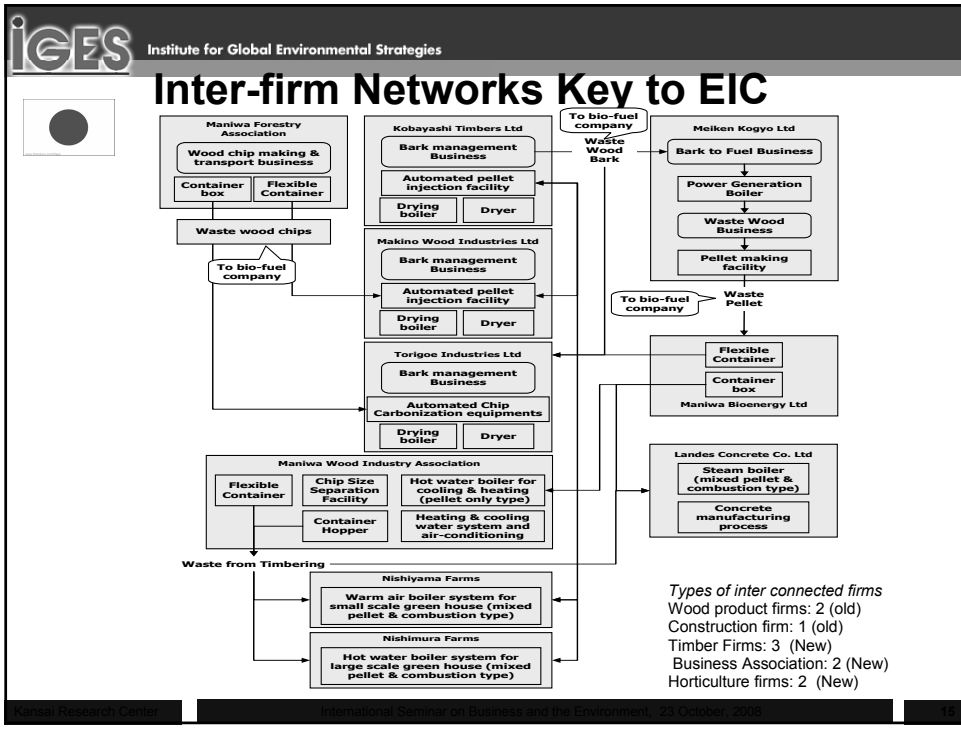


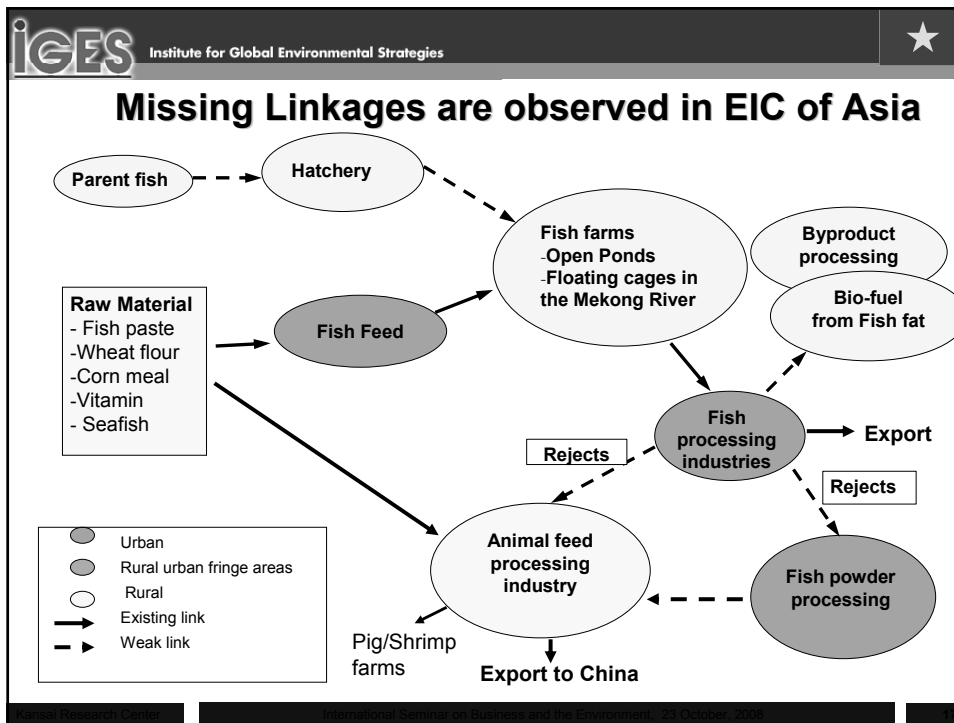
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Eco-industrial Clusters in URF Areas

- ❑ Small businesses of bio-industries tend to form clusters and inter-firm networks evolve because of the agglomeration of economies.

- ❑ The productivity and cost benefits linked to EICs are (i) effective use of raw and waste materials (ii) access to knowledge & technology (iii) employment generation and (iv) complementary eco-product development.





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Increased Socio-economic benefits are available from fully functional Eco-Industrial Cluster

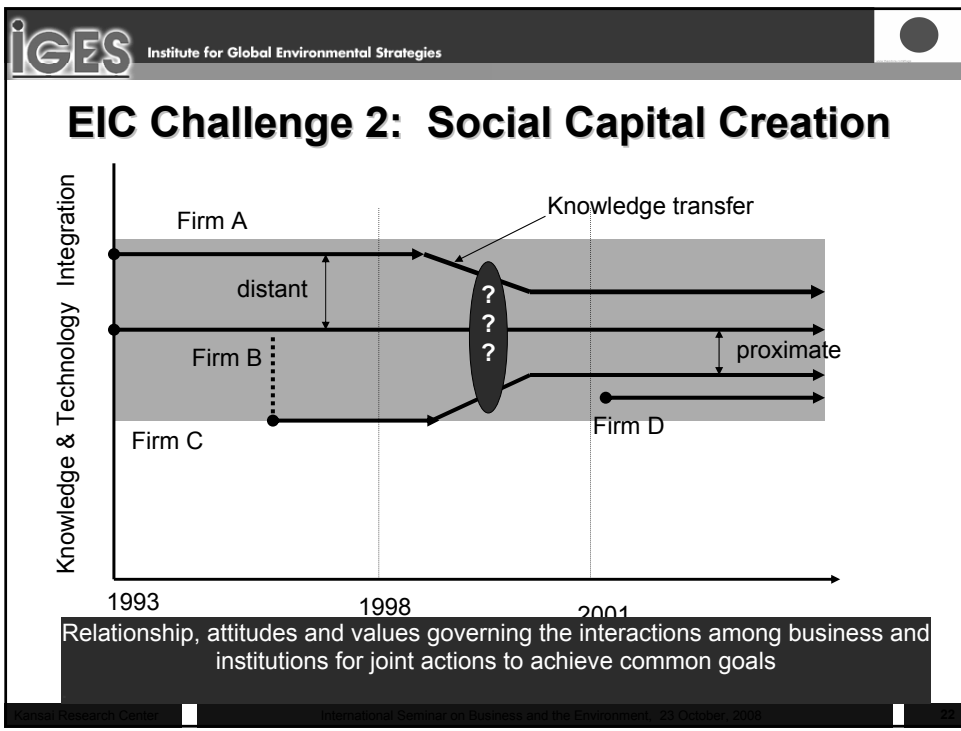
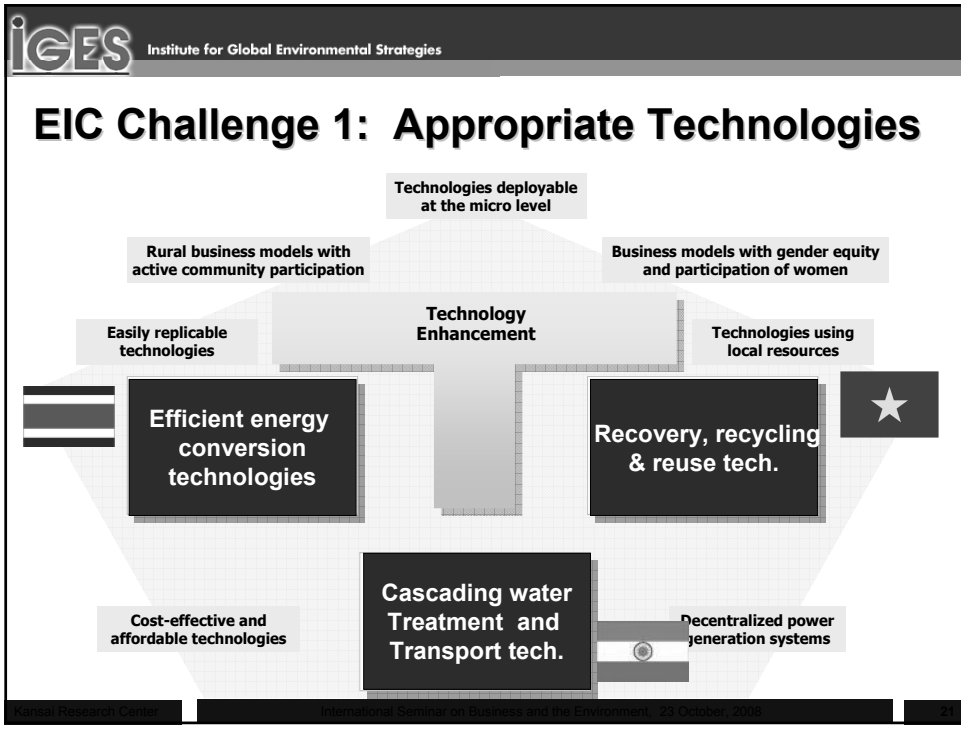
Enterprise	Average annual production	Labour requirement	No of labourers
Fish feeding	1916 ha	13persons/ha	23,870
Fish processing	179,000 tons	28.125 tons/person	6,365
Fish food processing	15,000 tons	120 tons/person	125
Animal food processing	2,200 tons	15 tons/person	147
Bio-diesel	22,000 tons	270 tons/person	82
Compost	19,000 tons	70 tons/person	272
Biogas	2000 pigs	100 pig/person	20
Total			30,881

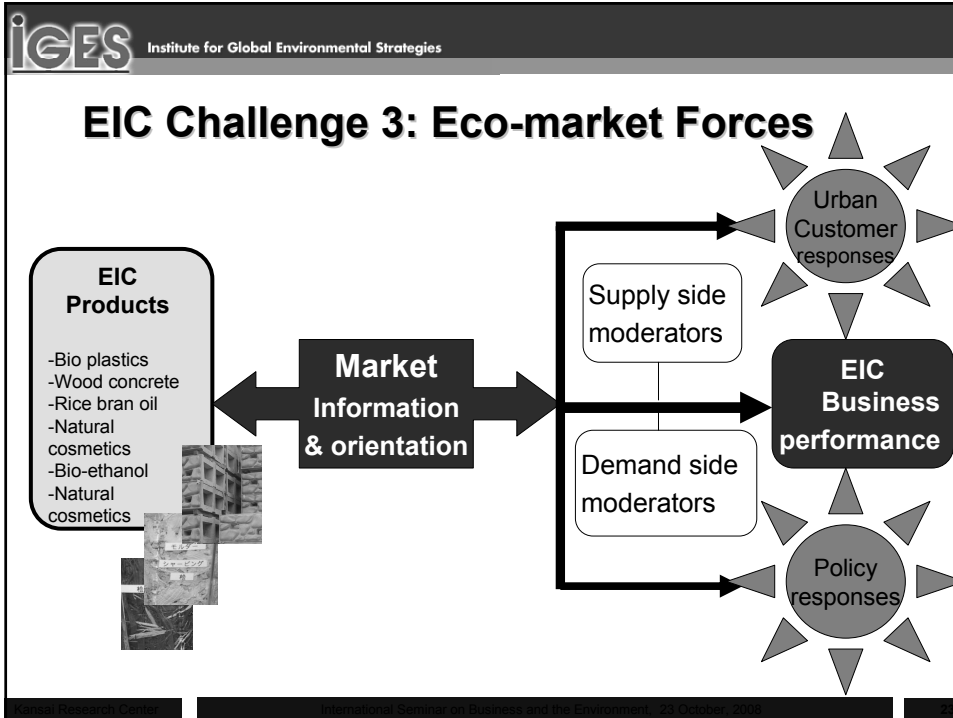
A Comparative Evaluation of Key Elements

Key Factors	Countries and Industrial Clusters			
	India	Japan	Thailand	Vietnam
	Sericulture, Hosur	Wood, Maniwa	Rice, Chachoengsao	Fish, An Giang
Small businesses	120	72	60	175
Nature of Market	Supply-led, mainly secondary towns	Demand-led, domestic	Demand-led, regional, passive exports	Demand-led, mainly export, limited domestic
Key Players	Producers & Development Assistance Policy	Lead firms & Environmental Policy	Large Firms & Social Development Policy	Foreign Buyers & Industrial Policy
Evidence of Inter-firm Networks	Weak bilateral linkages.	Extensive multilateral cooperation focussed on supply chain	Effective horizontal linkages	Extensive subcontracting.
Key Benefits	Product/market diversification, Employment	Zero-emission, Eco-product development	Waste management, Income generation	Improved water quality, Employment generation
Role of Community & Support Institutions	Limited. Disabling labour market pooling	Significant. Positive intermediate input effects	Important. Potential for significant technology spill over	No local but some central institutions; Improved market access
Major Constraint	Social Capital	Policy Conflicts	Enabling Technology	Integrated Policy

Key Challenges in Activating EICs

- ❑ Enabling Technologies
- ❑ Social Capital Creation
- ❑ Eco-market Forces





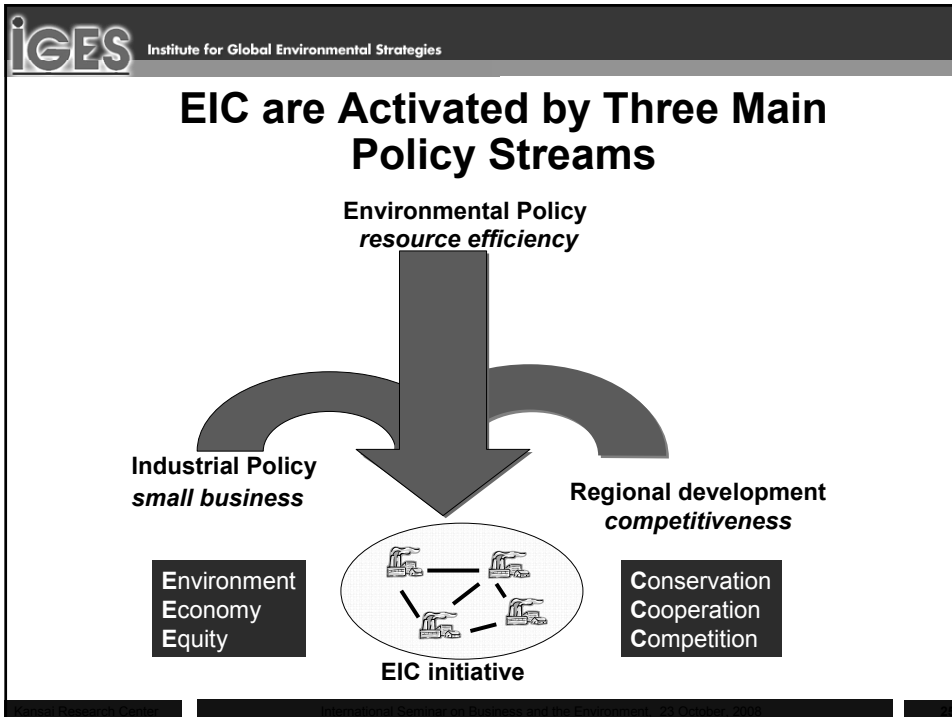
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Findings: EIC & SD Benefits

- Eco-industrial clusters develop slowly in an **evolutionary, path depended process.**
- Some of the factors that drive EICs in URF are **inherited** (location, resources, social capital etc) or externally given (technology, knoweldge and chance events)
- However, while these factors are important, the do **NOT** determine the evolutionary path of an EIC

↓

Policy choices or the decisions for a particular regulation is an important for EICs to attain its sustainability potential.



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Policy Streams that Support EIC

Policy Stream	Cluster Focused Intervention
Industrial Policy	<ul style="list-style-type: none"> - Supporting the common infrastructure needs of group of small and medium companies - Incentives for insertion of green materials, products and services in local and global value chain. - Collaborative R&D investments to support commercialization across sectors.
Environmental Policy	<ul style="list-style-type: none"> - Umbrella permit for a group of firms operating within a cluster. -Target the assistance to cluster based firms to innovate by technology & knowledge transfer -Consensus on cluster wide environmental agenda and economic priorities by promotion of the idea of cooperation by bottom up approaches.
Regional Development Policy	<ul style="list-style-type: none"> -Target the clusters as drives of competitive regions by increased use of untapped local resources. -Create public-private partnerships to attract investment and employees. - Engage the communities, producers and workers for collective action.

Current policy frameworks are fragmented and uncoordinated not as a result of negligence, but due to inconsistent understanding on the presence and importance of EICs

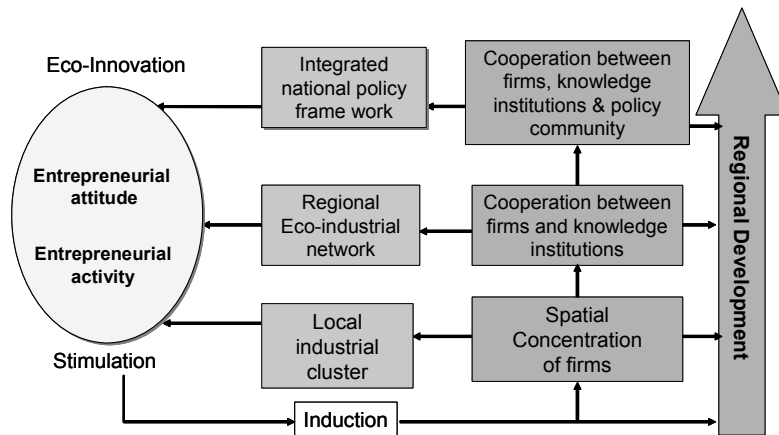
Policy Implications

- ❑ Adjust industrial policies to identify existing industrial clusters and strengthen inter-firm networks within them., Looking beyond urban-centred traditional manufacturing sectors and to have focus on new bio-based industries in urban-rural fringe areas will bring tangible economic benefits to the isolated inner regions.
- ❑ Expanded use and dissemination of low cost and easy type technologies need careful consideration by technology providers. Facilitating inter and intra cluster and if needed, international technology flow through agreements at different levels is an important alternative form of cooperation.

Policy Implication

- ❑ In order to attain full potentials of EIC, environmental regulatory instruments need to foster an entrepreneurial culture which is open to new ideas, encourage mutual linkages and raise prospects for cooperative actions in specific product value chains of the clusters.
- ❑ Estimation of the economic and environmental potentials of cluster development based on the factors such as locational advantages, infrastructure needs, social capital creation should be the target of regional development policies.

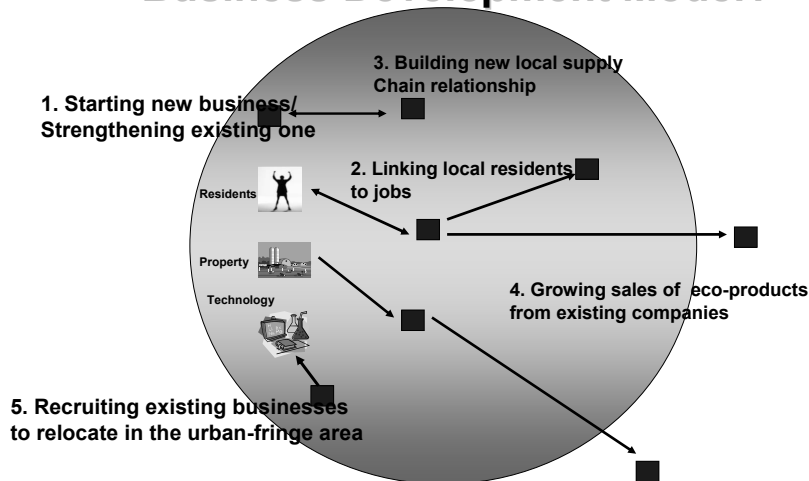
How to Create/Activate Eco-Industrial Clusters?



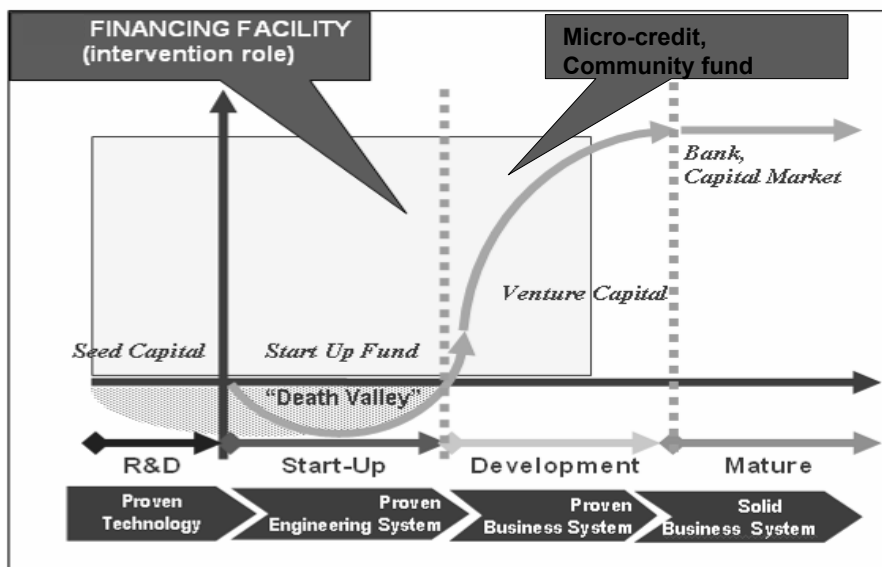
Objectives of the Seminar

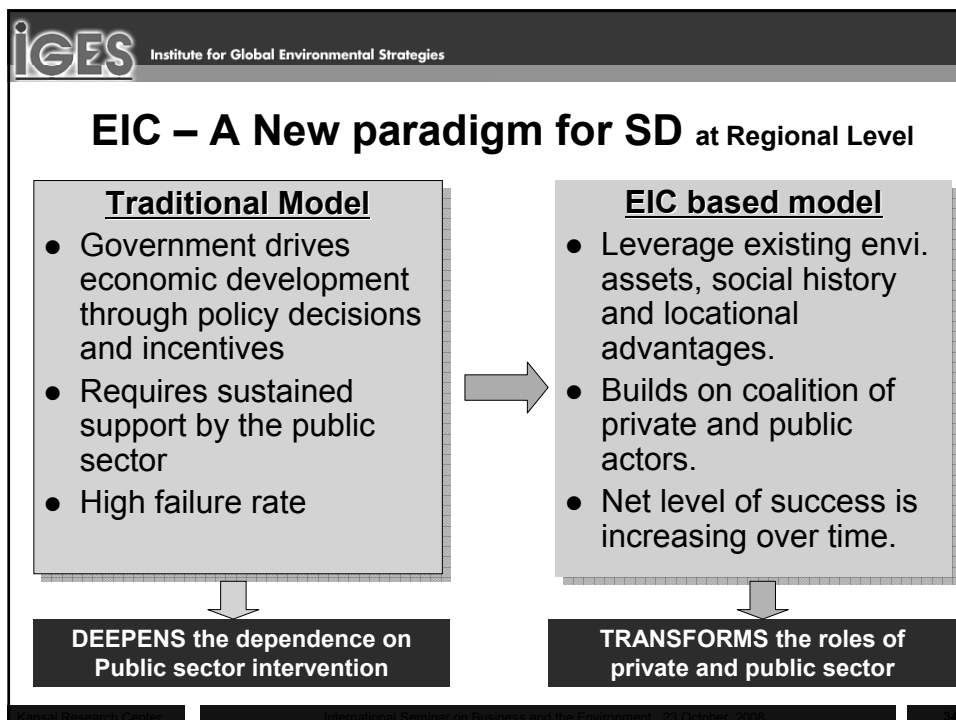
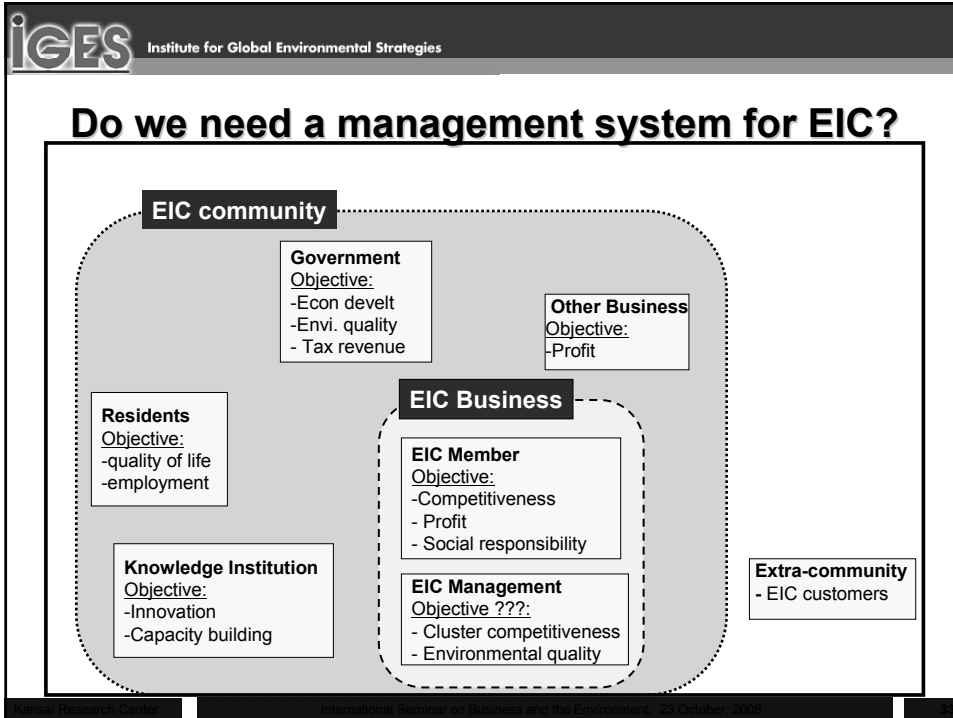
- ❑ How applicable are the recommendations of the Policy Brief to other emerging economies of Asia like China, Indonesia and Sri Lanka?
- ❑ How do we develop strategies for business to fully apply the concept of EIC to develop into an inclusive development model?
- ❑ What is the range of government's (Central, regional and local) appropriate role in facilitating the creation/activation of EICs, and how might this role vary in different settings?

How can we make EIC as an Inclusive Business Development Model?



When does an EIC need policy intervention?





Our special thanks to....

- Hyogo prefecture- Environmental Bureau
- Sumoto Municipal government
- Maniwa Municipal government
- Asian Institute of Technology - Thailand
- Bandung Institute of Technology - Indonesia
- University of Padjadjaran - Indonesia
- Tsinghua University - China
- Anna University - India
- Ho chi Minh City University of Technology – Vietnam

