

Insularity, informality and vulnerability:

The MFA of the island of Anjouan (Comoros)

Jean-Baptiste Bahers

Chargé de recherche CNRS

UMR ESO, Université de Nantes

Page perso : www.univ-nantes.fr/bahers-j



This work contributes to the field of investigation of island metabolism (Krausmann, Richter, et Eisenmenger 2014; Petridis et Fischer-Kowalski 2016) in a little explored aspect: the metabolic vulnerabilities of island environments. The article proposes a survey on the path of the analysis of the Material Flows Analysis (MFA) (Bahers, Barles, Durand, 2018) of the island of Anjouan (Comoros), which aims to overcome the constraints related to informal activities and the lack of a statistical data base. We have developed a grid for analyzing metabolic vulnerabilities, defined as the extension of environmental vulnerabilities to the social and territorial consequences of flow circulation. Thus, the understanding and the spatialization of the island metabolism allowed us to apprehend the metabolic vulnerabilities in their material, environmental and territorial dimensions (McFarlane 2013; Duro, Schaffartzik, et Krausmann 2018). Finally, island and emerging country metabolisms also present forces that deserve to be discussed in the light of South-North relations.

Slides



Insularity, informality and vulnerability: The MFA of the island of Ndzuwani (Comoros)

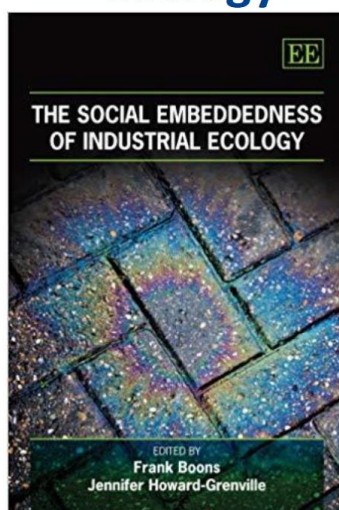


Jean-Baptiste Bahers,
CNRS Researcher
ESO Lab (Spaces&Societies),
Université de Nantes
Page perso : www.univ-nantes.fr/bahers-j

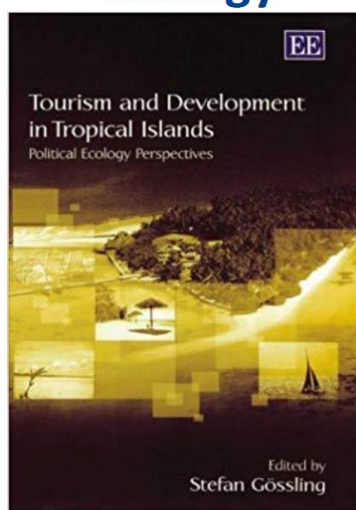
Island metabolism: a scientific archipelago

The three « ecologies » of the metabolism of islands

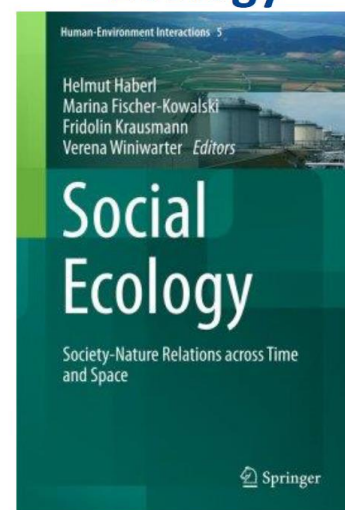
Industrial Ecology



Political Ecology



Social Ecology



The challenge of waste management and resources in SIDS*: Ndzuwani (Comoros)

*SIDS: Small Island Developing States



Waste emitted on Mutsamudu beach, Bahers, 2018



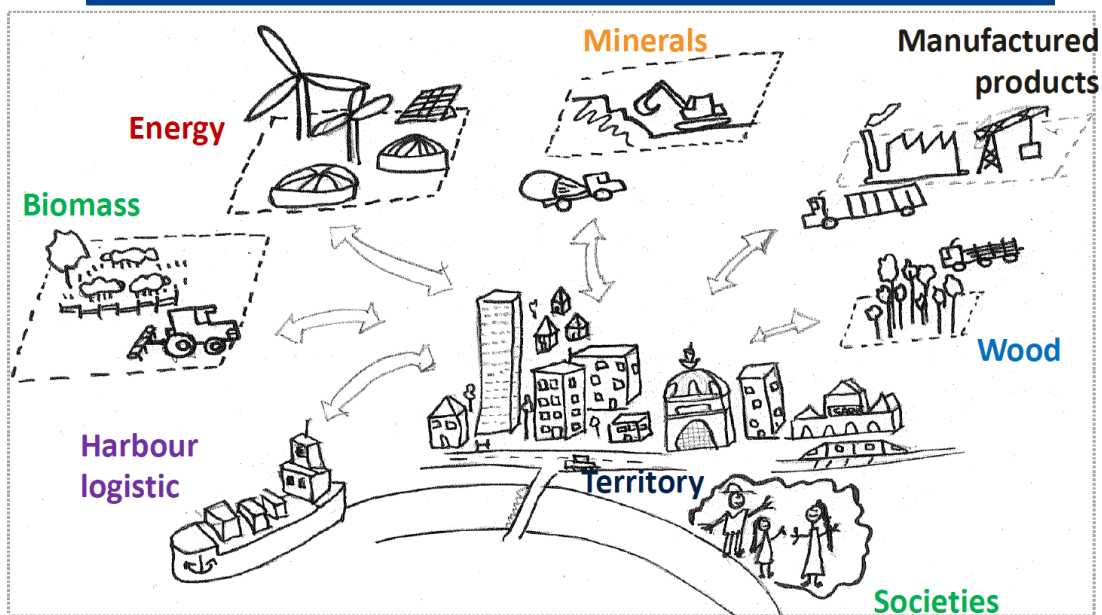
Scrap metal recyclers in Mutsamudu, Bahers, 2018



Old landfill in Fiji, Bahers, 2006

Research Hypothesis: Territorial Metabolism as Indicator of Island Constraints

The balances of power and forces between island territories and supply and emission territories



Figurative Representation of Territorial Metabolism, Bahers, 2017

Examining island vulnerabilities from a metabolic perspective

In what does knowledge of the circulation of material and energy flows through an island territory help us better grasp the vulnerabilities associated with its geographic isolation?



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Method: Survey for the MFA of Ndzuwani

Conduct of the survey in two stages: common framing and *in situ* observation



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Method: Survey for the MFA of Ndzuwani

Bottom-up method and informal economic activities:
towards a hybridisation of data sources

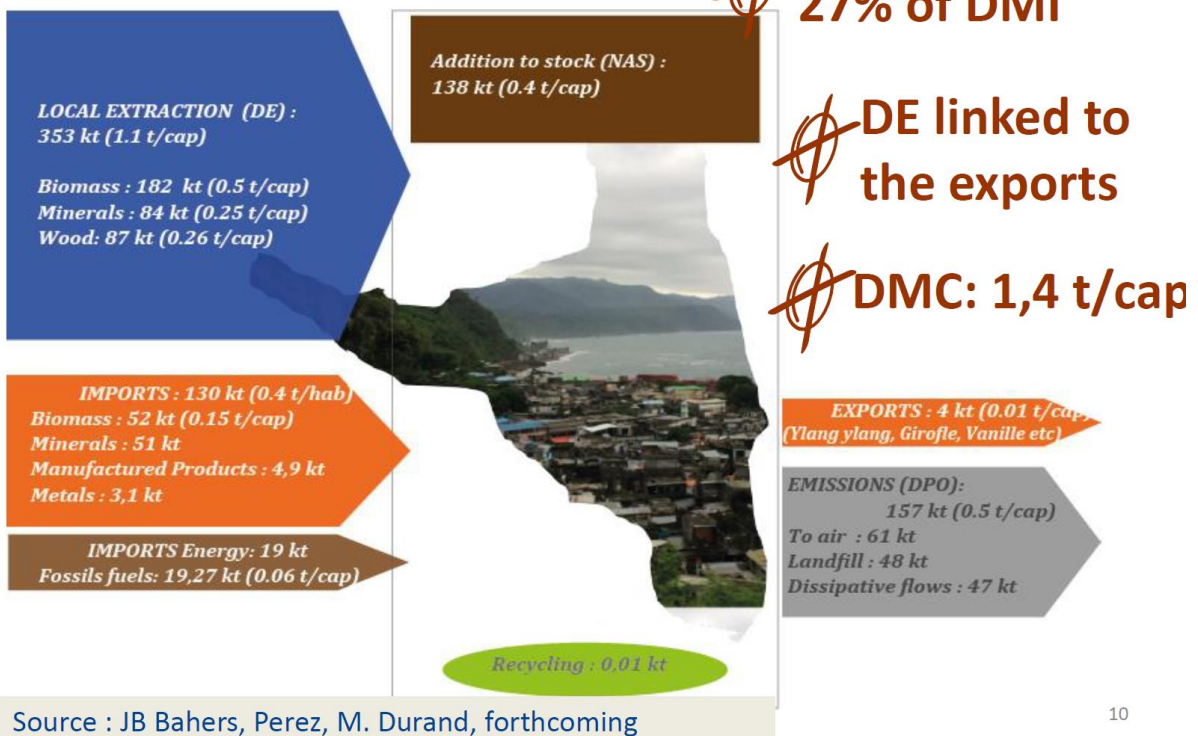


Sand collectors in the river
Source : Perez, 2018

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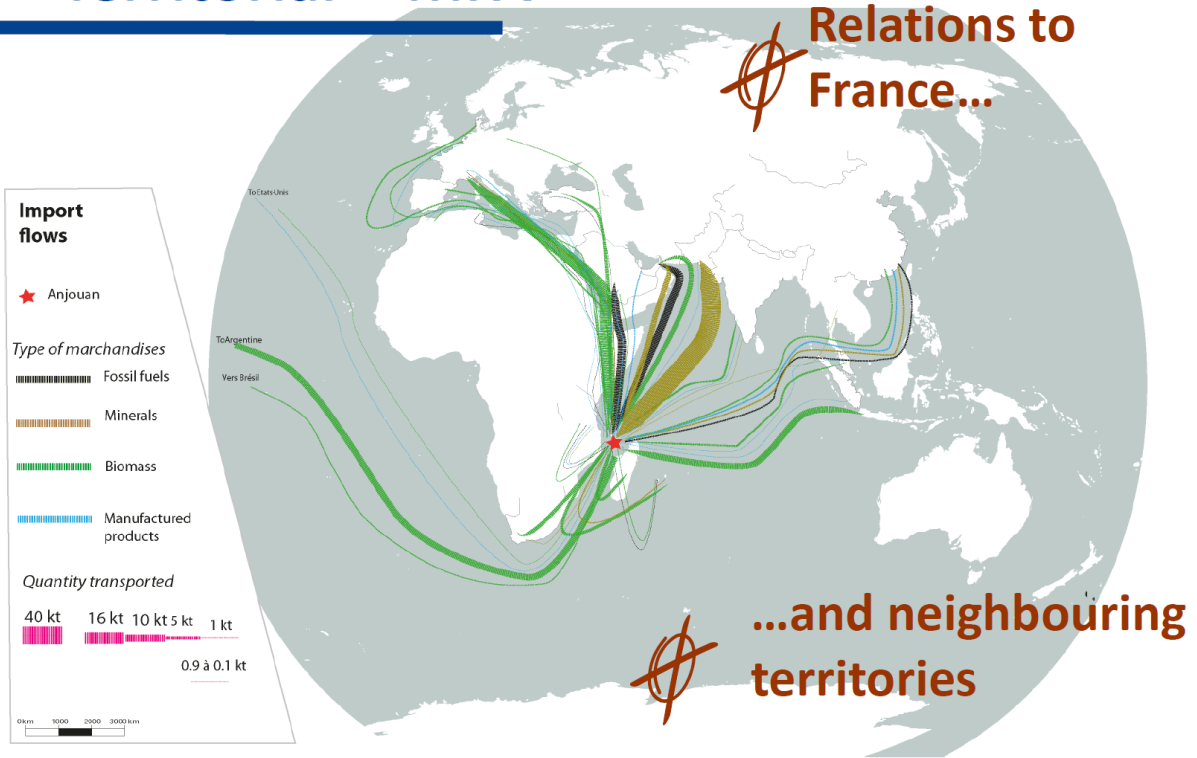
« Territorial » MFA

2016



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« Territorial » MFA



(Réalisation : Bahers, 2018 ; Source : Données du port de Mutsamudu 2016)

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Three situations of metabolic vulnerabilities

*The metaphor of the myth of Sisyphus:
Road sweeper that repels waste from the sea
(Source : Bahers, 2018)*



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Three situations of metabolic vulnerabilities

- Conflicts relating to “new” urban waste and the organic material cycle



Lack of supervision of the “controlled” Domoni dump (Source : Bahers, 2018)



Protests to the siting of a dump in Ouani (Source : Bahers, 2018)



Plastic waste on Mutsamudu beach (Source : Bahers, 2018)

Waste: 150kg/cap

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Three situations of metabolic vulnerabilities

Sand and infrastructure: the social and environmental consequences of material flows on territorial metabolism

Informal worker collecting sand on the coast (Source : Perez, 2018)



A collapsed road at Mutsamudu (Source : Bahers, 2018)



"I extract a quantity of 30 buckets a day. When I arrive at a quantity of 4m³, about 1 month to get there, I sell the sand at 50 000 Frc [about 100 Euros]" (Interview worker extracting the sand from the Ouani River, 2018).

20% of DE-minerals → informal

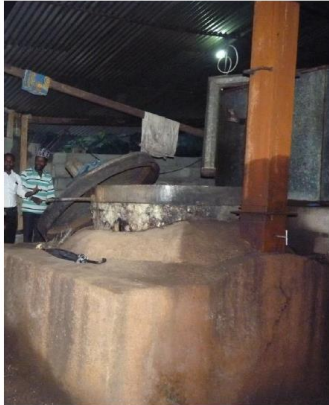
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Three situations of metabolic vulnerabilities

The economic relationship between a resource (wood) and the export of goods (ylang-ylang essential oil)



Ylang-ylang still (Source : Bahers, 2018)



Distillation site with store of cut wood (Source : Durand, 2018)



Ylang-Ylang

“Most of the time they task get a logger with to selecting and cutting the tree, but don’t replant after wards” (Interview with NGO mission, 2018).

 **Area of deforestation : *2 in 20yrs**¹⁵

Discussion & conclusion

On the usefulness of critical MFA: the role of *in situ* study of island metabolism

An informal and sober economy to resist vulnerabilities

From “environmental vulnerabilities” to “metabolic vulnerabilities”

Thanks – jeanbaptiste.bahers@univ-nantes.fr

