Complex Rice Systems

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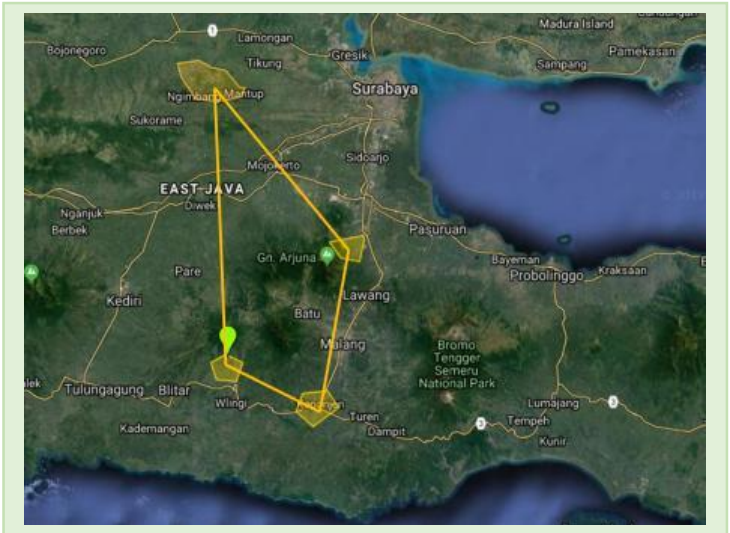
Geographic and demographic information

Country	Indonesia
Province	East Java
District	Lamongan, Pasuruan, Malang, Blitar
Size of geographical area (four districts)	Land: 8,380 km^2
Number of indirect beneficiaries (four districts)	6,670,000 persons (Men: 3,336,000 persons) (Women: 3,334,000 persons
Dominant ethnicity	Javanese and Madurese



Size of project area	25.5 km^2
Number of direct beneficiaries	350 persons (Men: 190 persons) (Women: 160 persons)
Geographic coordinates (longitude and latitude)	7º08′31.95″S-112º23′46.9″E 7º40′58.79″S-112º40′19.77″E 8º09′25.35″S-112º32′41.24″E 7º57′29.08″S-112º19′55.83″E
Dominant ethnicity	Javanese and Madurese

Ecosystem Types

	Forest		Grassland	x	Agricultural		In-land water
	Coastal		Dryland		Mountain		Urban/peri-urban

Important species in the site

English common name (*Local name*)	Scientific name	Description
Javanese runner duck	*Anas platyrhynchos Javanicus*	Commonly found after rice harvest in traditional Javanese rice field to eat leftover rice grain
Rice	Oryza sativa	Staple food of Indonesian
Silver rasbora	*Rasbora argyrotaenia*	Commonly found in the water body of traditional Javanese rice field

General introduction

East Java is the biggest rice producer province in Indonesia. However, their majority of rice is produced under conventional production systems, which produce high yields, but is dependent on agro-chemicals, having detrimental effects to the environment. On the other hand, moving to organic rice production systems are environmentally more sustainable but produce low rice yields that may threat food security.

Our project aimed to develop bio-diversified rice-based farming systems by combining diverse plant and animal species and integrated sustainable rice cultivation methods, referred to as complex rice systems (CRS), with the ultimate goal to improve rice yields along with yield stability in an ecological way.

To support the development of CRSs we conducted participatory experiments and farmer field schools (FFSs) in four districts of East Java, Indonesia. The experiments were set in a gradient complexity from monoculture to the most complex systems consisted of compost, azolla, fish, ducks, and border plants. FFS as a means of knowledge transfer and CRS adaption were modified and simplified to comply with our objectives. By modifying the FFS method, feedback from farmers was generated for adaptation measures of CRSs to the contextual conditions (socio-economic and biophysical conditions). Meanwhile, simplification improved the cost-effectiveness of the FFSs.

Monoculture rice before the project

Complex rice system implementation

IPSI-7 Working Group B

Contribution to Aichi Biodiversity Targets' Strategic Goal B

		Breakdown Target	How did you measure the outcome?	Result
Strategic Goal B	TARGET 5	The rate of loss of forests is at least halved and where feasible brought close to zero		
		The loss of all habitats is at least halved and where feasible brought close to zero		
		Degradation and fragmentation are significantly reduced		
	TARGET 6	All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches		
		Recovery plans and measures are in place for all depleted species		
		Fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems		
		The impacts of fisheries on stocks, species and ecosystems are within safe ecological limits, i.e. overfishing avoided		
	TARGET 7	Areas under agriculture are managed sustainably, ensuring conservation of biodiversity	Monitor the use of inputs for production, plant and animal diversity, as well as beneficial organisms	- At least 8 experimental rice farms have eliminated the use of pesticides and herbicides and more than 50% artificial fertiliser reduced. - Natural enemies and detritivores are more abundant - Frogs, eel, and bumble bees significantly appear
		Areas under aquaculture are managed sustainably, ensuring conservation of biodiversity		
		Areas under forestry are managed sustainably, ensuring conservation of biodiversity		
	TARGET 8	Pollutants (of all types) have been brought to levels that are not detrimental to ecosystem function and biodiversity	Monitor the use of agrochemicals	At least 8 rice experimental farms eliminated the use of pesticides and herbicides.
		Pollution from excess nutrients has been brought to levels that are not detrimental to ecosystem function and biodiversity	Assess NH3 and NO3 concentration	NH3 concentrations in complex systems were lower than in conventional, but NO3 concentrations were higher, which need further study for their reduction.
	TARGET 9	Invasive alien species identified and prioritized		
		Pathways identified and prioritized		
		Priority species controlled or eradicated		
		Introduction and establishment of IAS prevented		
	TARGET 10	Multiple anthropogenic pressures on coral reefs are minimized, so as to maintain their integrity and functioning		
		Multiple anthropogenic pressures on other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning		

Relations to other Aichi Biodiversity Target & SDGs

Please indicate the Aichi Biodiversity Targets other than the targets your working group focuses and SDGs that your activities contribute to if any. Use "●*" and "*■" to indicate the "direct" or "indirect" contributions to the targets.

CBD Aichi Biodiversity Targets (https://www.cbd.int/sp/targets/)

Strategic Goal A				Strategic Goal B					
●	●					●	●		
									
Strategic Goal C			**Strategic Goal D**			**Strategic Goal E**			
■		●	●		■		■	●	
									

UN Sustainable Development Goals (SDGs) (https://sustainabledevelopment.un.org/sdgs)

●	●	●	■	●	●	■	●	■
								
●	●	●	●	●	●	●	●	
								

Any difficulties you found during your assessment

Our project covers four districts. Due to the distant and limited resources (tools/ equipment and costs), this moment the assessment is still intensively conducted in one location. Although the intensive experiments were only on 12 rice farms, but 80 farmers participated in these participatory experiments. The impacts might be higher than what has been measured, and thus need to be conducted in the near future.

Key messages for the CBD in planning for the post-2020 Targets

As the centre of many smallholder livelihood and human life, the link between agriculture & biodiversity should be given more room in the target goal. Addressing a specific target goal on biodiversity-related farming maybe can be more meaningful than combined with strategic goal for natural biodiversity conservation. Emphasizing the link to the SDGs would in turn make explicit strong focus on implementation, such as biodiversity-related farming. IPSI has a central role in facilitating networking and collaboration among its members, which can make better impacts, ensuring biodiversity implementation in many aspects. Therefore, IPSI should be continued for post-2020 target.