How to Intensify Organic Basmati Production in Uttarakhand, India?

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Background and Objectives

In the state of Uttarakhand in northern India, an ongoing agricultural development project aims at improving the livelihoods of smallholder farmers through the promotion of organic and fair-trade Basmati rice production. Parallel research activities seek to assess the effect of diverse irrigation and soil fertility management on farm-level sustainability. Research results will be used to improve management recommendations and support agricultural advisory services. Here, we present data on effects of irrigation and soil fertility management on yield and greenhouse gas emissions.

Materials & Methods

- Field trial at GB Pant University of Agriculture and technology
- Determination of yields and greenhouse gas emissions (CH_4 and N_2O)

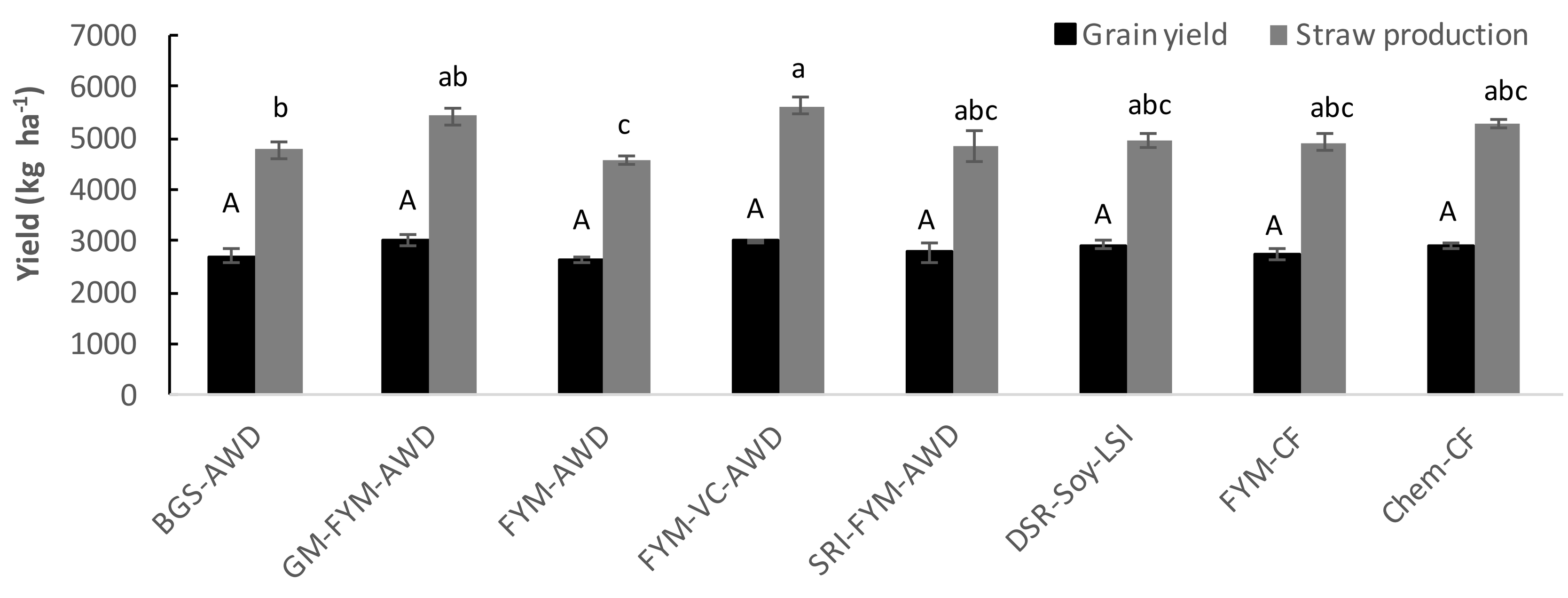
Treatments during kharif* (rice) season

	Abbreviation	Fertilizer Application	Water mgmt	Nutrient loadings (kg/ha)				
				OC	N	P	K	S
T1	BGS-AWD	Biogas slurry (10t/ha)	AWD	133	65	21	51	13
T2	GM-FYM-AWD	Green Manure & Farm yard manure (10t/ha)	AWD	553	190	34	75	22
T3	FYM-AWD	Farm yard manure (10t/ha).	AWD	183	88	19	38	11
T4	FYM-VC-AWD	Farm yard manure (10t/ha) & Vermicompost (5t/ha)	AWD	239	139	24	45	18
T5	SRI-FYM-AWD	System rice intensification & Farm yard manure (10t/ha)	AWD	183	88	19	38	11
T6	DSR-Soy-LSI	Direct seeded rice –Soy with Life saving irrigation	LSI	183	88	19	38	11
T7	FYM-CF	Farm yard manure (10t/ha).	CF	183	88	19	38	11
T8	Chem-CF	Chemical applications (70 kg N : 30 kg P_2O_5 : 30 kg K_2O /ha)	CF	43	70	7	13	0

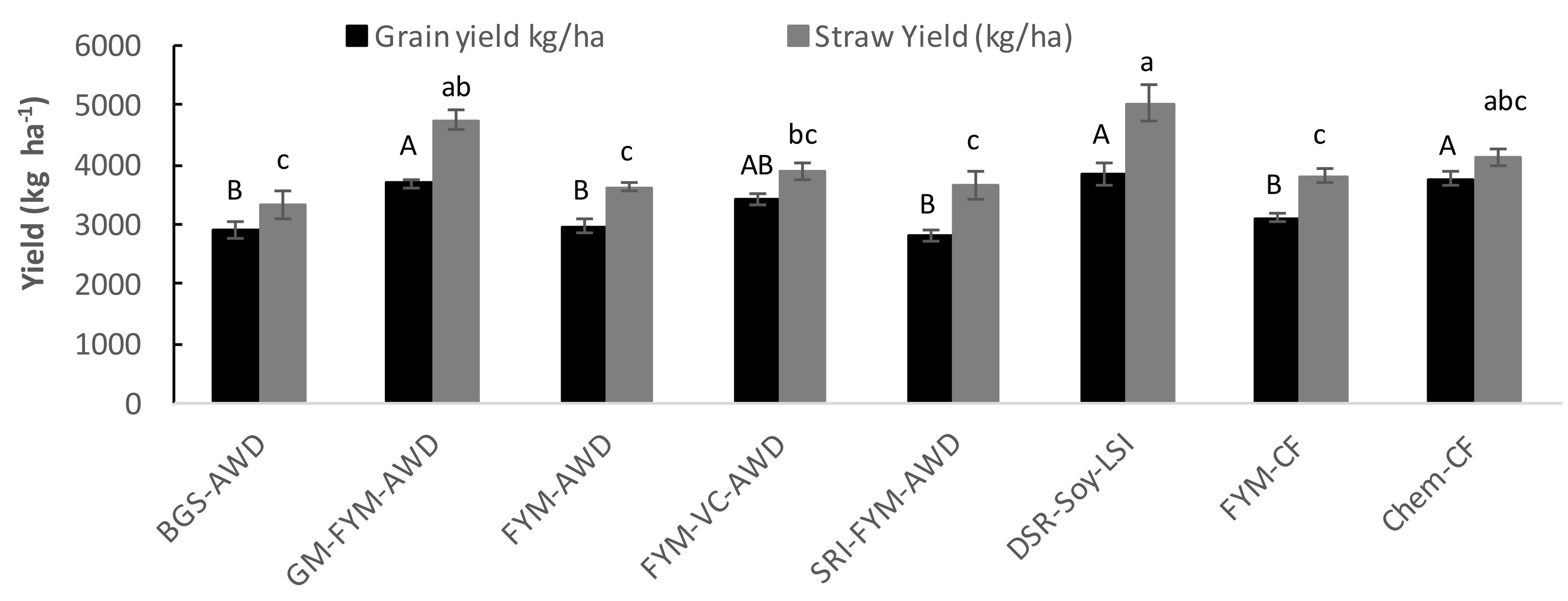
AWD = alternative wetting and drying, CF = continuous flooding, LSI = Life saving irrigation. *During rabi (wheat) season, LSI was deployed. All organic treatments received 7t FYM and 5t VC. The chemical control received 120-60-40 kg NPK.

Results

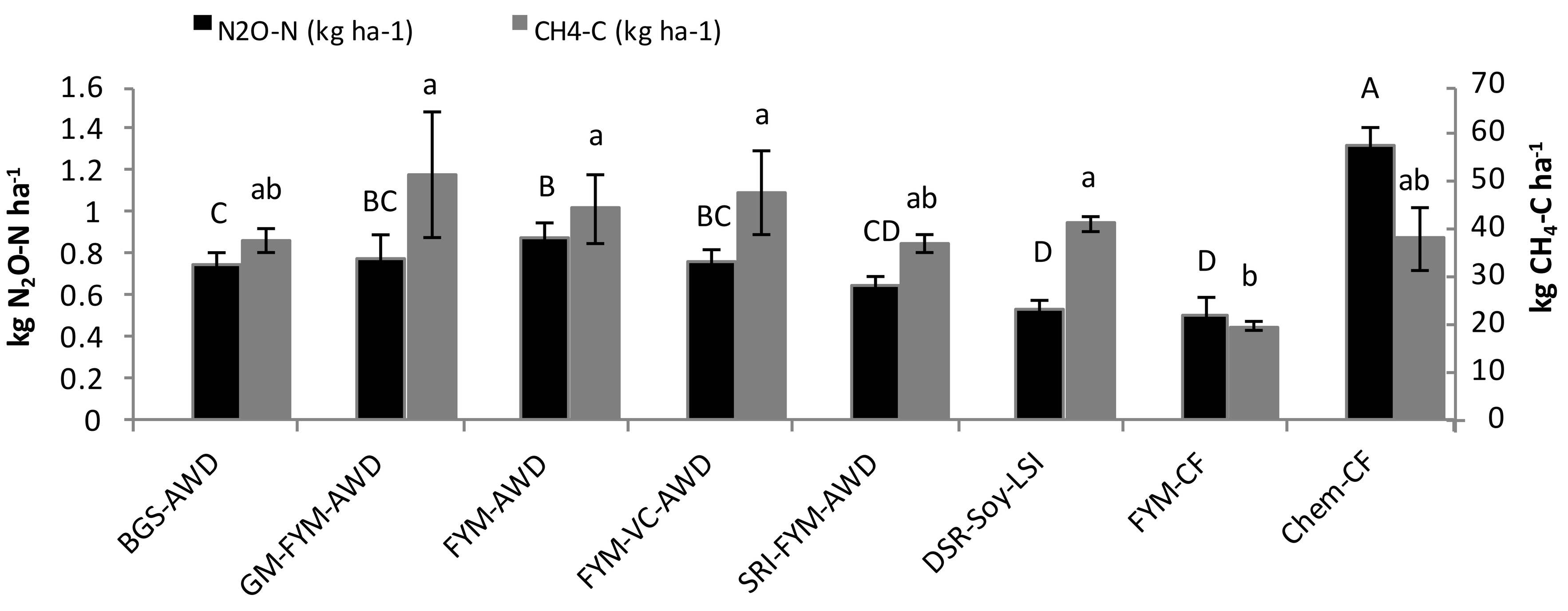
Kharif - Basmati yield 2015



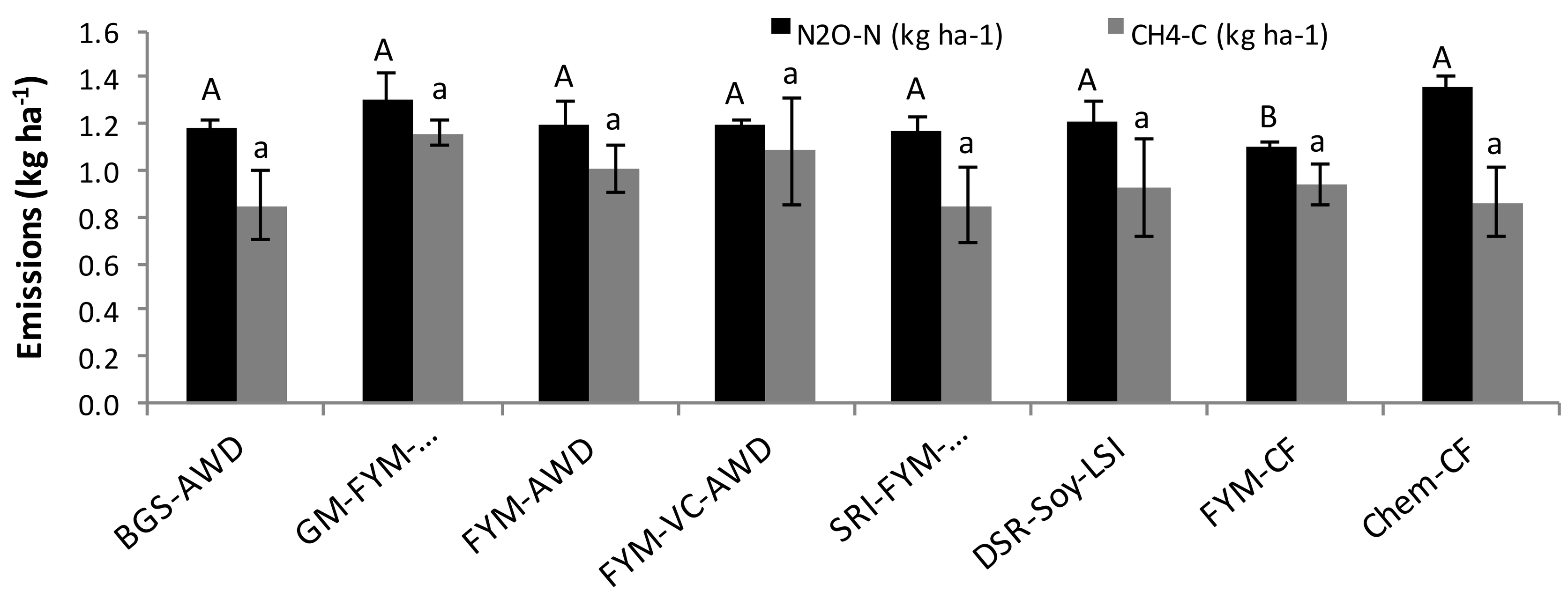
Rabi - Wheat yield 2016



Kharif Greenhouse gas emissions



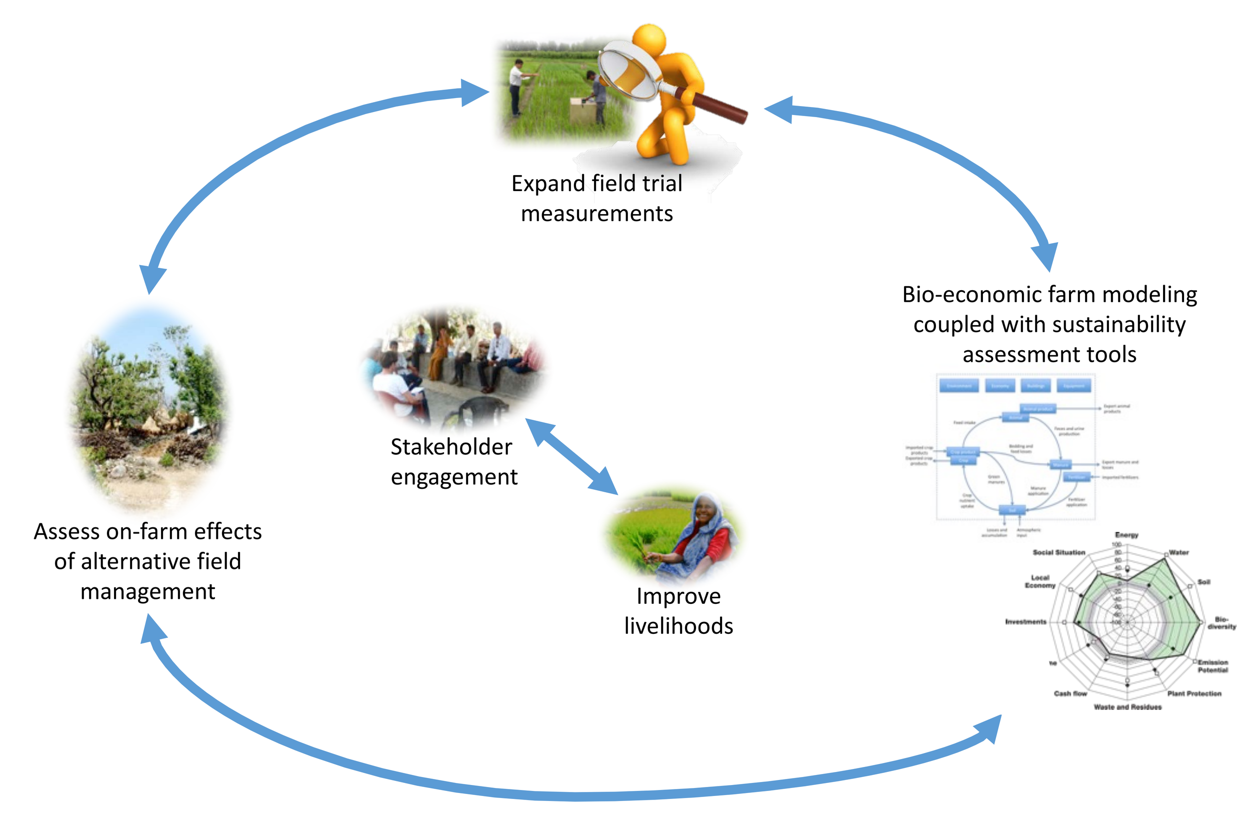
Rabi Greenhouse gas emissions



Preliminary conclusions

- Water input for Basmati cultivation can be reduced by adoption of AWD, without yield penalty
- In the kharif season, N_2O emissions were lower in the organic treatments compared to the chemical control, suggestion that adoption of organic Basmati production could reduce N_2O emissions in this region.
- Within the organic treatments, increasing N inputs did not increase N_2O emissions, offering promising options for sustainable intensification
- The results suggests that the introduction of legumes is promising to improve soil fertility and system productivity

Next steps



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