

Nitrogen management strategies for organic farming systems in Africa

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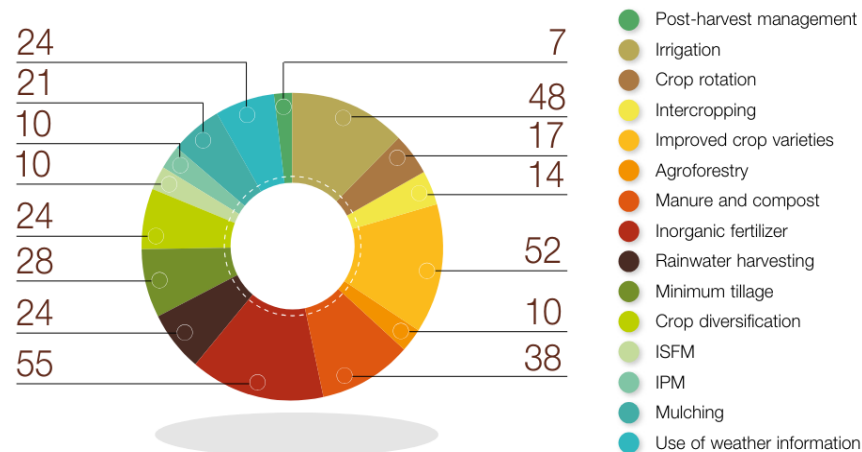


Nitrogen-management approaches at IFAD

1. Improving efficiency, avoiding “wasted” nitrogen
2. Developing availability and access to organic inputs through research and markets
3. Building a case - understanding economic and other co-benefits

FIGURE 2. PREVALENCE (%) OF CROP-FOCUSED SAI PRACTICES PROMOTED BY LOAN PROJECTS

FARM SCALE SAI PRACTICES (CROPS)



SUSTAINABLE AGRICULTURAL INTENSIFICATION PRACTICES in East and Southern Africa



Focusing on efficiency

Reducing PHL to make any grain count

- Renewable-energy powered irrigation and food processing schemes
- Warehouse schemes
- Tarpaulins for improved drying and to reduce aflatoxin contamination
- Improved storage options (metal silos or hermetic storage bags to reduce insect damage)

On-farm NUE and recycling

- Legume intercropping
- Soil fertility management
- Livestock-crop integration
- Agroforestry (i.e. fertilizer trees such as *Faidherbia albida* in Niger. Agroforestry Stocktake upcoming)
- ...

Efficient inorganic fertiliser use

- Area-based recommendations based on soil analysis and crop requirements
- Micro dosing (small bottle cap doses of fertilizer to crops)
- Fertiliser deep placement in rice systems

Organic inputs availability and access

- **Key gaps** : “access to agroecological bio-solutions, including [...] organic fertilisers” and “increase benefits for organic farmers from market participation” (*IFAD Agroecology Stocktake*)
- **Improved access to organic fertilizers - threefold benefits**
 1. Sustainably tackle fertility loss affecting small-scale producers in many countries
 2. Cushions against raise in price of synthetic mineral fertilizers, exacerbated by the Ukraine conflict
 3. Offer job opportunities to the rural youth
- **Requirement to build human capital**, including through engagement with private sector

Organic inputs availability and access - examples

- **Burundi PRODEFI (2010-2021) – direct provision**
 - Provision of input kits with seeds, organic fertilizer and plant protection products in the two seasons following COVID onset
 - Training on production practices and weather and market information was also conducted
 - **360 tons of organic fertilizers**, fortified and climate resilient bean seeds (63 tonnes), potato seeds (20 tonnes), ...
- **Malawi SAPP (2012-2024) (RPSD funds) – research, provision, market access and participation**
 - Tested efficacy of phosphorus solubilising organisms through the National Agriculture Research Department
 - 48 demonstrations on fertilizers and 84 demonstrations promoting indigenous phosphate, solubilising microbes and rhizobia.
 - 47 farmer groups supported to facilitate linkage to markets
 - Initiatives to scale-up ongoing



Organic inputs availability and access - examples

- **Mali MERIT (2020-2026) – on-farm recycling**
 - Promotes bio-digestors and slurry use as an organic fertilizer and application of relevant agroecological techniques
 - 4m3 biodigester produces approx 50T of bio-slurry/year = fertilizing about seven (7) hectares
 - Statistics from similar models show yield increases up to 100%
- **Kenya KCEP-CRAL (2015-2024) – bio-input market development**
 - E-wallet on card at selected bank connects input providers and buyers
 - Bio-fertiliser companies linked to e-wallet voucher
 - CASP trained to offer services through e-wallet voucher
 - Beneficiary cash contributions triggers access to e-wallet and choice of input packages
 - Awareness raising to encourage selection of bio-input in e-wallet
 - Competition challenges with other input-supply schemes

Organic inputs availability and access - examples

Viet Nam AMD (2013-2020) – market development and access and participation

- Public-Private-Producers-Partnership (4P) model
 - Betrimex provides agricultural inputs (e.g., organic fertilizers, bioplat protection) quarterly, offers training services, conducts, quality verification and enters into long-term agreements with the producers (including the purchase of 100% of the produce at a fair price), as part of their commitment to support the producers to make the transition into organic certified production,
 - Producers commit to supplying their production to the company as per agreed conditions.
 - AMD Ben Tre supports by providing a matching grant and acts as a liaison between the company, farmer organizations and local authorities.
 - During the project, Betrimex had expanded its organic material zone to 184 ha with the participation of 336 households. 322 farmers were included, out of which 69 were women.
 - The income of farmers increased by an average of 183% and a total of 731 jobs were create.

Building a case: economic and other benefits

Expanding Economic and Financial Analysis of investments (EFA+) – account for **avoided negative externalities** and broader **medium to long term benefits** (biodiversity, clean water, public health and nutrition, flood risk reduction, soil regeneration, carbon storage and reduced GHG emissions)

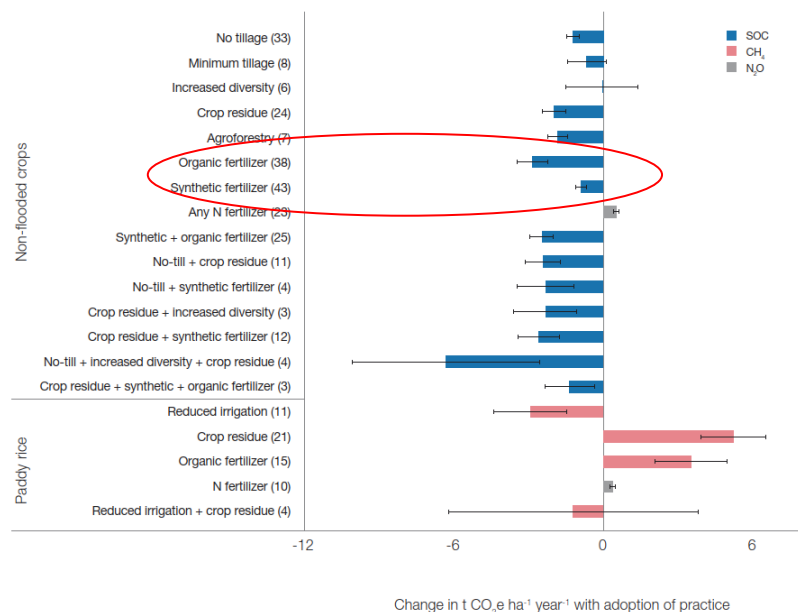
Building a case: economic and other benefits

- Impact assessment [Lesotho SADP](#) (2011-2020) – **economic benefits**:
 - Substantially higher use of organic fertilisers among horticulture producer
 - When organic fertilizer are not purchased externally (self-produced), **higher costs of production** but **higher positive profits**. Profits still negative when self-produced organic fertilizers are associated a price (median-market price). Beneficiaries don't consider cost
- [Ex-ante analysis](#) of IFAD Investments **climate mitigation potential**:
 - SOC improvement from nitrogen use offsets emissions
 - SOC higher with bio-inputs
 - Offset only lasts SOC reaches equilibrium



Building a case: economic and other benefits

Figure 4 Mitigation potential of climate-smart practices



SOC accumulation offsets increased emissions during the early years of a change in practice.

In the long term, however, emissions will eventually be larger than carbon accumulation, as SOC reaches equilibrium (Lugato et al. 2018).

Table 3 Improved agricultural practices within IFAD's investment portfolio during IFAD9 period (2011-2014), as determined from project design documents, and their estimated annual mitigation potential at the portfolio level

Practices promoted	IFAD contribution (US\$ million)	Number of projects	Farmers targeted (000)	Effect on GHG emissions	
				Per hectare (t CO ₂ e ha ⁻¹ year ⁻¹)	Total for IFAD portfolio (thousand t CO ₂ e year ⁻¹)
Pasture management ^a	48	3	50	-2.10 (soil C) 0.54 (N ₂ O)	-60 -- -25 10-16
Reduced irrigation of paddy rice	67	2	34	-2.94 ± 0.08	-75 -- -25
Live fences ^b	72	3	20	-1.83 ± 0.40 (soil C) -2.13 ± 0.70 (biomass C) ^g	-22 -- -14
System of rice intensification ^c	75	4	21	-2.94 ± 1.47	-46 -- -15
Synthetic fertilizer	86	1	120	-0.88 ± 0.22 (soil C) 0.54 ± 0.12 (N ₂ O)	-66 -- -40 25-39
Crop residue management ^d	89	5	15	-1.98 ± 0.48	-18 -- -11
Green manure ^e	98	3	47	-1.98 ± 0.48	-58 -- -35
Organic fertilizer	205	5	135	-2.86 ± 0.62 (soil C) 0.54 ± 0.12 (N ₂ O)	-235 -- -151 28-44
Biogas	243	5	181	No data	No data
Increased diversity of crops	253	9	167	-0.04 ± 1.47	-126-119
Agroforestry	293	8	124	-1.83 ± 0.40 (soil C) -10.82 ± 2.57 (biomass C) ^h	-139 -- -89 -829 -- -511
Minimum/no till ^f	430	11	187	-0.66 ± 0.77	-137 -- -10
Water harvesting	527	12	400	No data	No data
Irrigation	1 065	33	392	No data	No data ¹⁰

Thank You

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