



Africa RISING in the Ethiopian Highlands

Natural resource management: Africa RISING science, innovations and technologies with scaling potential from the Ethiopian highlands

Tilahun Amede, Tadesse Asrat and Gizachew Legesse (ICRISAT), Kindu Mekonnen, Addisu Asfaw, Mohammed Ibrahim, Temesgen Alene, Workneh Dubale- (ILRI) and Job Kihara and Lulseged Tamene- (CIAT)

Key messages

- ✓ Homogenous management zones could be used as an alternative to grid soil sampling and to develop nutrient maps for variable rate of fertilizer application.
- ✓ Spatially similar areas within fields may be useful in relating yield to soil and topographic parameters for crop performance evaluations.
- ✓ in hillslopes, where crop response to mineral fertilizer is low, there is a need to apply organic resources in terms of manure, crop residues, green manures and other alternative sources that would improve soil OC thereby improve soil water holding capacity and enhance nutrient and water use efficiency

Objectives and approach

- identify the most yield limiting nutrients across landscape positions and farming systems and assess the yield benefits of application of various combination of nutrients in various slopes and landscape positions.
- ✓ Validation and further refinement of blended fertilizer recommendations have been done in the wheat-based cropping systems on about 240 farms.
- ✓ The experiment was conducted in Africa RISING sites (Lemo, Basona, Sinana and Endamehoni woredas in the Hadiya, North Shewa, Bale and Southern Tigray zones, respectively).

Key results

- Landscape position and slope dictated crop response to fertilizers than soil types and application rates (Figures 1,2, and 3).
- There was strong crop response to application of N and P, with positive response to K particularly in degraded soils and Nitosols (Fig 4).
- Response to S is limited to pocket areas. However, application of S and Zn has significantly improved grain quality (Ca content 200% and Zn 35%).
- Blending treatments (NPKSZn) had significantly increased Ca grain contents; by up to 300% higher than control treatments. Even higher NP rates had doubled Ca content compared to low NP rates.

Significance and scaling potential

Decision support tools for farm-level fertilizer recommendation:

- Reducing cost of inputs, increasing profitability of farmers (Fig 5);
- Improving production efficiency, with targeted fertilizer applications
- Enabling development agents and development partners to provide evidence-based recommendations to farmers;
- Rethinking of policy makers and lead institution towards evidence-based fertilizer blends and recommendations;
- Increasing system productivity and improve nutrition;
- The approach and specific fertilizer recommendation will be scaled in wheat growing highlands.



Fig 1. Hill slopes - degraded, limited response to K

Fig 2. Mid slope farms- responsive soils to NPK

Fig 3. Fertile, valley bottoms, No response to NPKSZn

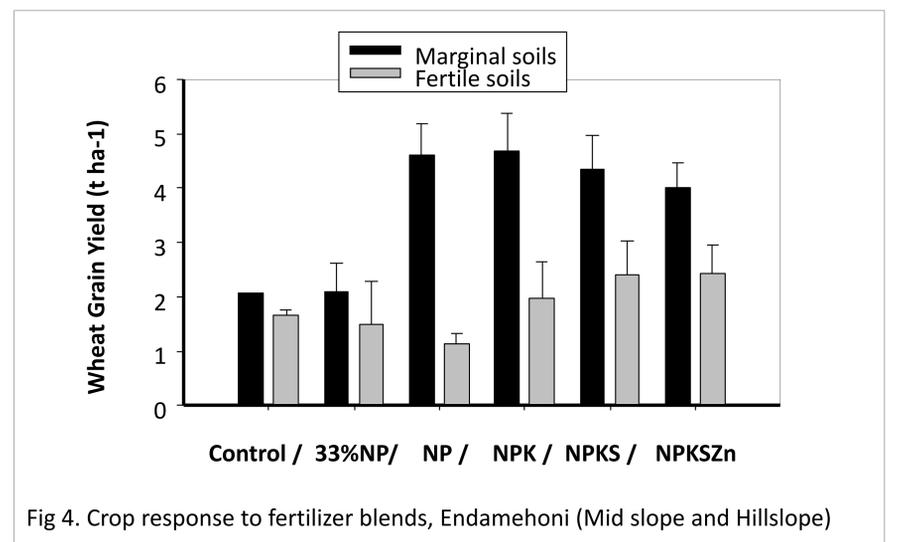
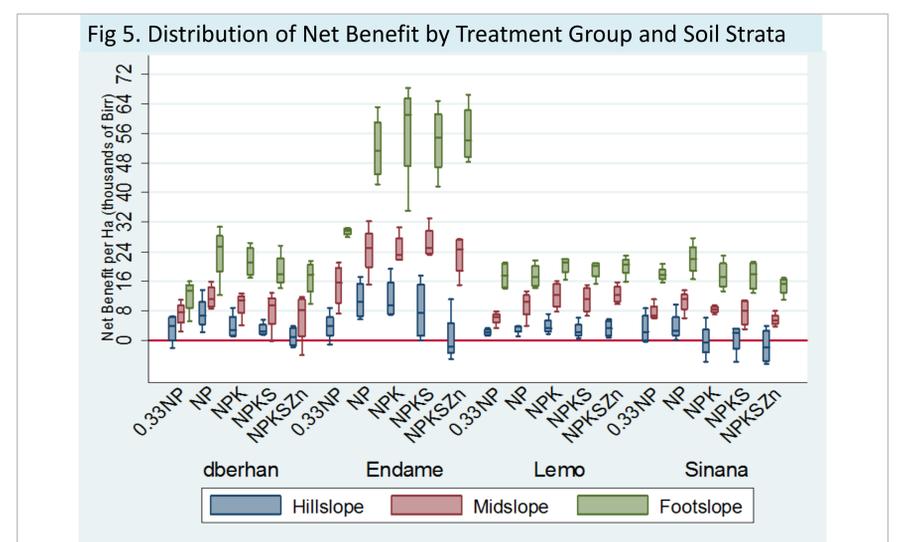


Fig 4. Crop response to fertilizer blends, Endamehoni (Mid slope and Hillslope)



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