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Collaborative Research on Sorghum and Millet

FEED THE FUTURE INNOVATION LAB

INCREASING SYNERGIES AND IMPACT THROUGH DUAL-PURPOSE CROPS

Dr. Timothy J. Dalton

Director, Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet

Professor of Agricultural Economics

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: Multipurpose crop varieties are economically perior to single purpose (specialized) crop varieti

- Economic arguments?
- Specialization and economies of scale.
  - Economies of scope.
- Diversification and risk reduction.

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: Multipurpose crop varieties are biologically
perior to single purpose (specialized) crop varieti

iological arguments?

- Utilization of energy?
- Within plant diversification against pests and pest damage?

ow "tradeoff" between products (?)

nvironmental stability of grain and biomass yields

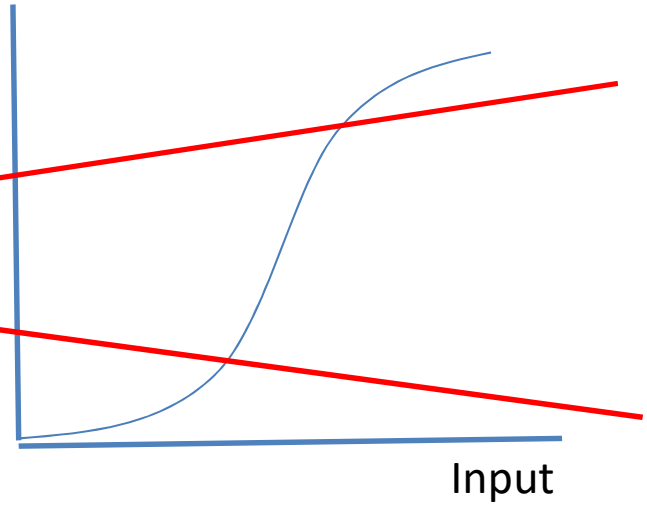
hat do we need to rigorously evaluate this questio

Appropriate framework

Good data

- Production grain, biomass and other attributes x E
- Prices of grain, forage, fodder, feed, fuel, fencing material, roofing etc. x
- Behavioral information on risk attitudes x E

mework



roduction function, then profit (or cost)

(land, labor, biochemical inputs)

dual purpose (or full…)

ultiproduct production function, then profit (or cost)

$_{rain}, Y_{biomass})$,land, labor, biochemical inputs)=0

hat does partitioning of energy into grain and gestible straw look like?

Figure 1. Transformation curve, grain and digestible straw.

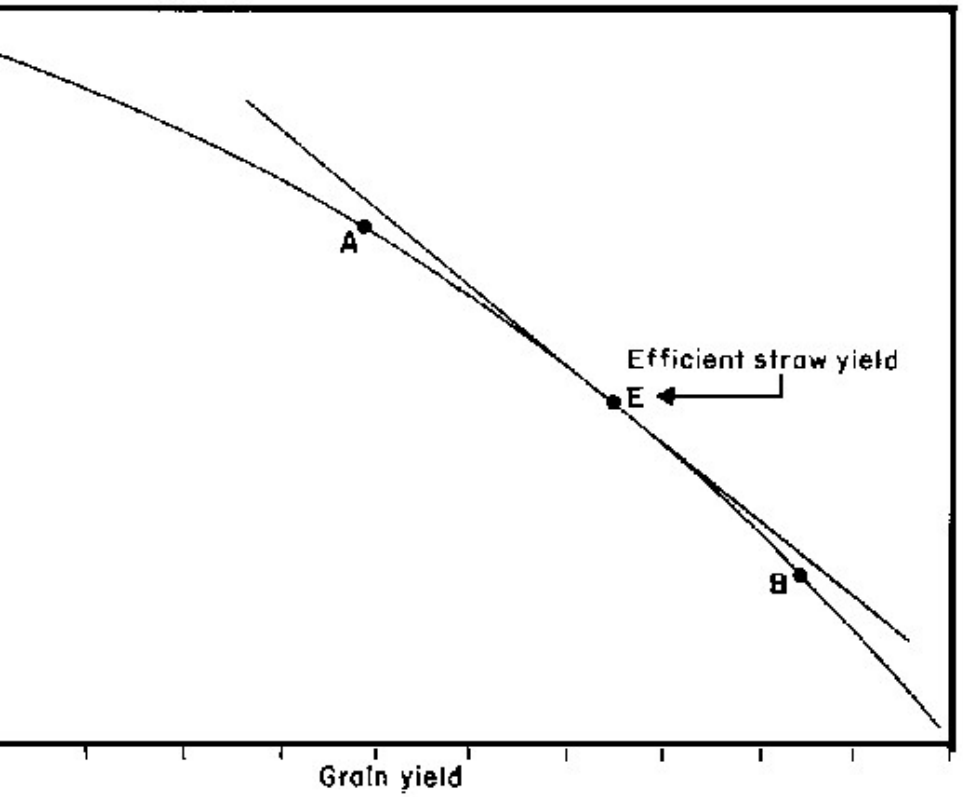
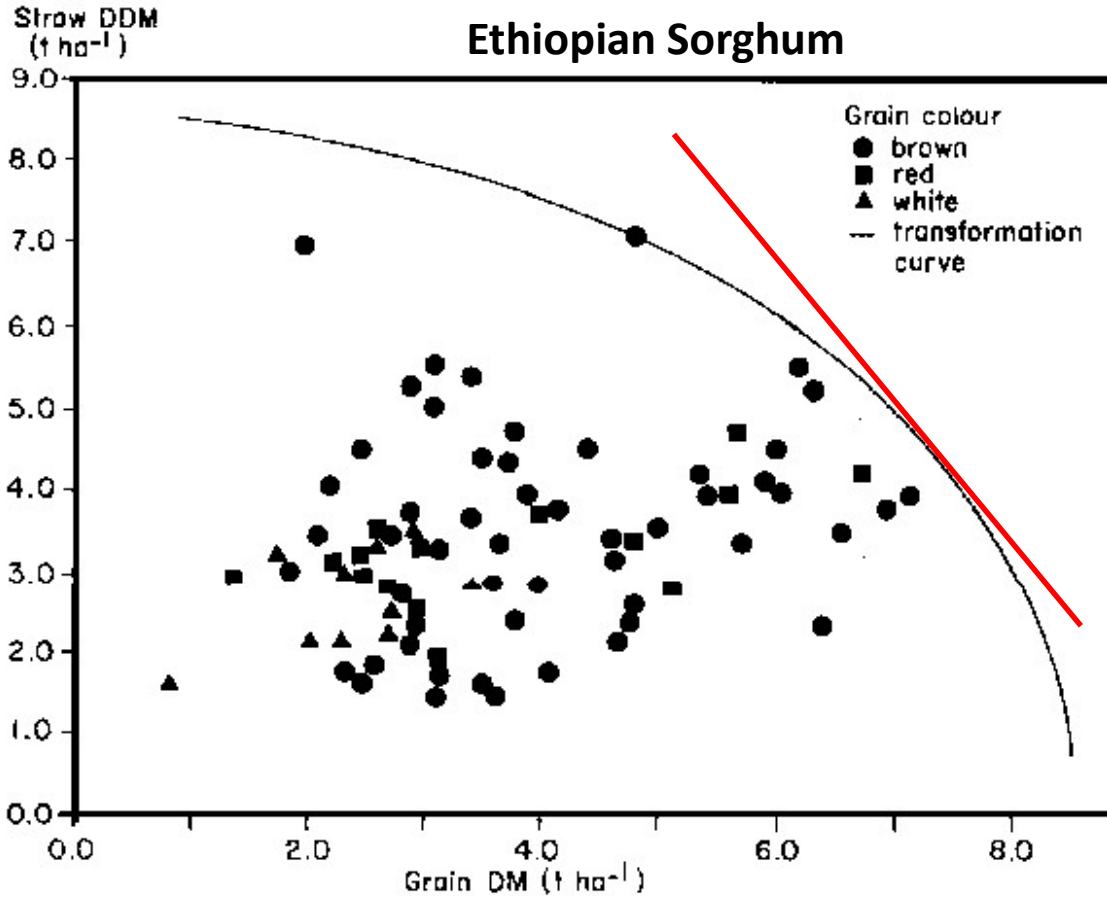


Figure 2. Transformation curve, grain and digestible straw, pooled trials.

Ethiopian Sorghum



McIntire, Reed, Tedla, Jutzi and Kebede, "Evaluating sorghum cultivars for grain and straw yield, 1988. (ILCA)

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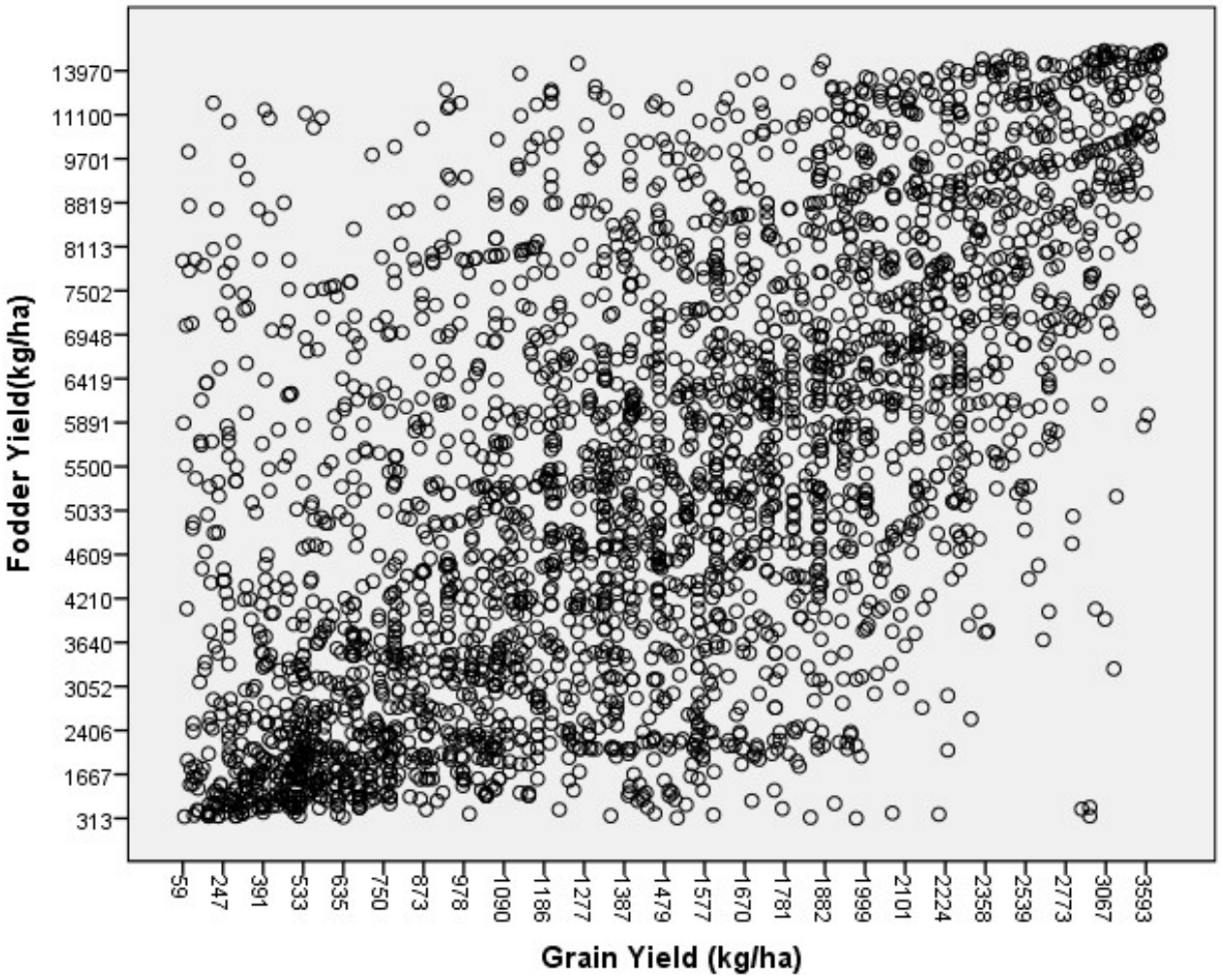
tential for dual-purpose pearl millet in West Africa



2 years of Data

100 OPV varieties

9 sites
- **Niger**
- **Burkina Faso**
- **Mali**
- **Senegal**

Zones
- **Sudano-Sahe**
- **Sahelian**

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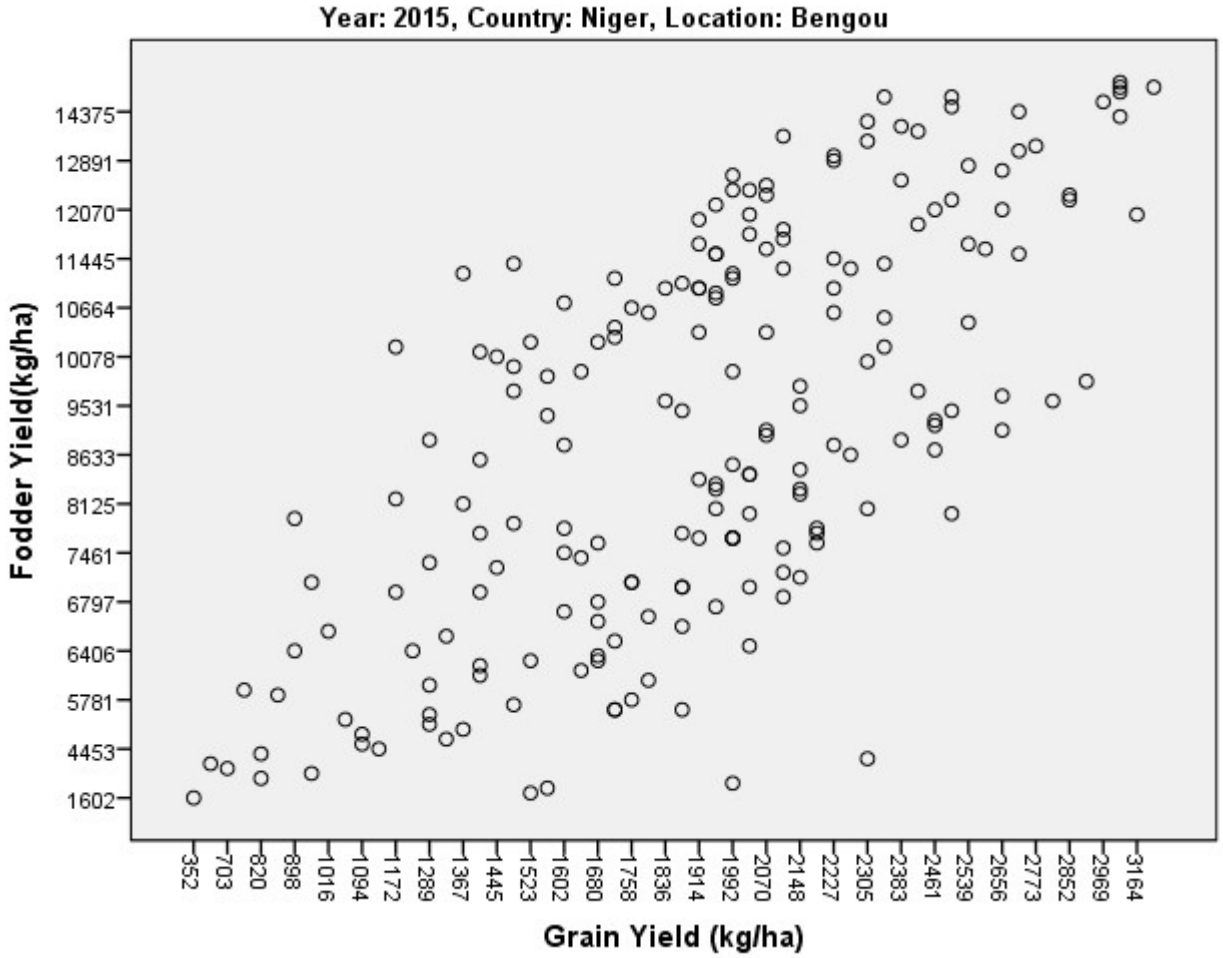
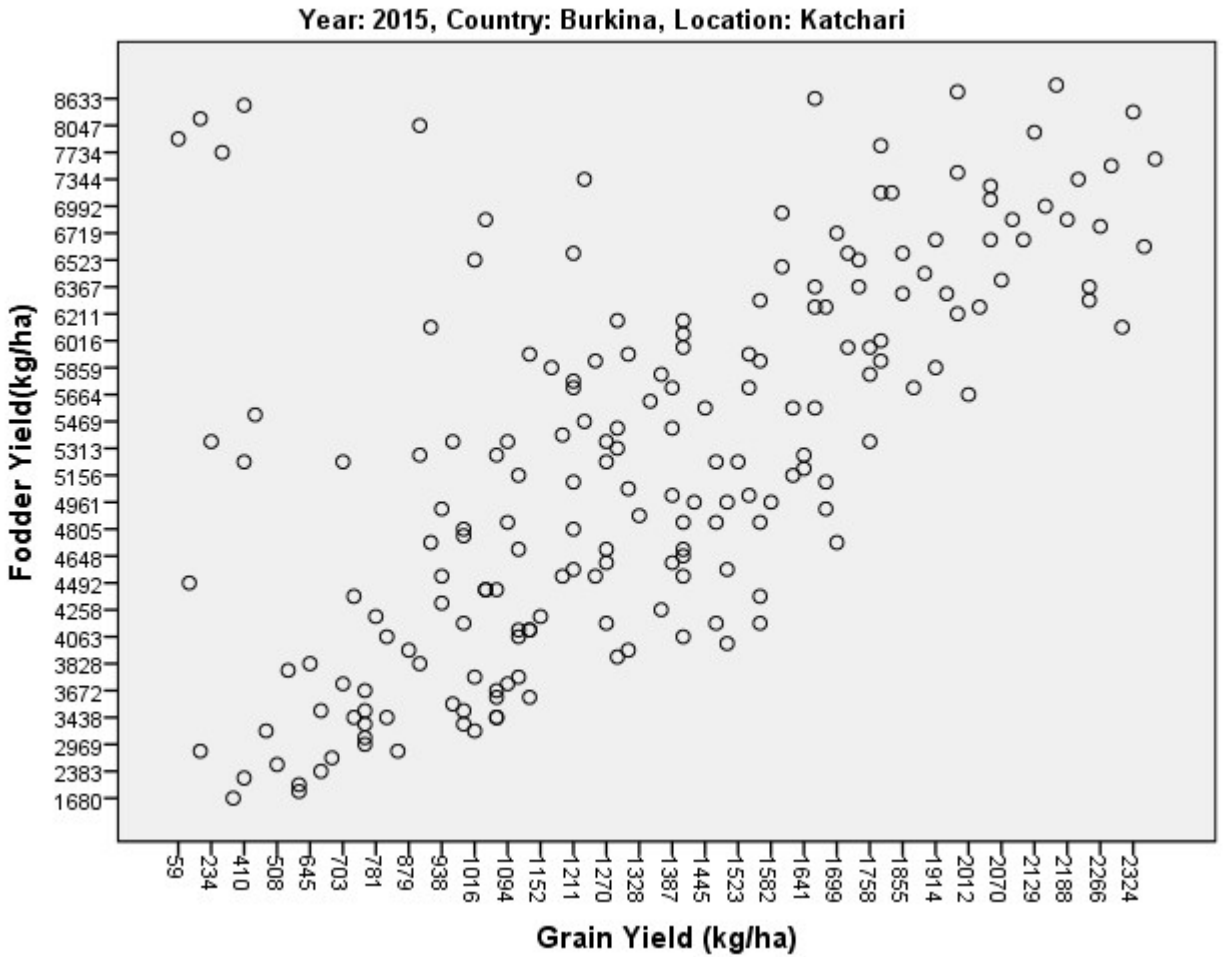
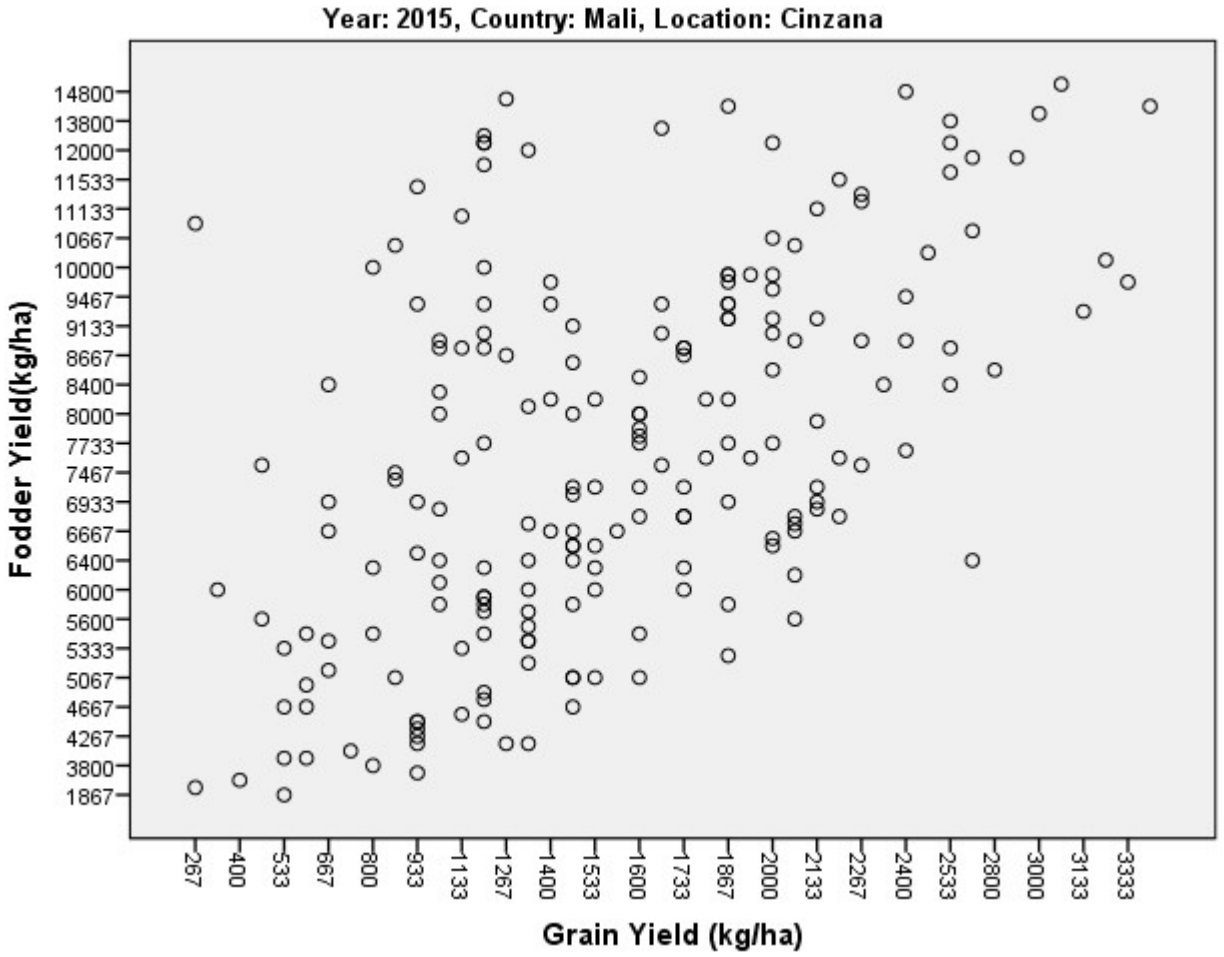
ngou, Niger-2015 corr=0.69**



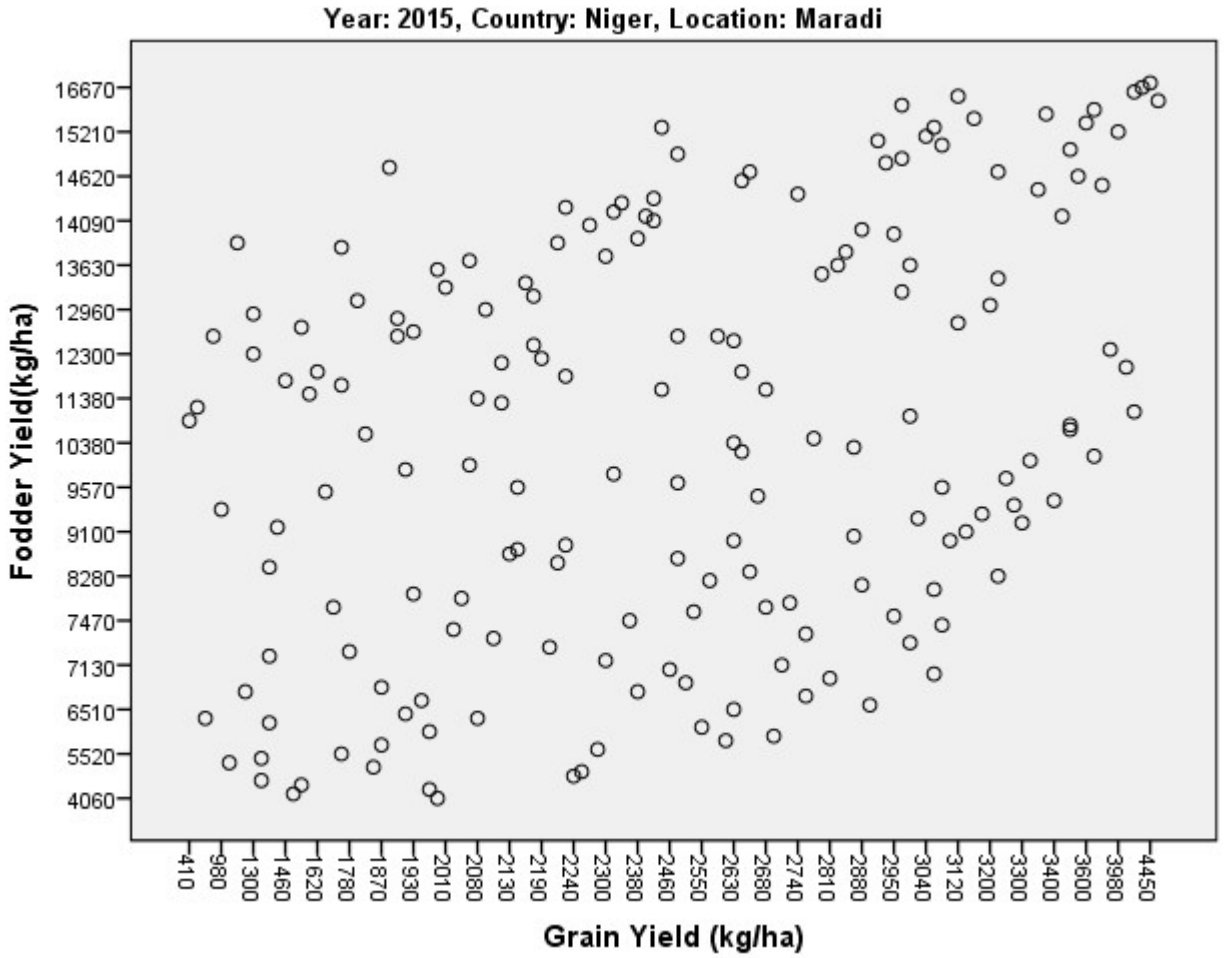
Katchari, Burkina Faso-2015 corr=0.58**



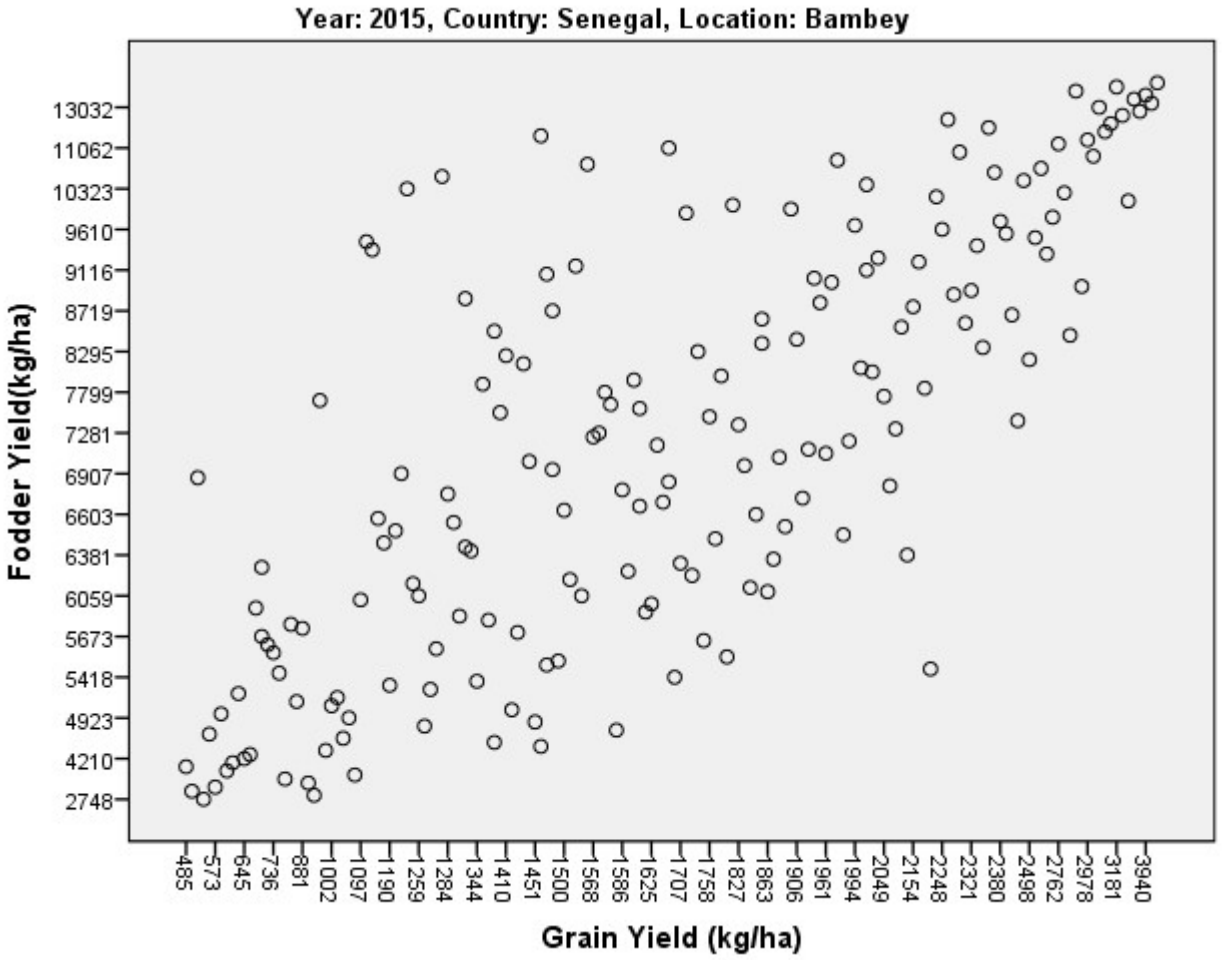
Cinzana, Mali-2015 corr=0.53**



Maradi, Niger-2015 corr=0.30**

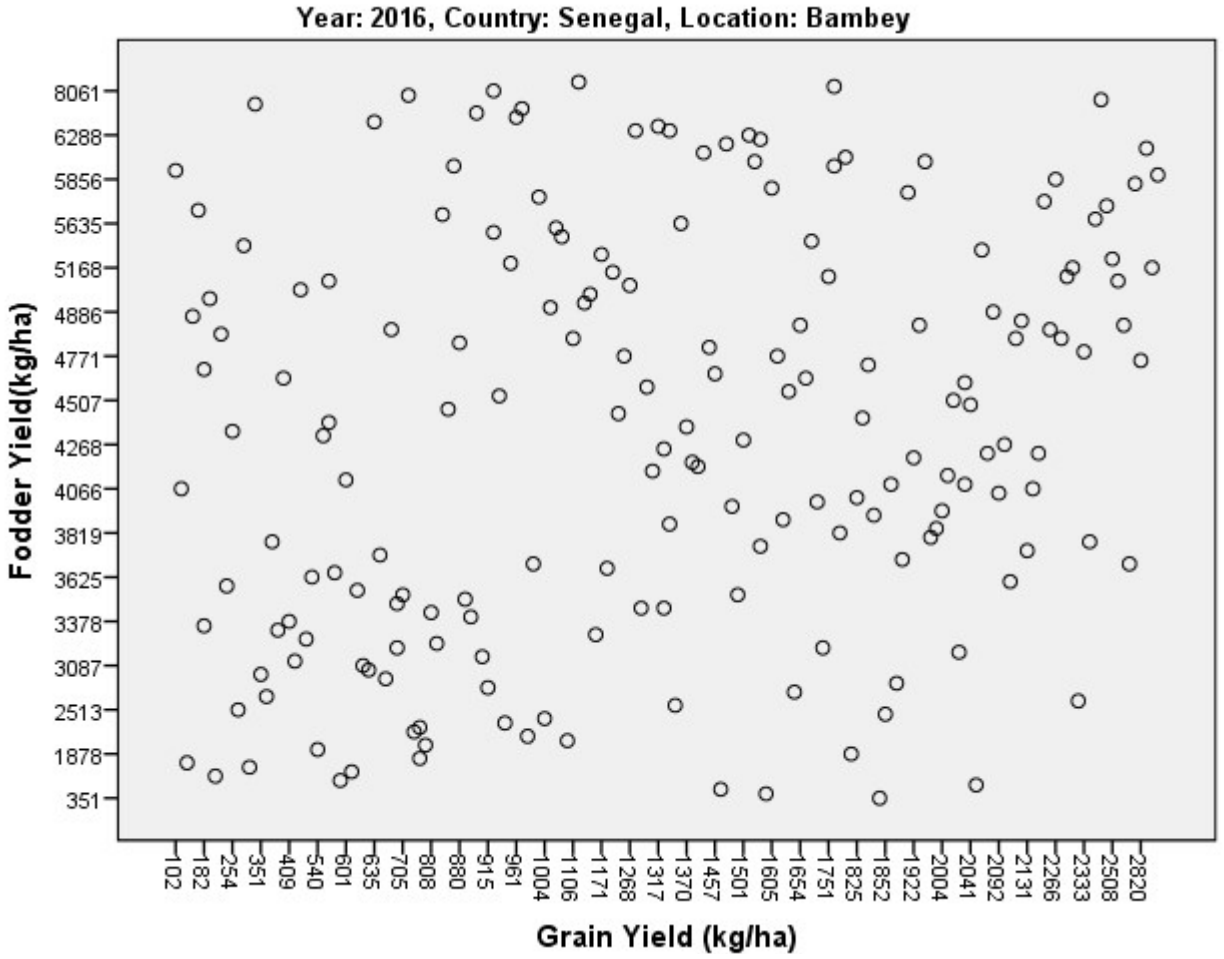


Bambey, Senegal-2015 corr=0.80**



Bambey, Senegal-2016 corr=0.18**

mum Fodder yield
62% of 2015



Maximum Grain yi
71% of 2015

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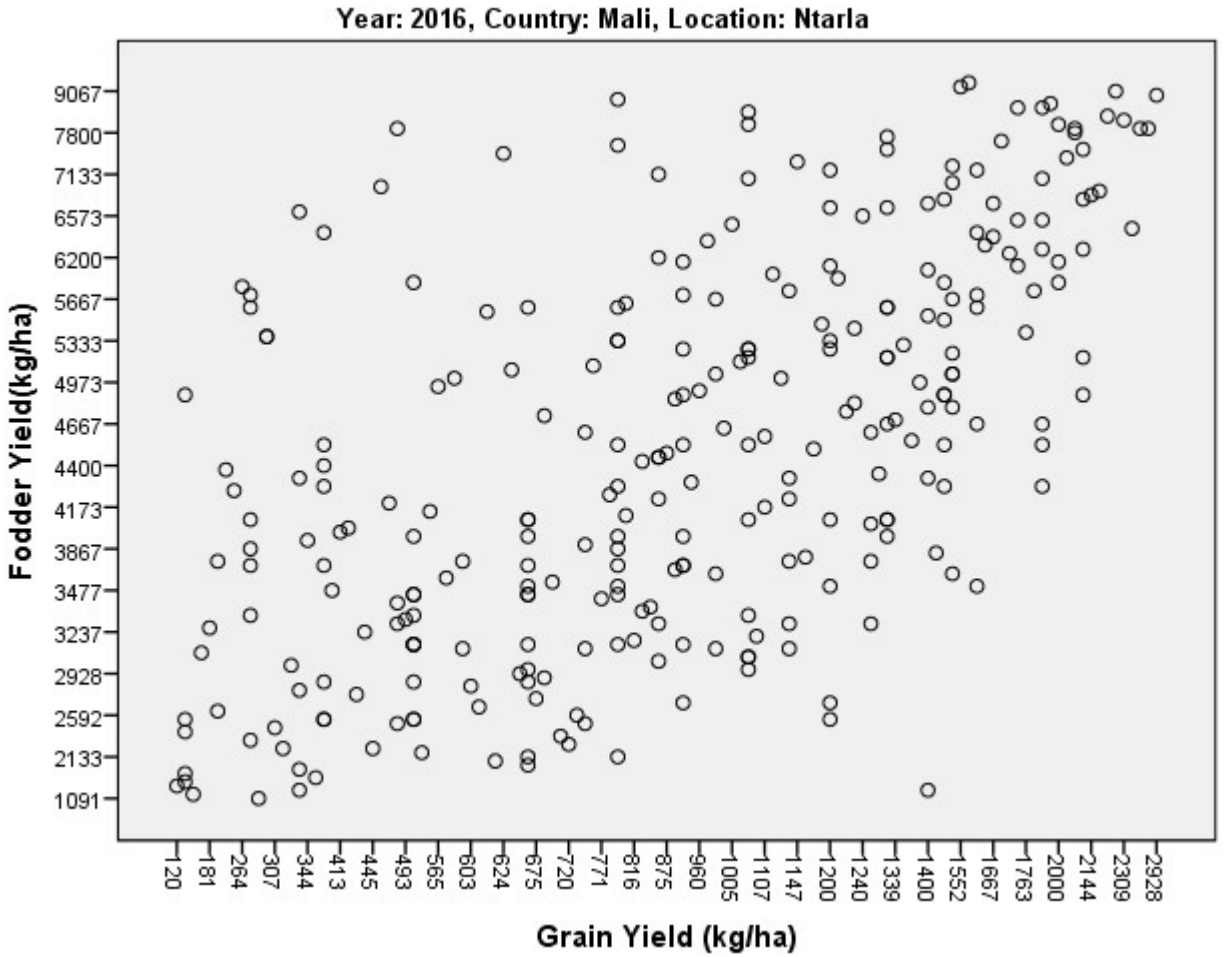
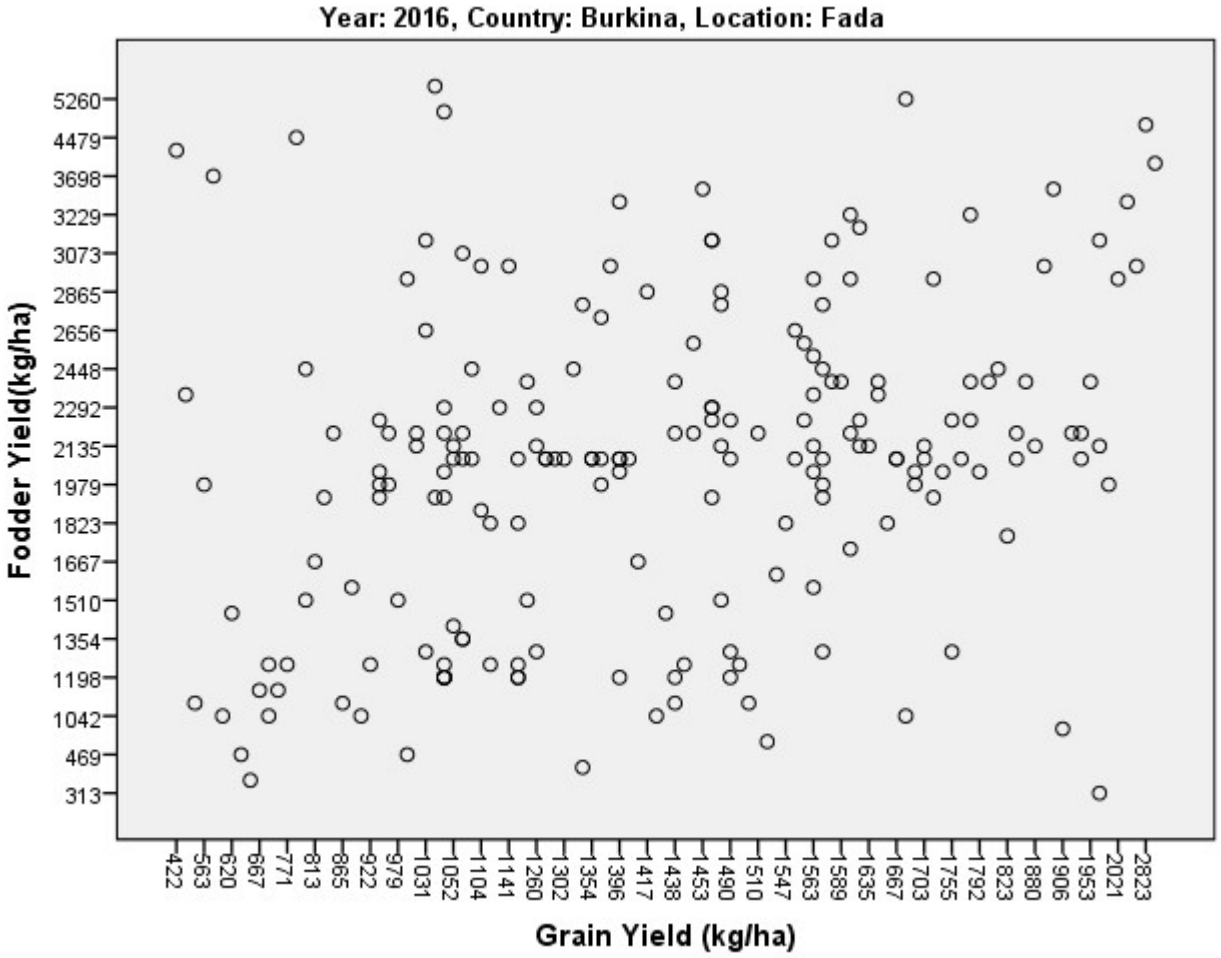
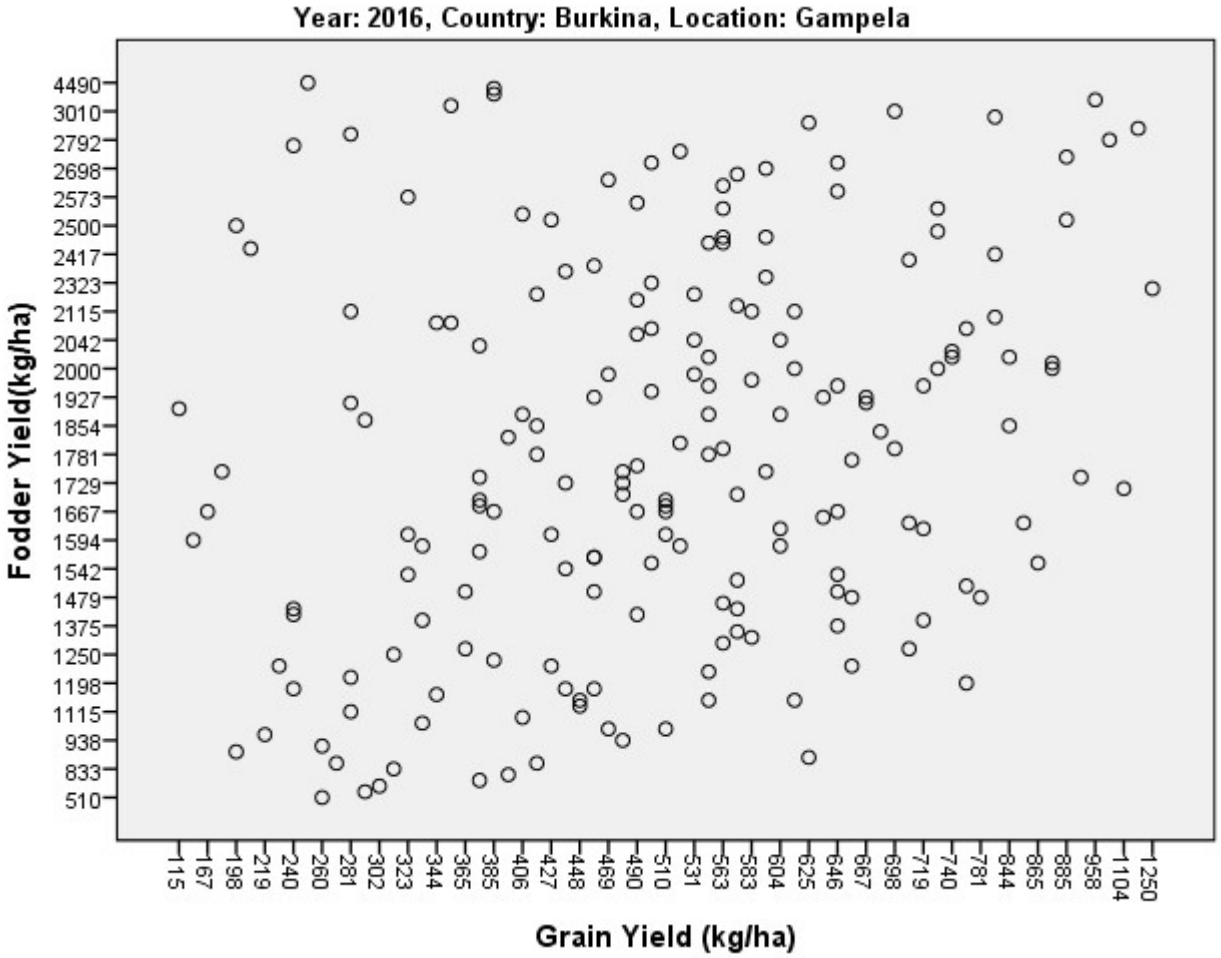
N'tarla, Mali 2016 corr=0.63**



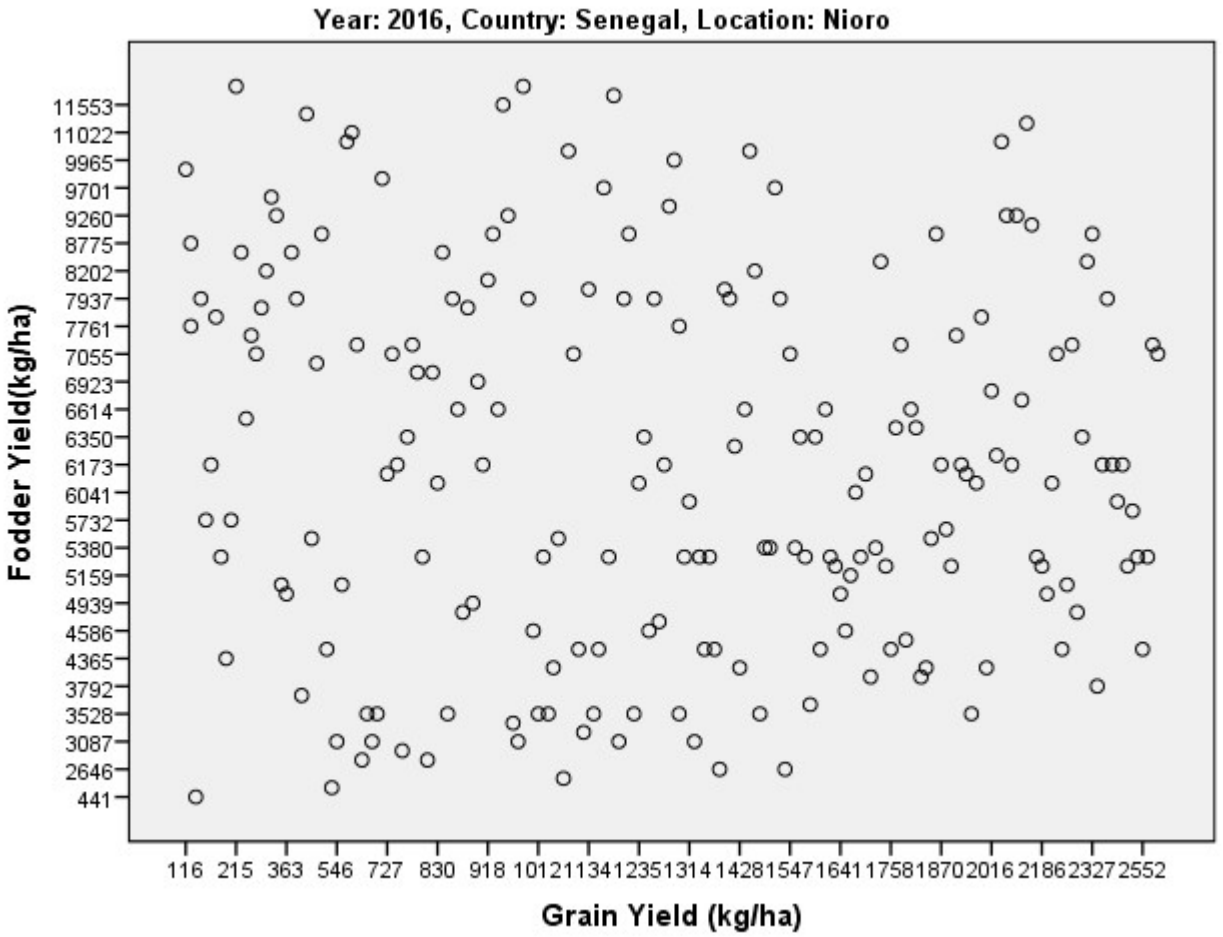
Fada, Burkina Faso-2016 corr=0.271**



Gampela, Burkina Faso-2016 corr=0.24**



Nioro, Senegal 2016 corr=-0.08*



ological issues

- High grain and fodder yielding Pearl millet cultivars exist;
  - Correlations between the two range from 0.80** to -0.07*
    - *High variation in quality of grain and fodder*
  - Large variation from year-to-year
  - Forage quality/grain quantity tradeoff related to cycle length
- A subset of 8 varieties performed similarly well across the Sah
- Many more were locally superior emphasizing "E" interaction

here do dual-purpose crops make economic sens

Where the price of grain and fodder are relatively similar.

- Household consumption
- Transport (and transaction) costs are high

Harvest and storage costs are low to maintain value

pecialized systems where large relative price differences

- Grain
- Forage located in areas of high livestock density

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