

# The Challenge of Forest Diagnostics

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# Why Should We Be Concerned about Measuring Forest Conditions?

- Given the importance of forests in today's world it is important for ecologists and social scientists to agree on the usefulness of various measures of forest conditions to assess:
  - Impact of policies and institutions on forest conditions
  - Robustness of different institutional arrangements to a variety of social & ecological disturbances

# Multiple Methods do Exist

- We now have multiple tools for measurement
  - Plot based ecological measures of biodiversity, density, biomass, and regeneration rates
  - Remote sensing now becoming a tool to assess change in forest cover over time
  - Evaluation of forest conditions by foresters
  - Evaluation of forest conditions by users
- If these were to generate similar information, we could choose any one that fitted a budget and a policy question. Do not yet know how these generate similar or different measures of change over time in the same forest

# International Forestry Resources and Institutions (IFRI) Program

- Established at request of FAO in 1992
- Uses multiple measures of the same forest over time because
  - Very few prior studies examined diverse social factors as they affect forest conditions
  - Need data using same measurement techniques at multiple time periods to assess robustness of diverse policies
  - Need data from multiple countries to assess how macro institutional arrangements impact local conditions

# Overview of our Measures

- For each forest, take a random sample of plots
  - Measure DBH, heights and species of all trees (also measure shrubs)
    - Can aggregate plots measures for a forest, but not comparable across ecological zones
  - Ask forester after completing measures in all plots to assess how this forest compares to other forests in the region in regard to forest density
  - Ask users to evaluate change in tree and shrub density over time

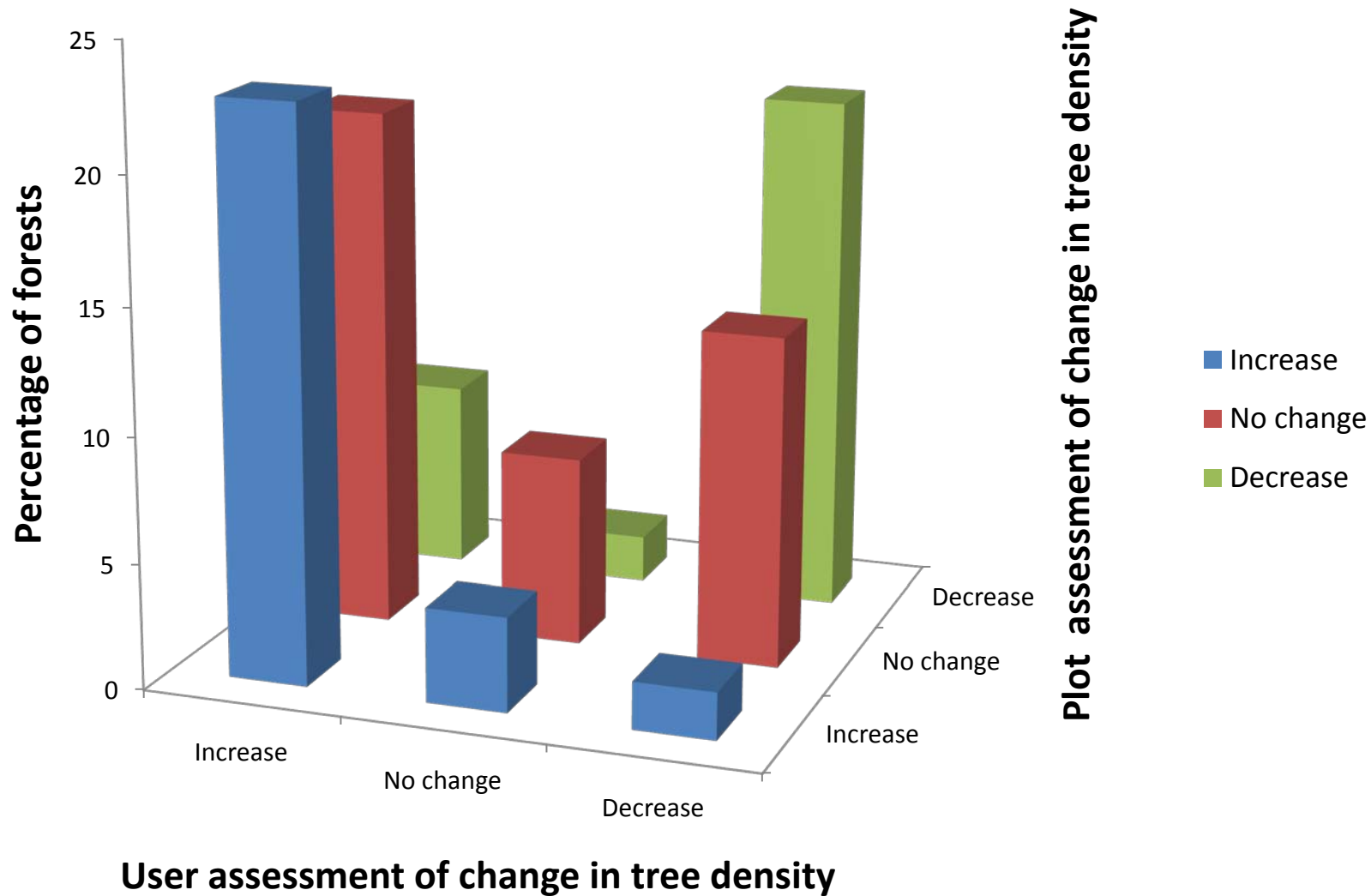
# Measures of the Same Forest Over Time

- Thus, the IFRI program is unique for providing all three measures over time related to the same forest
- Now have 53 forests that have been visited at least two times
  - So we can compare the similarities and differences across time

# Comparing Plot Data & User Assessment of Tree Density

- Plot based & user assessment agree (in regard to direction) in one half (51%) of the forests.
  - Strong disagreement (one measure indicates increase while the other indicates decrease) in only 10% of forests
  - Weak disagreements accounts for 39%

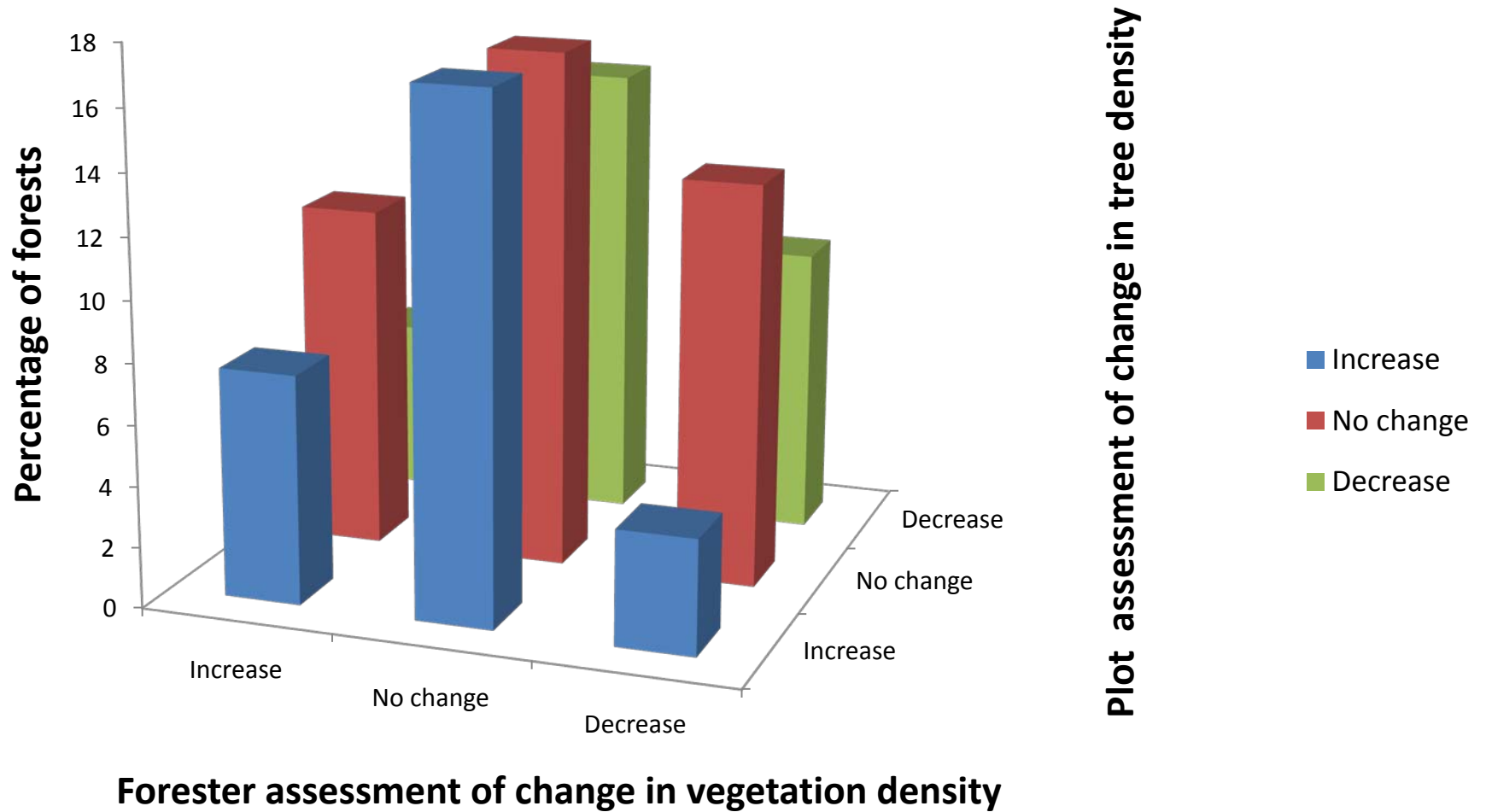
# Plot assessment of change in tree density vs User assessment of change in tree density



# Comparing Plot Data and Forester Assessment of Tree Density

- Plot based & forester assessment agree in one third (34%) of the forests
  - Strong disagreements occur in 10% of forests
  - Weak disagreements in in over half the forests (56%)

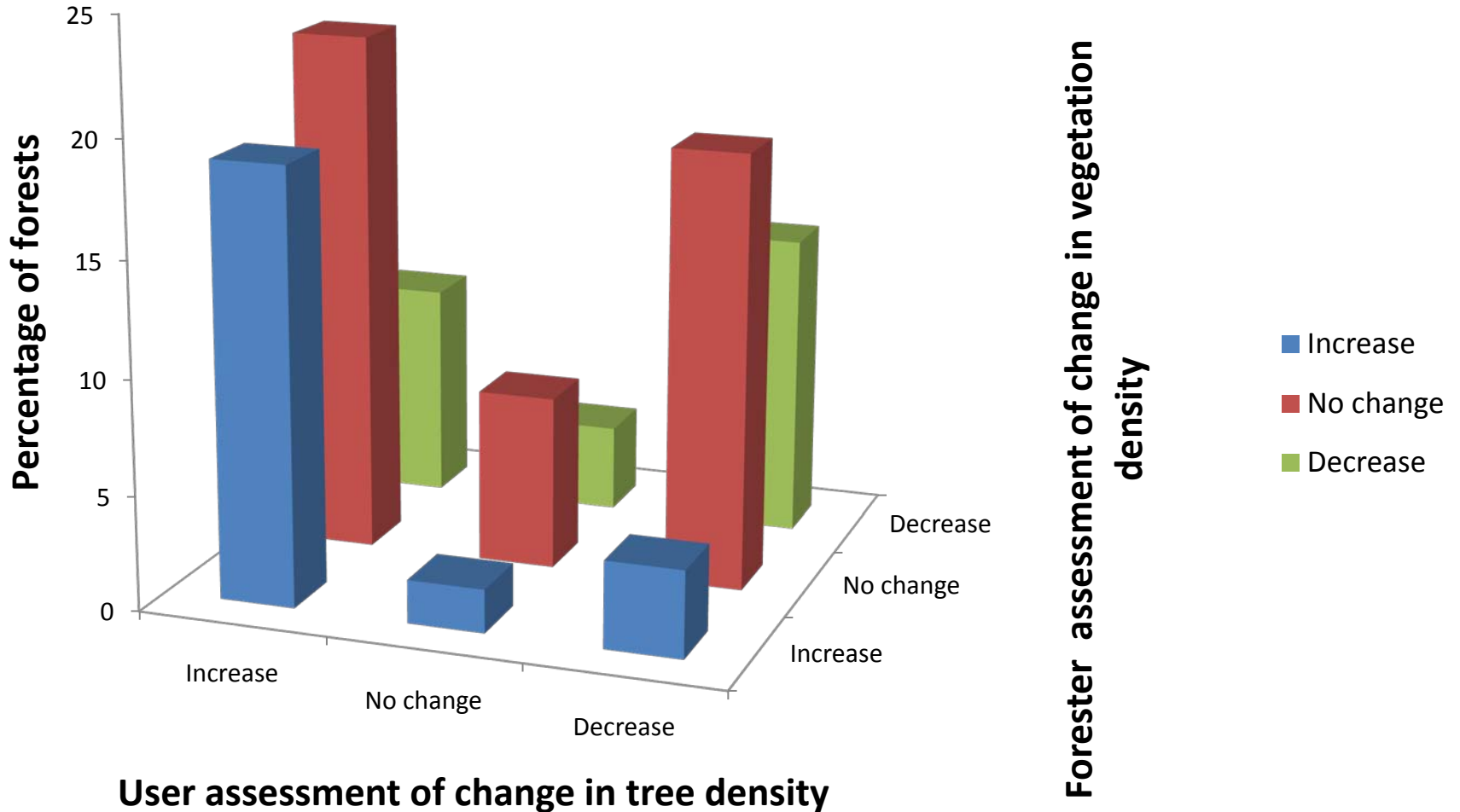
# Plot assessment of change in tree density vs Forester assessment of change in vegetation density



# Comparing Forester and User Assessment of Tree Density

- Agree in 40% of forests
- Users perceive great change & more positive picture of change (indicate 51% of forests have positive change)
- Foresters indicate 25% of forests have decreased in density which 26% have positive change

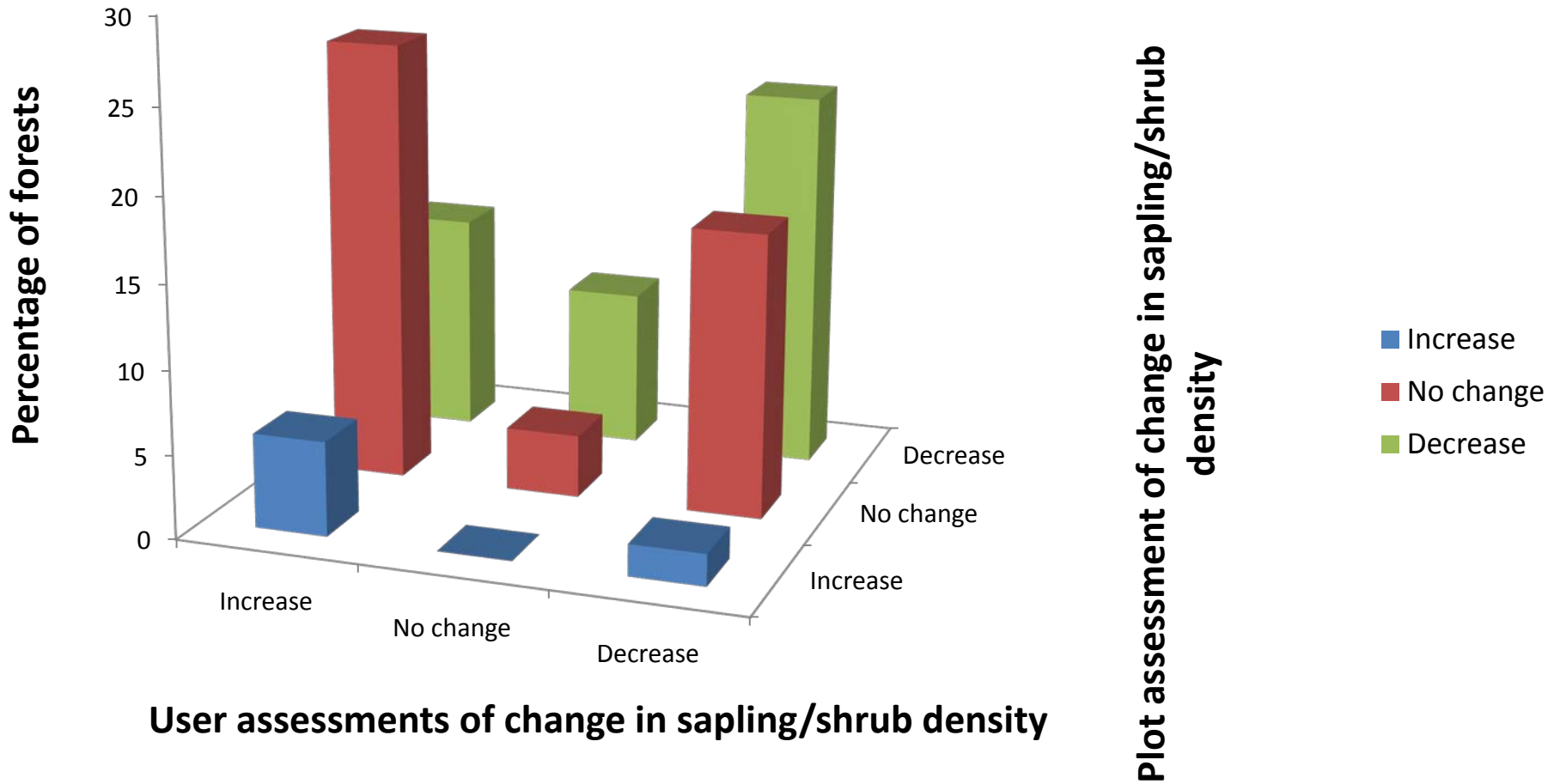
# Forester assessment of change in vegetation density vs User assessment of change in tree density



# Comparing Plot Data and User Assessment of Sapling & Shrub Density

- Less agreement
- Users assess that slightly over 40% of forests has increased and the same for decreased
- Plot data indicates an overall decline in regeneration
- Disagree strongly in 15% of forests

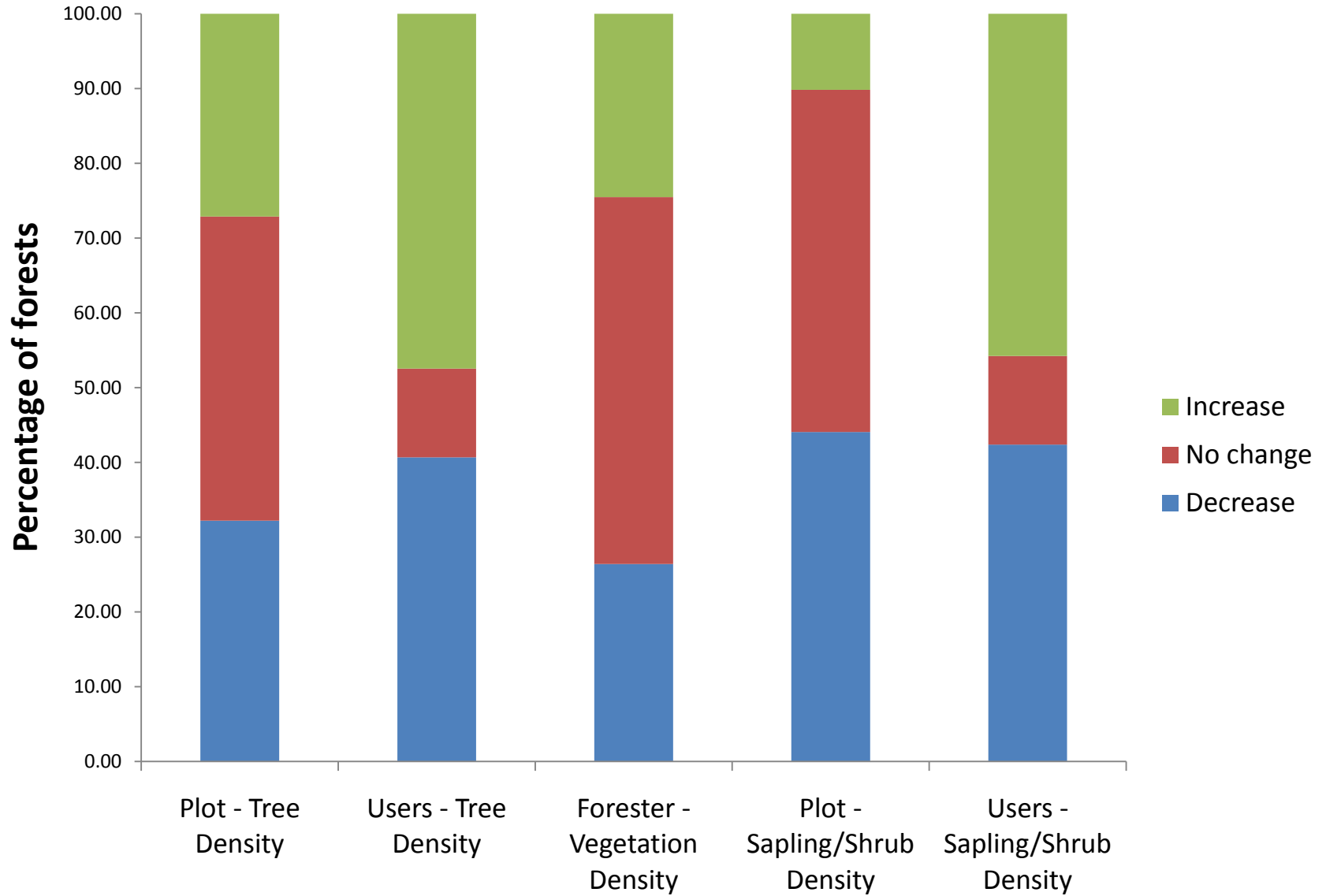
Plot assessment of change in sapling/shrub density vs User assessment of change in sapling/shrub density



# Comparing Across Methods

- Diverse methods do give different results
- User assessments of forest density and forest plot measures tend to have a higher agreement that forester's assessment and forest plots measures
- Not so for shrub density

# Plot assessment of change in sapling/shrub density vs User assessment of change in sapling/shrub density



# One Method May Not be Fully Sufficient for all Purposes

- Plot based measures –widely accepted, time tested, reliable and useful --
- But they are expensive
- Assessment by users and foresters are less expensive and useful for many purposes but we should recognize the differences that tend to be regular

# Regular differences

- Users perceive greater variation –but this may generate useful information about valuable spots to which users pay most attention
- Foresters heading the plot team will not usually be as familiar with a *particular* forest so asked them to compare forest X with others in the region and then looked at this comparison over time
- But, overall -- considerable agreement – completely contrasting assessments found in only 10-15% of cases

# A Lot More to Think About

- This is the first study able to do this kind of comparison over time
- When you want to measure across forest types must have either user or forester evaluations to use as forest plots assessments do not help compare tropical to dry forests
- Need to understand why users make the evaluations they do – may give an “early warning” about some problems

# Your Thoughts and Suggestions are Welcome

- And, thanks for all of our IFRI colleagues for all of their hard work in the field collecting this valuable data