PRODUCTIVITY DECLINE IN THE IRRIGATED PLAINS

By

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S.I.R.I

Decline in soil Productivity a Concern

Fig 1A. Production History for Estate A

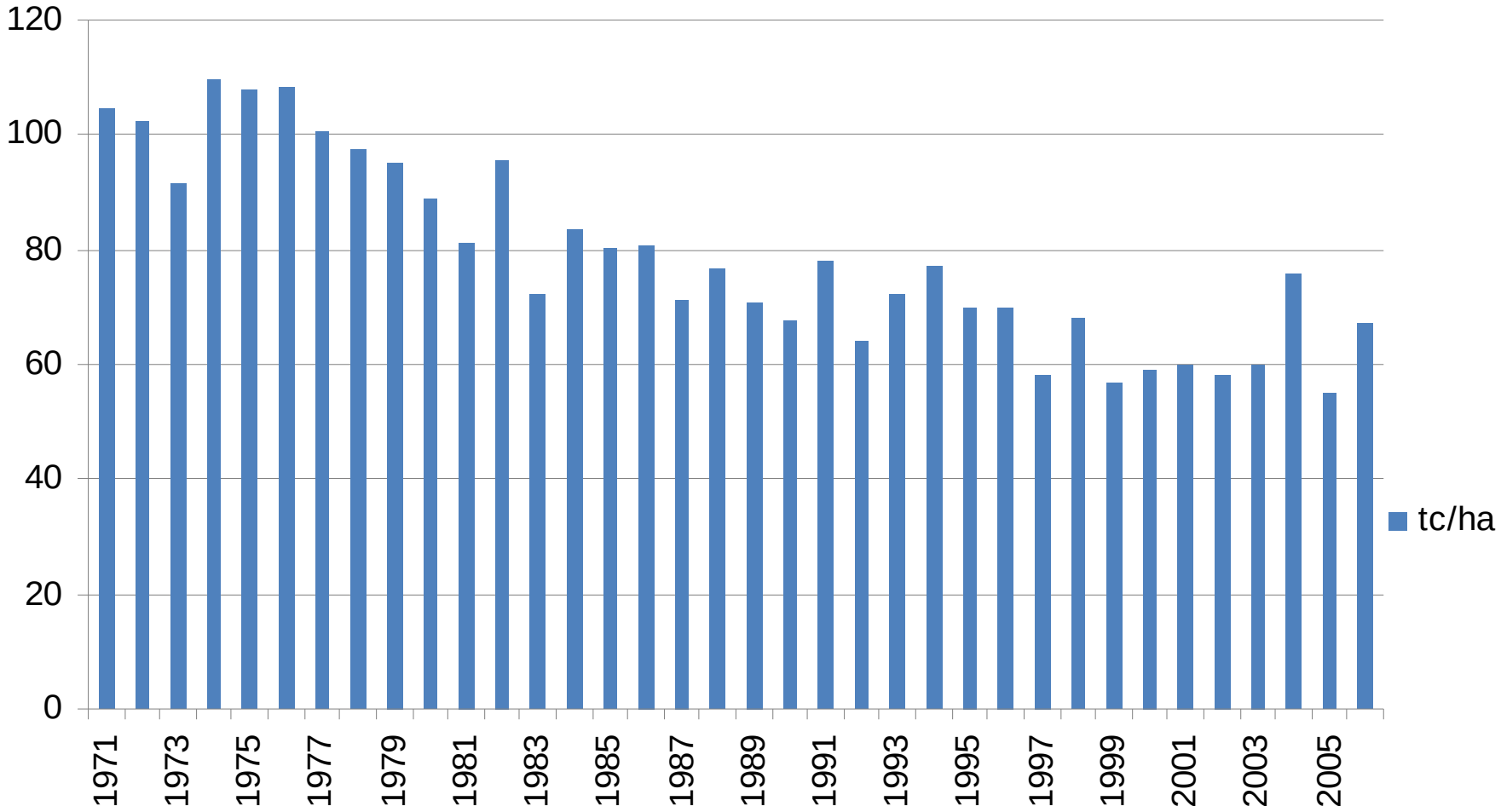
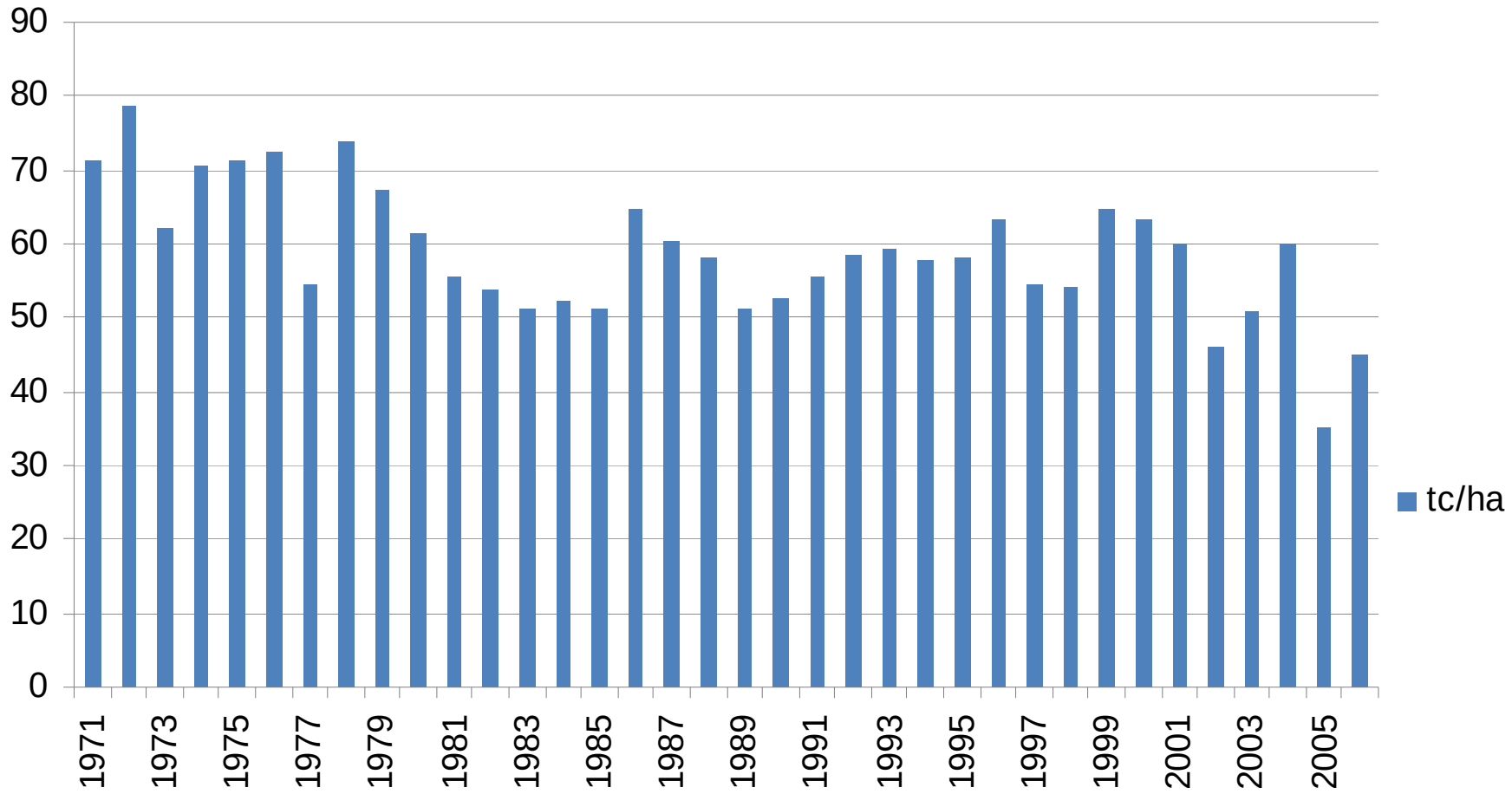


Fig 1B. Production History for Estate B



Study Undertaken to

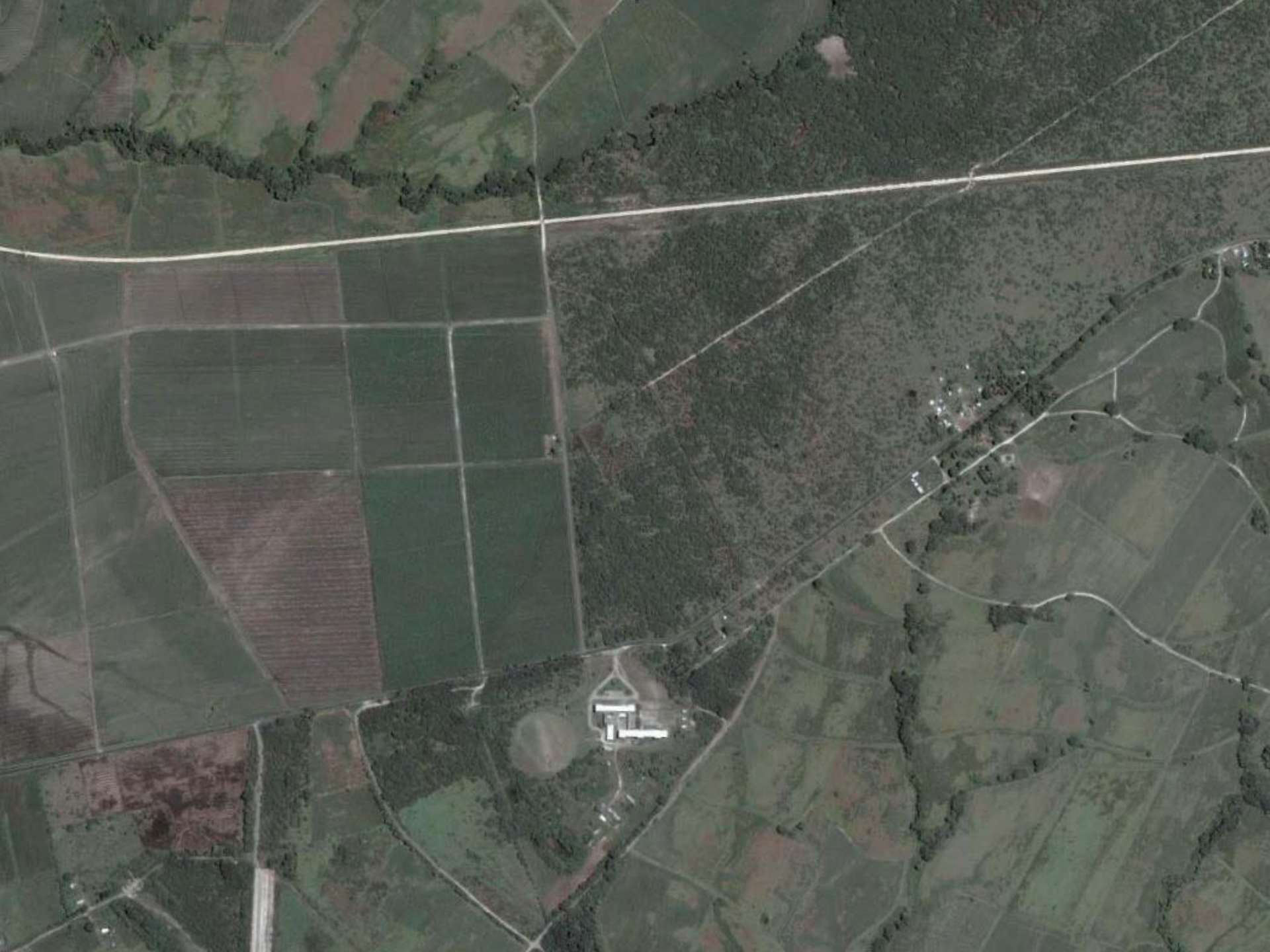
- Compare chemical, physical and biological properties of lands in continuous sugarcane with lands in fallow

- Isolate factors associated with yield decline

Methods

Paired sites selected at

1. New Yarmouth - Farm 2
2. Monymusk – Springfield
3. Monymusk - Morelands




5 FEB 2008
3pm
NSD 12
1240A
PUMP HS1
1241B
1242

Methods Contd.

- **Six mini soil pits dug in both fallow and continuously farmed plots**

Sample taken at:

0 – 15 cm

15 – 30 cm

30 – 45 cm

Methods Cont'd

Determinations made of

- pH, Organic matter
- Major nutrients
- Sodium, Sodium adsorption ratio
- Bulk density
- Water infiltration
- Nematode population
- Heavy metals (As, Pb, Cd)

Fig 2. Comparisons of % organic matter in continuously cropped and fallow lands

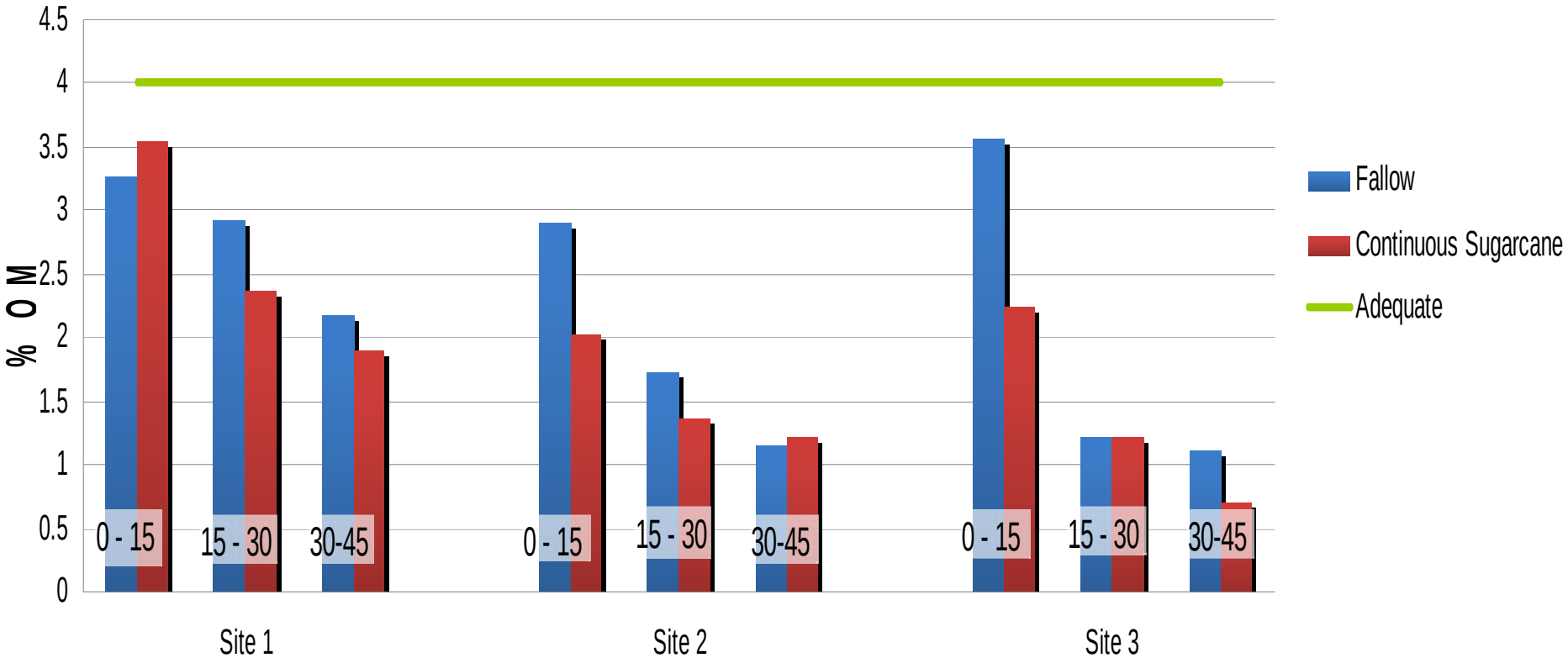


Fig 3. Comparisons of % nitrogen in continuously cropped and fallow lands

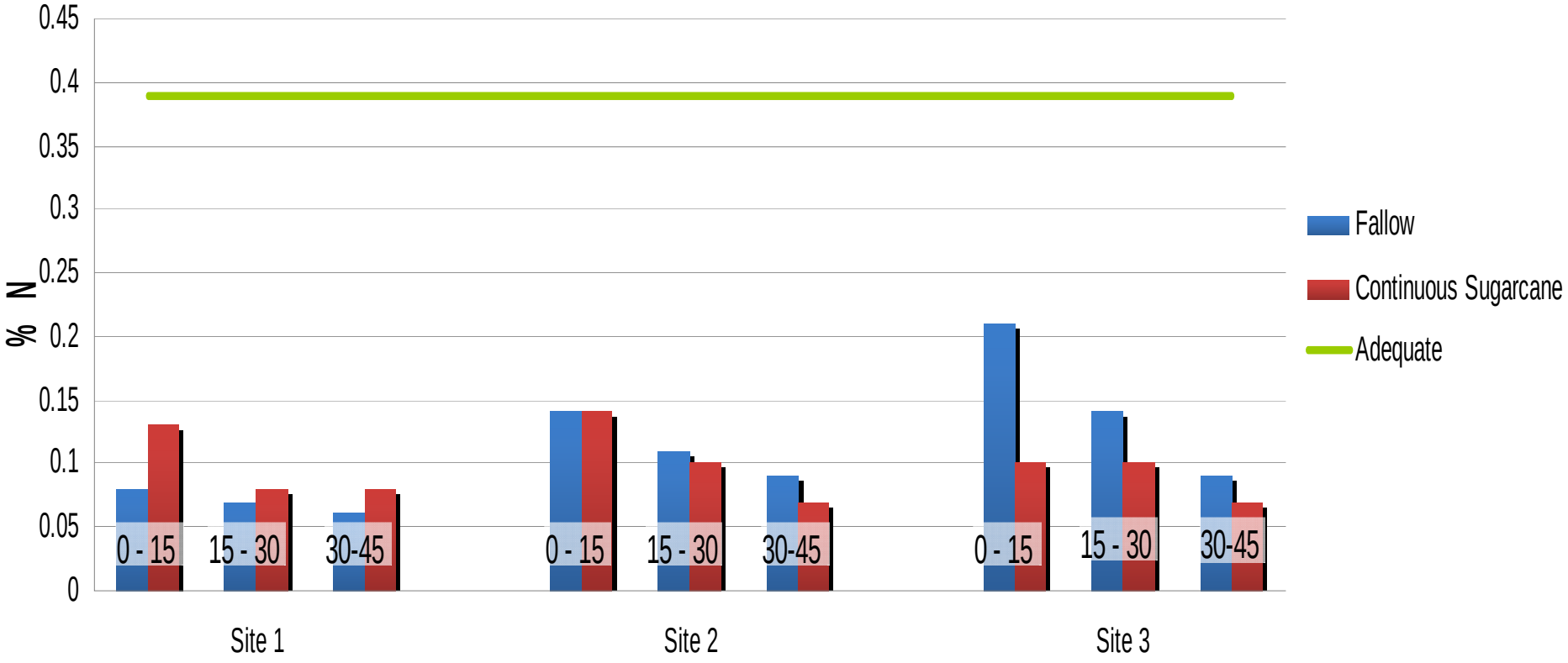


Fig 4. Comparisons of phosphorus in continuously cropped and fallow lands

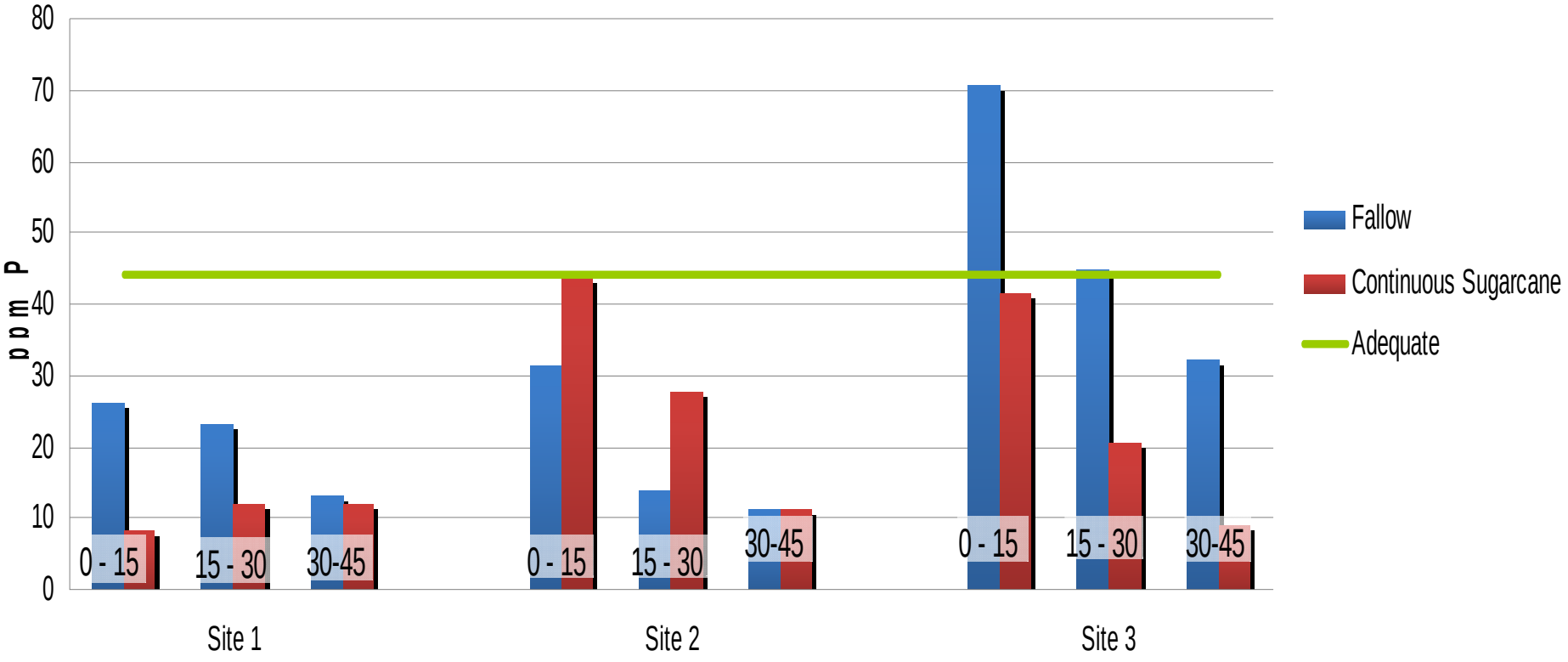


Fig 5. Comparisons of potassium in continuously cropped and fallow lands

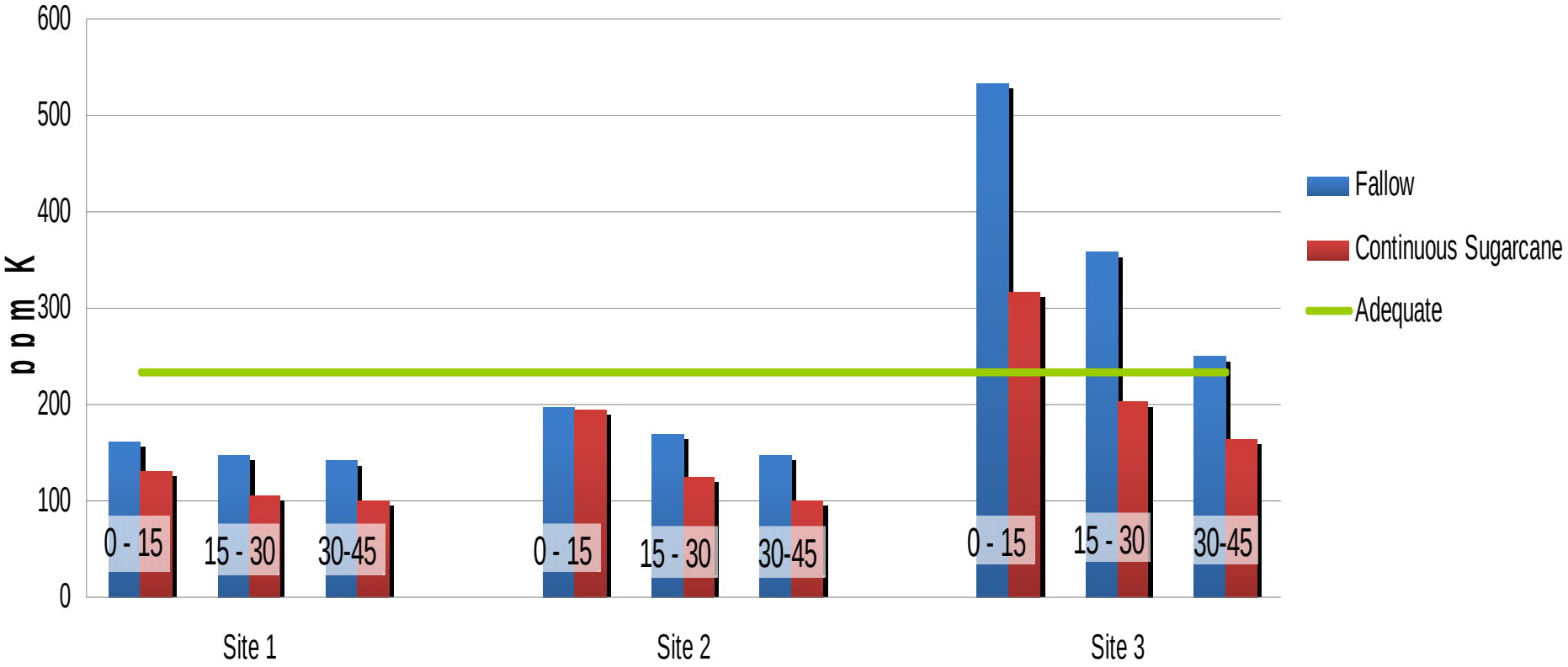
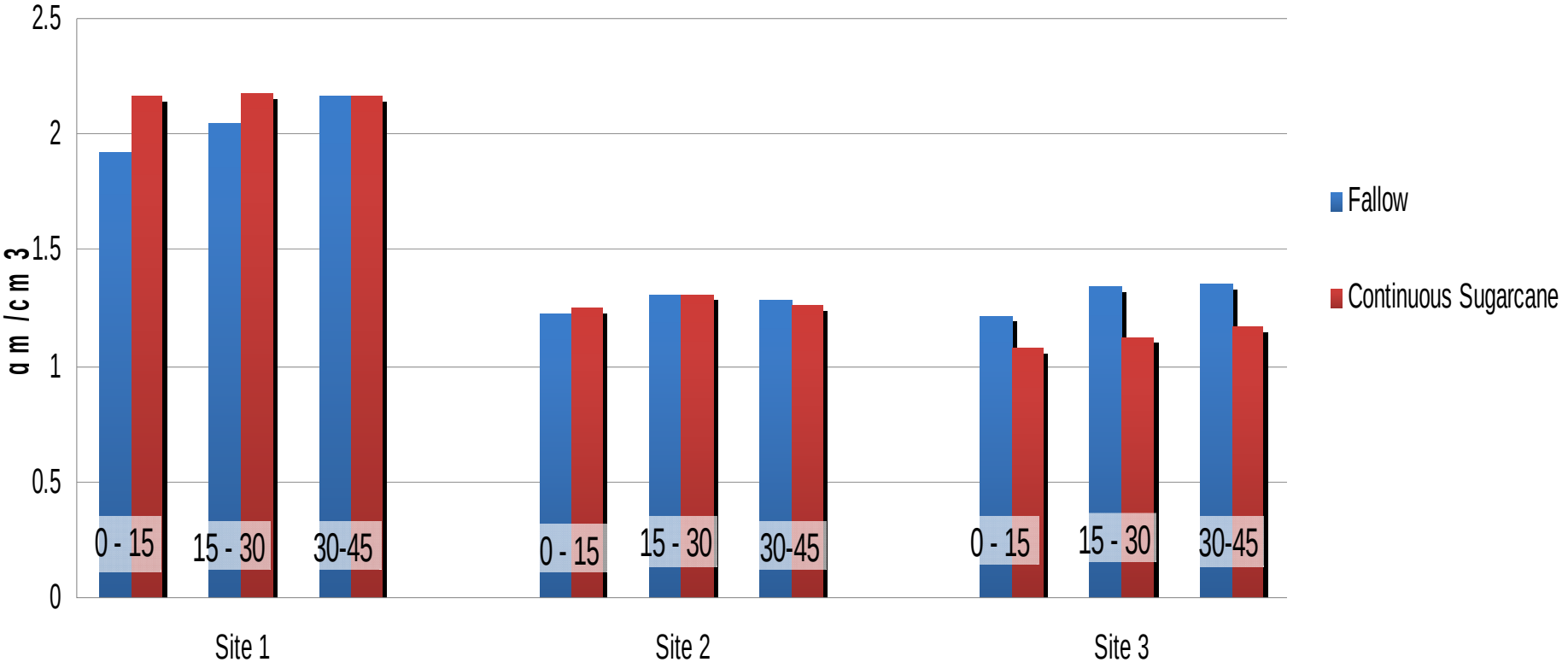


Fig 6. Comparisons of bulk density in continuously cropped and fallow lands



Water Infiltration

- Relatively heavy clays at sites
- Infiltration rates for fallow and cultivated lands were very slow (< 0.125 cm/hr)

Fig 7. Comparisons of soil pH in continuously cropped and fallow lands

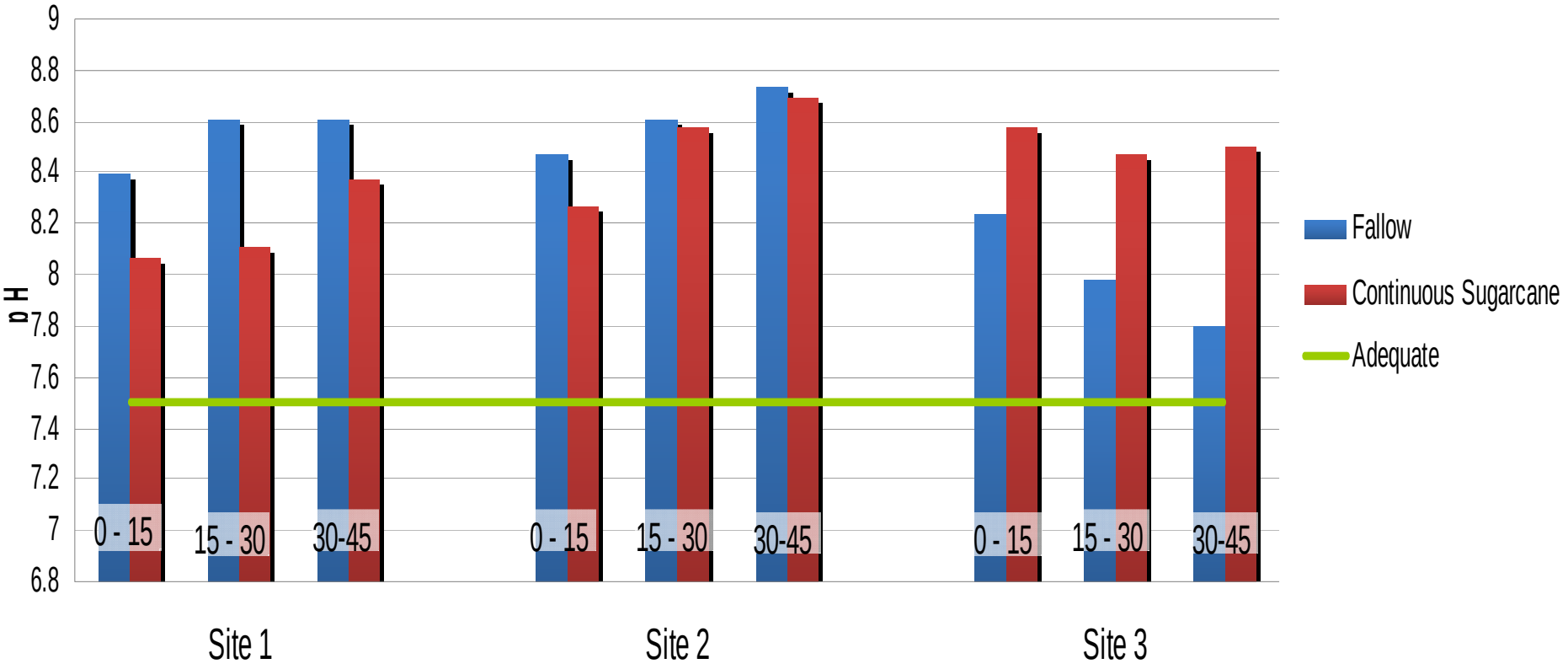


Fig 8. Comparisons of Sodium in continuously cropped and fallow lands

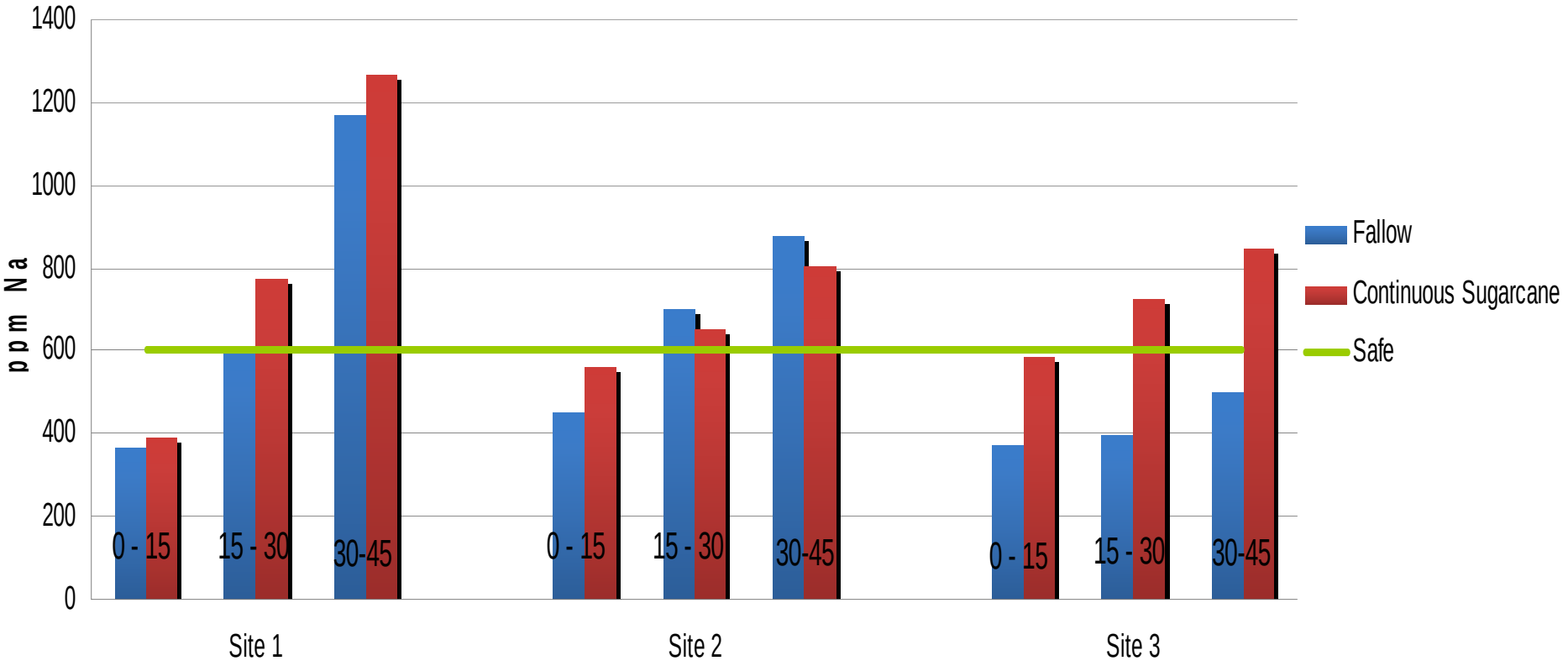


Fig 9. Sodium Adsorption Ratio in Continuously cropped and fallow lands

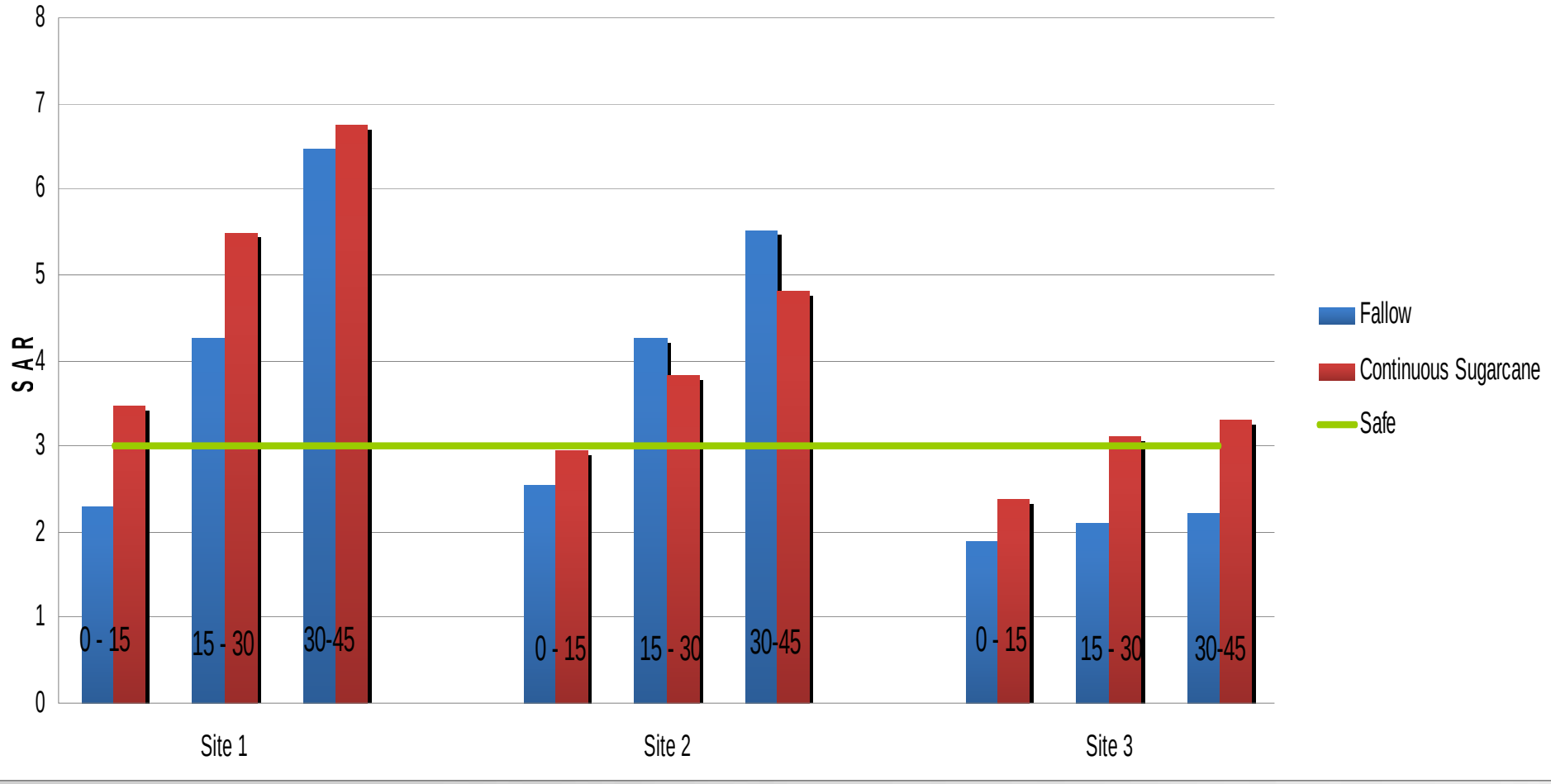


Fig 10. Comparisons of heavy metals in continuously cropped and fallow lands

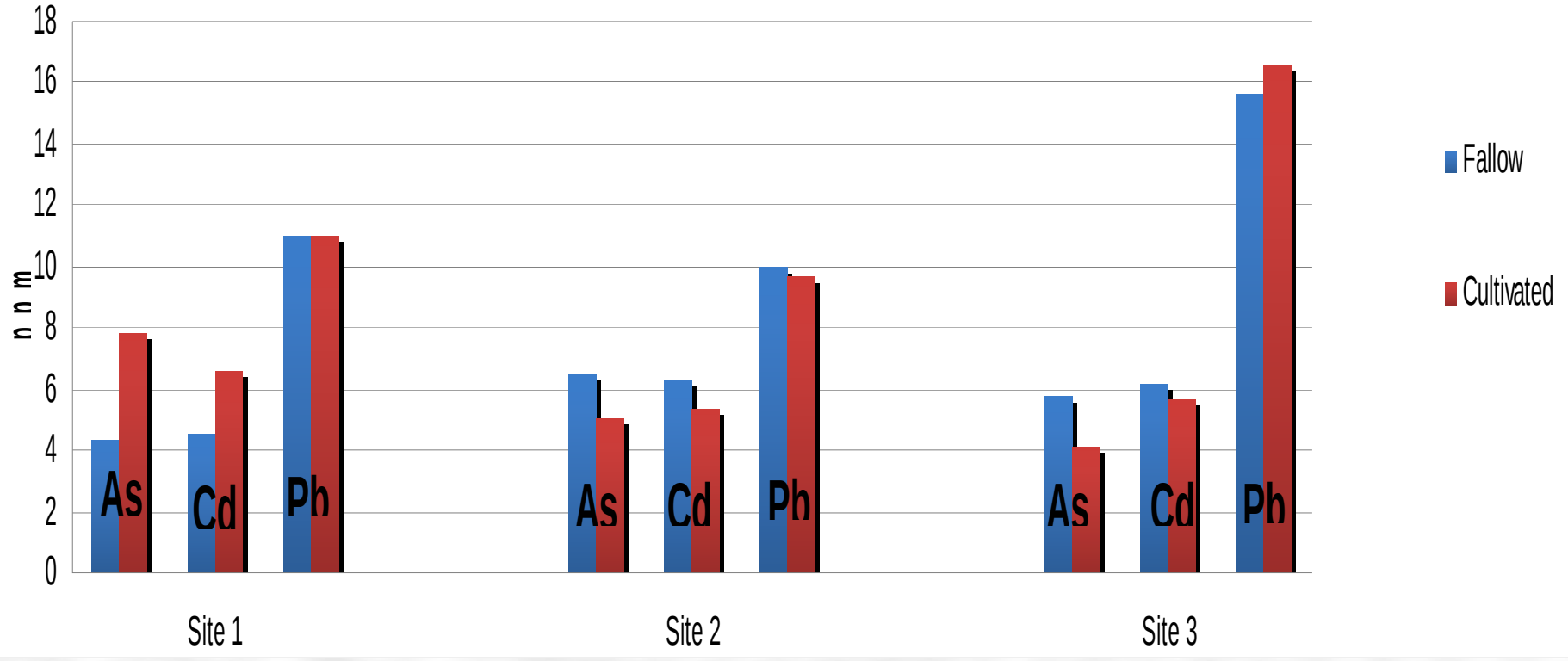


Table 1. Comparisons of mean nematode population per 100 ml soil in continuously cropped and fallow lands

Site 1		Site 2		Site 3	
Fallow	Continuously Cultivated	Fallow	Continuously Cultivated	Fallow	Continuously Cultivated
Helicotylenchus sp.					
81	293	13	41	15	16
Pratylenchus sp.					
65	39	17	11	205	28
Paratylenchus sp.					
0	0	0	0	226	0
Meliodogyne sp.					
0	0	0	0	140	0
Rotylenchulus reneformis sp.					
0	0	0	0	0	16

Table 2. Comparisons of mean nematode population per 100 grams roots in continuously cropped and fallow lands

Site 1		Site 2		Site 3	
Fallow	Continuously Cultivated	Fallow	Continuously Cultivated	Fallow	Continuously Cultivated
Helicotylenchus sp.					
0	234	0	0	0	0
Pratylenchus sp.					
0	186	0	0	0	0
Paratylenchus sp.					
0	0	0	0	0	9

Conclusions

- Fallow land showed improved organic matter, phosphors, potassium, pH and salinity.
- Lower salinity hazard in fallowed areas attributed to non-use of saline irrigation water
- High salinity in subsoil in fallowed and cultivated areas calls attention to quality of irrigation water and drainage.
- Nematode population was below economic damage thresholds.

Conclusions Cont'd

- Heavy metals accumulated with continuous sugarcane cropping but not considered to be at dangerous levels.
- A period of fallow appeared beneficial. However prospects for fallowing are limited by the demand for land.
- An alternative could be a programme of soil amendments through addition of filter cake, distillers waste and poultry manure as well as conducting general improvements in soil management and drainage.

Thank You