

Evaluation of various artificial protein sources for *Apis cerana* colonies

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Introduction

Beekeeping enterprise of Nepal faces significant challenges such as seasonal forage scarcity and nutritional stress among bees. Despite the use of various artificial diets and indigenous practices to address nutritional deficiencies, there is limited research on the effectiveness of these methods, especially for the local bee species, *Apis cerana* Fabricius.

Research questions

- How can artificial diets mitigate nutritional stress and improve hive productivity of *Apis cerana*?
- How effective are local beekeepers' diet administered during rainy dearth for optimum colony performance?

Methodology

Eight treatments with five replications were tested in 40 hives of local beekeepers. The diets were given at 3 days interval. The brood parameters, stored honey and pollen were measured every 15 days. The honey yield of first harvest during honey-flow season was taken. Data analysis was done using R4.3.2.

Key findings

- Farmers' diet, Diet 2, and Diet 8 positively influenced the honey yield.
- The Diet 1 and Diet 4 were rejected. Diet 4 was treated as debris and thrown out of hive whereas Diet 1 was not consumed.
- The availability of even low-quality natural forage reduces preference for artificial diets.

Treatments	Composition
Diet 1	Soyabean flour: Similac milk-based infant formula: Instant baker's yeast powder: Yolk: Honey: Sugar Syrup (2:1) @ 8: 2: 1: 1: 1: 2
Diet 2	Soyabean powder: Instant baker's yeast: Similac milk-based infant formula: Natural Multifloral Pollen: Honey @ 75g: 100g: 200g: 100 g: 500g
Diet 3	Chickpea powder: Instant baker's yeast: Similac milk-based infant formula: Natural Multifloral Pollen: Honey @ 75g: 100g: 200g: 100 g: 500g
Diet 4	Chickpea powder: Sugar powder: Instant baker's yeast: Similac milk-based infant formula: Water @ 75g: 100g: 45g :35g: as per need
Diet 5	Soyabean powder: Sugar powder: Instant baker's yeast: Similac milk-based infant formula: Water @ 75g: 100g: 45g :35g: as per need
Diet 6	Soyabean flour: Sugar powder: Similac milk-based infant formula: Instant baker's yeast powder: Yolk: Honey =75: 125: 25: 2: 15: 20
Farmers' Diet	Soyabean flour: honey: turmeric: drops of lemon: salt @600g: as per need: 0.1mg: 3 drops: 0.1mg
Diet 8	Sugar syrup @600g

Figure 1 Feed consumed by honeybee colony

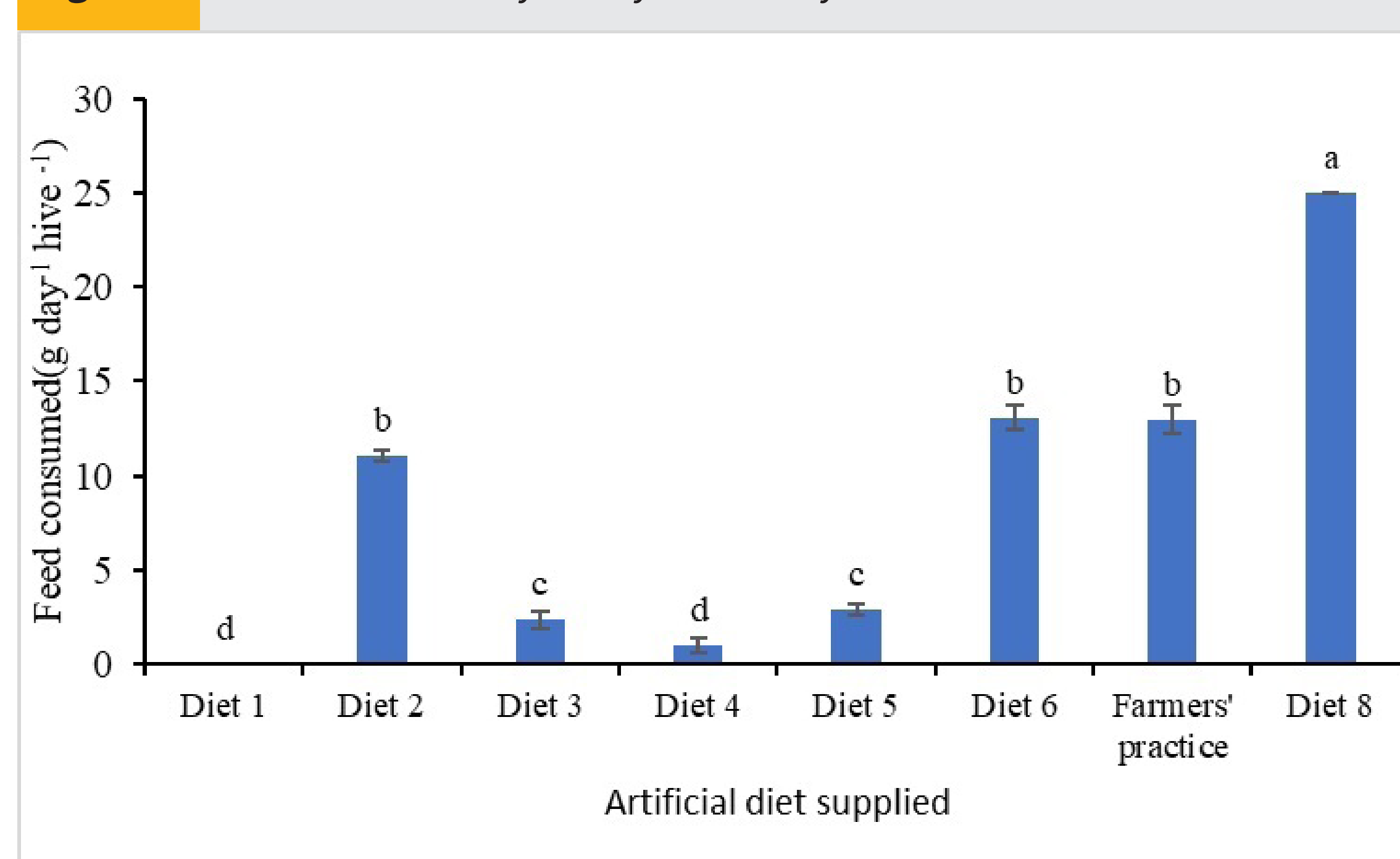


Figure 2 Honey yield as influenced by diet consumed (r=0.3, t = 2.367, p > 0.05)

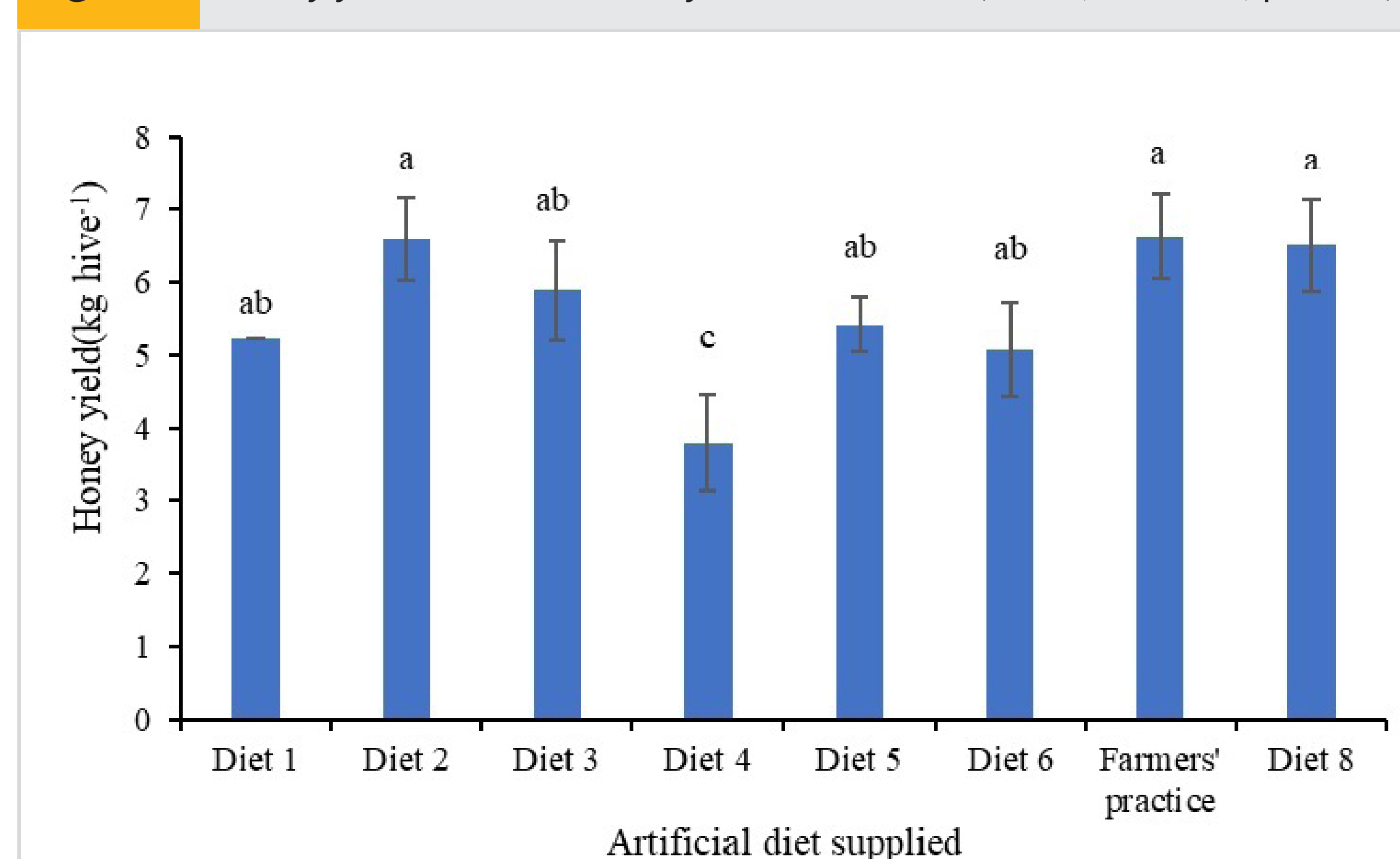
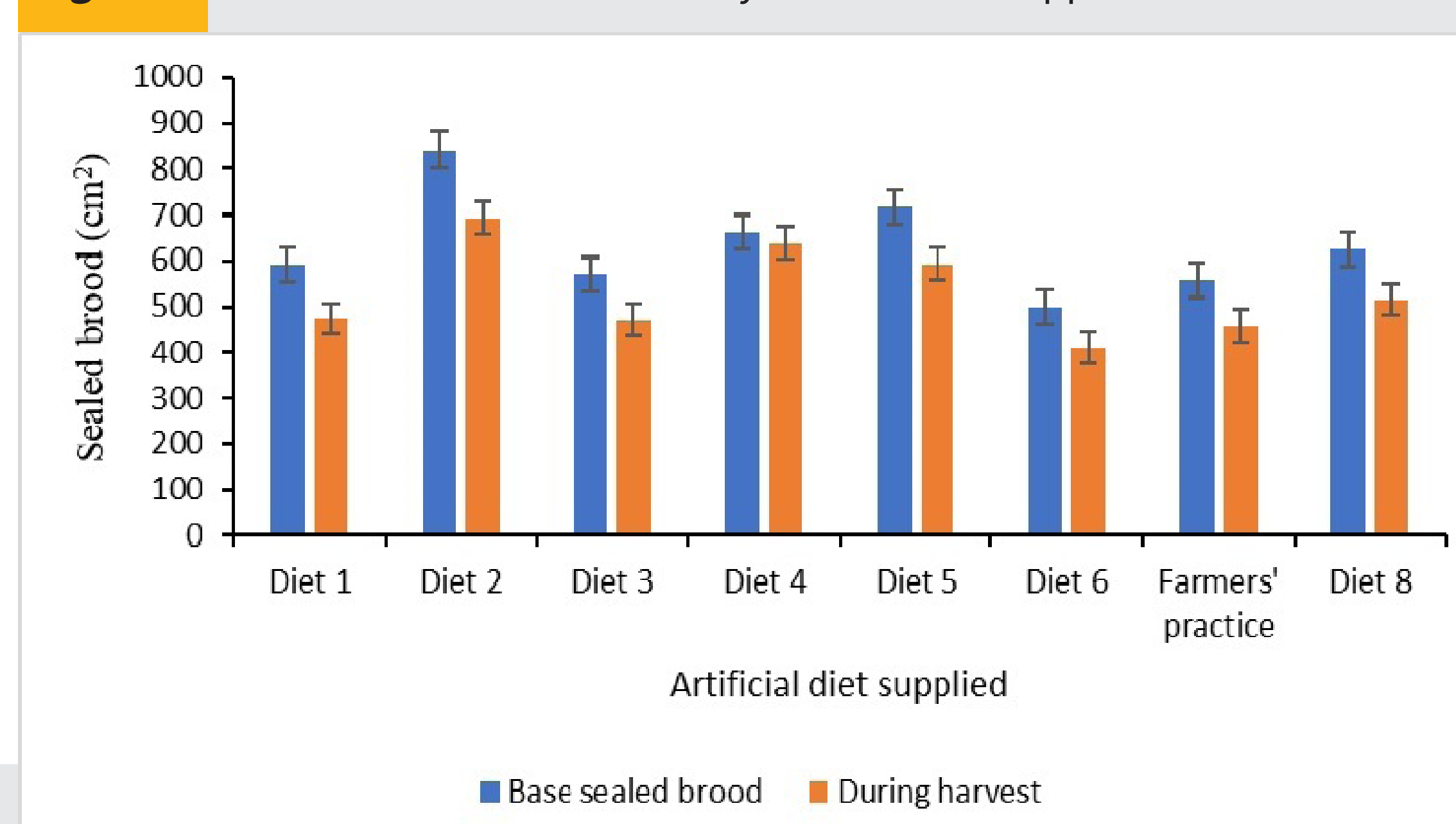


Figure 3 Sealed brood as influenced by artificial diet supplementation



Conclusion

In Dadeldhura district, the pollen-based diet and farmers' diet during rain dearth will ensure optimum honey yield. Artificial diets should be tailored to bee preferences and environmental conditions. Thus, the already established local practices should be explored, evaluated and scientifically supported for informed recommendations.

