Guide on area specific nutrient management on Capsicum

The Project for Promotion of Safe and Appropriate Use of Pesticides and Fertilizers in Sri Lanka (SAFE)

Purpose:

The cultivation of vegetables is a vital component of agricultural systems, directly impacting food security and farmers' livelihoods. Among the many of vegetables grown, capsicum stands out as a major crop in Puttalam (Kalpitiya) region.

While current fertilizer recommendations of Department of Agriculture provide a foundational guideline for open pollinated vegetable cultivation, they often lack the specificity needed to address the unique challenges and opportunities presented by different agro-ecological zones and soil types. Soils can vary significantly in their nutrient composition, pH levels, moisture retention, and other characteristics that influence plant health and productivity. Therefore, a blanket fertilizer recommendation does not effectively support optimal growth for cabbage in all regions in the country.

To address these limitations, area-specific nutrient management packages were investigated. This initiative aims to provide precise nutrient management guidelines, ensuring that farmers have access to the best practices for their region. This manual introduces area-specific nutrient management guidelines for capsicum cultivation in Kalpitiya based on the testing in farmer’s field.

Area specific nutrient management using improved fertilizer package (IDOA):

In Kalpitiya, the predominant soil type is Regosol (Entisol), characterized by low organic matter content and rapid drainage. The soil pH in Kalpitiya generally falls within the neutral to alkaline range, between 6.8 and 8.5. However, it is often noted that the soils in Kalpitiya are sandy and lack a fine-textured fraction, which can lead to rapid nutrient leaching and reduced fertility.

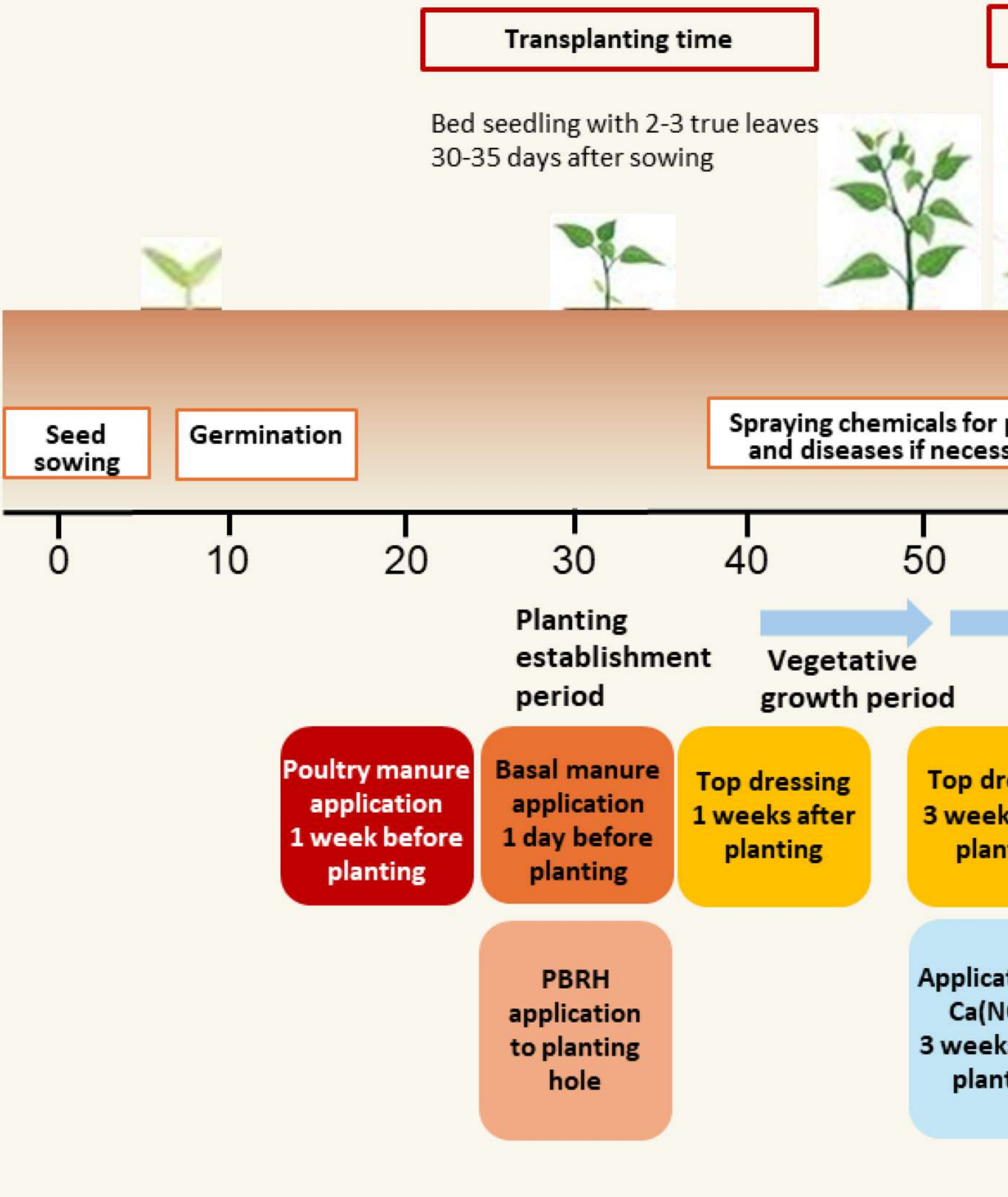
Capsicum grows best in well-drained, fertile, and loamy soils with a pH of 5.5–6.8. The soil should also have high organic matter. Therefore, it is needed to add organic matter to Kalpitiya soil. That is the reason for application of **cattle manure** (decomposted cow dung) since it has long-term effects on soil improvement . Cattle manure can improve soil structure, enhances moisture retention, and promotes beneficial microbial activity in the soil.

Because of soil type, nutrients are leaching rapidly. Therefore, the application of fertilizers **Urea** and **MOP** should be split and applied repeatedly within a short period. **Ca $(NO_3)_2$** (Calcium nitrate) provides both nitrogen and calcium, which are essential for plant growth. It strengthens plant cell walls, helps prevent calcium deficiency-related disorders, promotes healthier stems and leaves, and enhances resistance to pests and diseases. Additionally, moisture retention is low with the sandy nature of the soil which can be restricted the Ca absorption by plant roots. By providing foliar spray of Ca this situation can be prevented.

Improved fertilizer management package (IDOA) tested in Kalpitiya is shown in the following table 1:

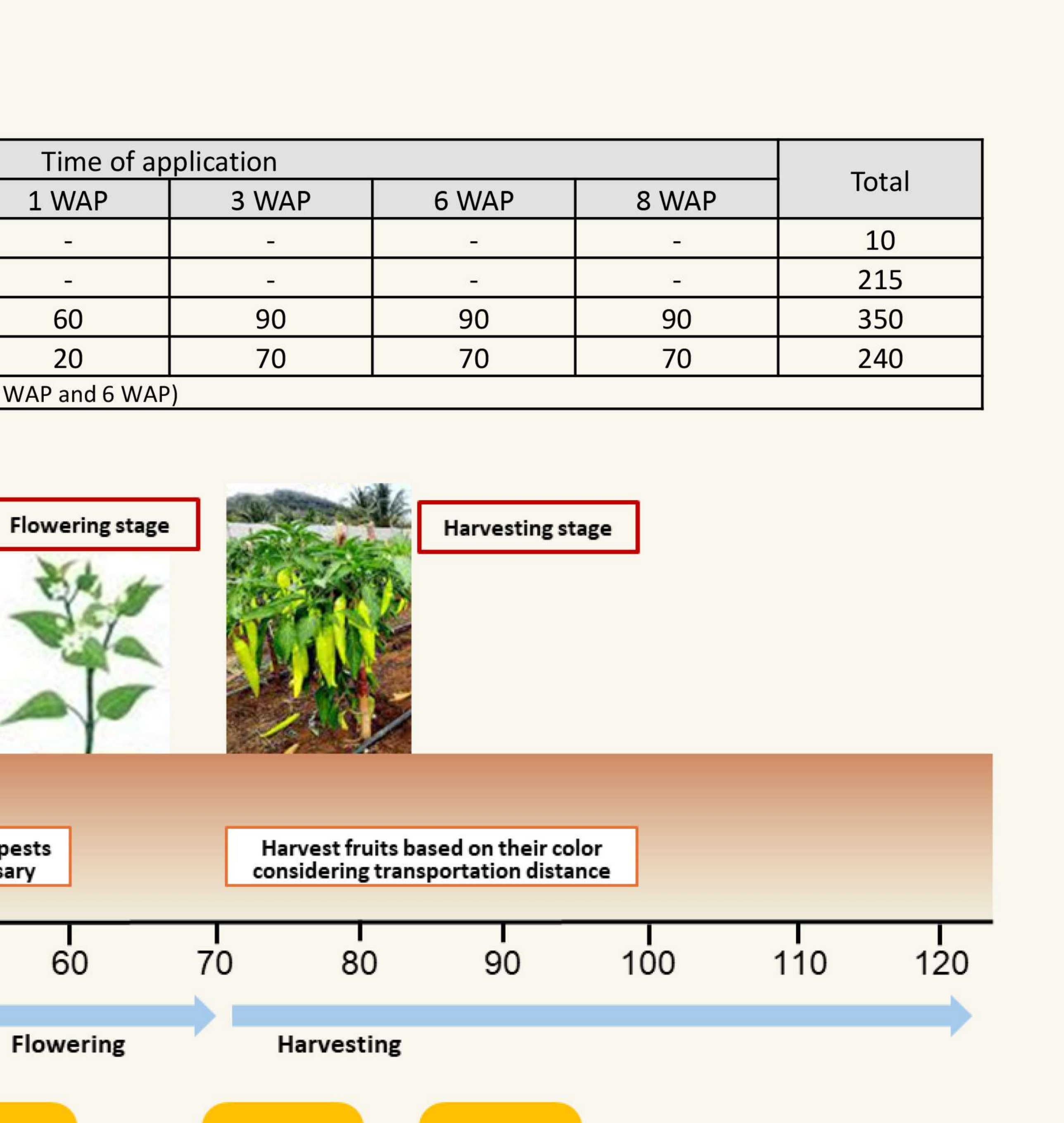
Table 1: Area specific fertilizer application in Kalpitiya

Fertilizer			
	Before planting	Basal	
Cattle manure (t/ha)	10	-	
TSP (kg/ha)	-	215	
Urea (kg/ha)	-	20	
MOP (kg/ha)	-	10	
$Ca(NO_3)_2$ foliar spray-0.5 % solution (dilution rate 5g/l water,25 tanks (16L) for one hectare)(3			



Time of application				Total
1 WAP	3 WAP	6 WAP	8 WAP	
-	-	-	-	10
-	-	-	-	215
60	90	90	90	350
20	70	70	70	240

WAP and 6 WAP)



Timing of fertilizer application

Demonstration summary:

The experiments were conducted at farmer fields in Kalpitiya area. Three farmer fields were selected for the study and capsicum variety “Prarthana” was selected. Four different treatments were tested such as current Department of Agriculture Recommendation, Soil Test Based Fertilizer Recommendation, Improved Fertilizer Management Package (IDOA) and Farmer’s Practice. The results were shown in Figure

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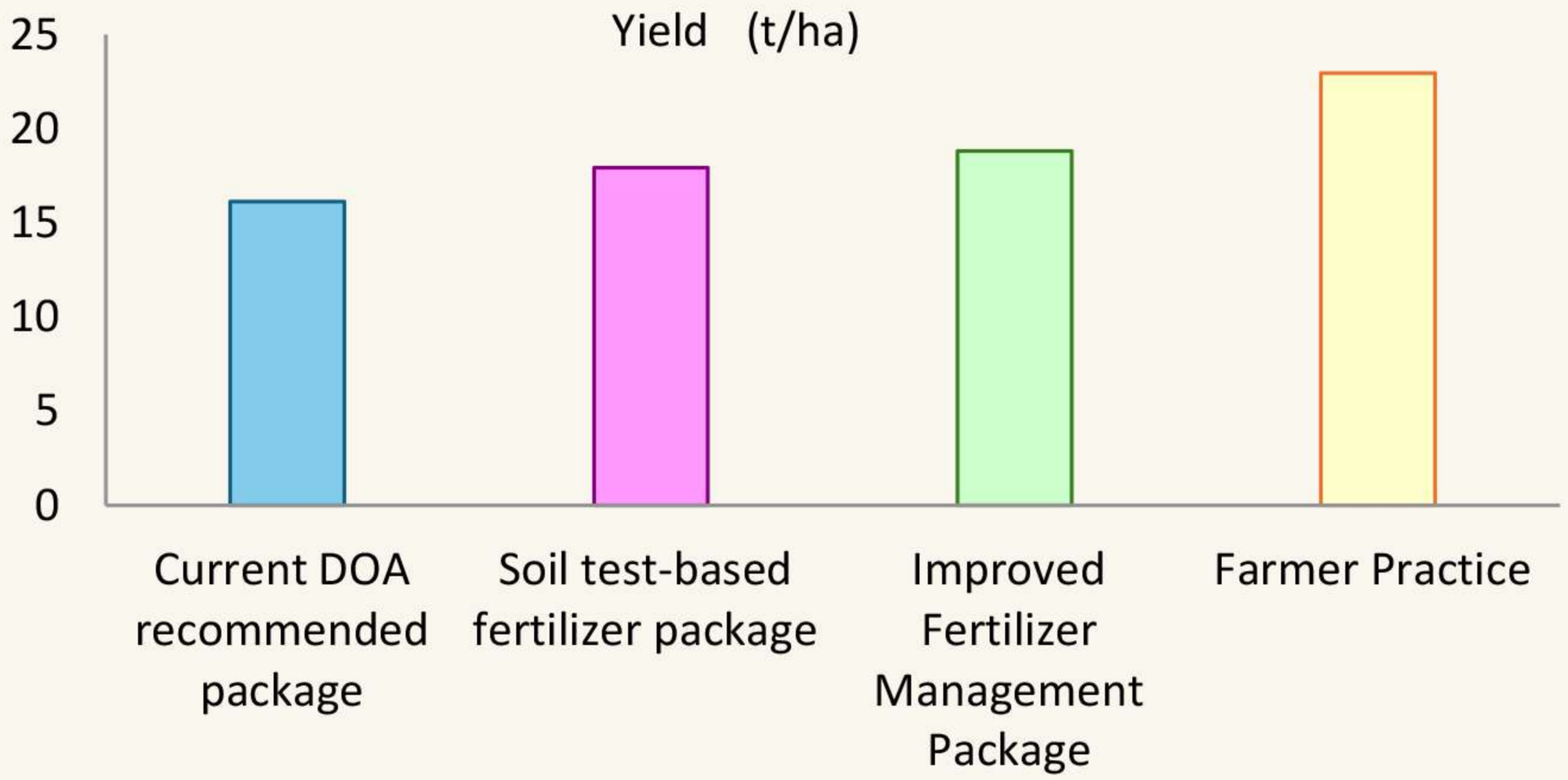
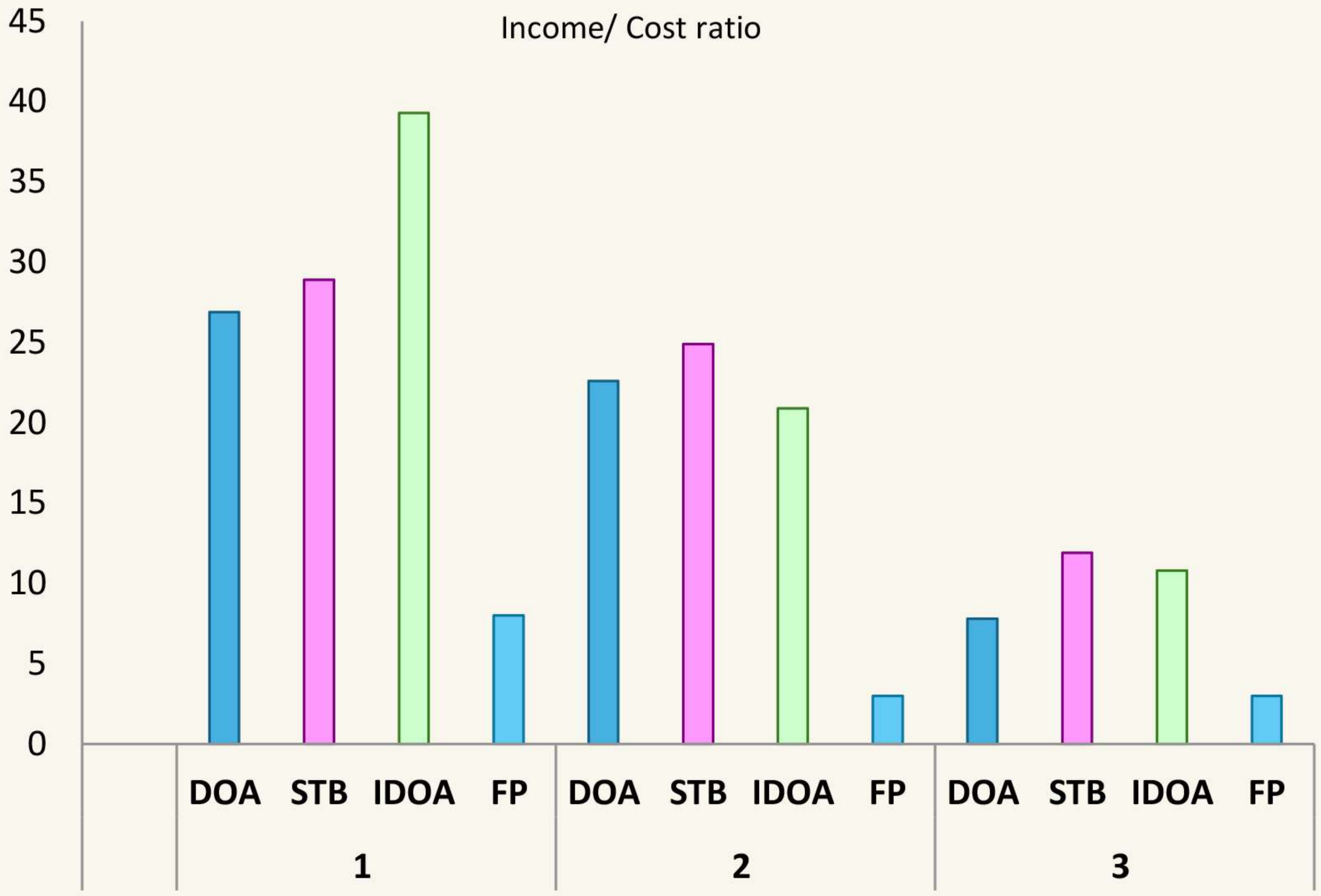


Figure 3: Results of Field Trial

*DOA-Current department of recommendation, STB- Soil test based fertilizer recommendation, IDOA - Improved package, FP-farmer practice



Income – Cost ratio, field trail Kalpitiya

As shown in Figure 3, FP treatment showed comparatively higher yield. The highest income-to-cost ratio is achieved with IDOA and soil test- based package when considering all three farmers (Figure 4). However, FP shows the lowest income-to-cost ratios across all farmers. Overall, IDOA appears to be the most profitable option for capsicum.

Capsicum field in Kalpitiya

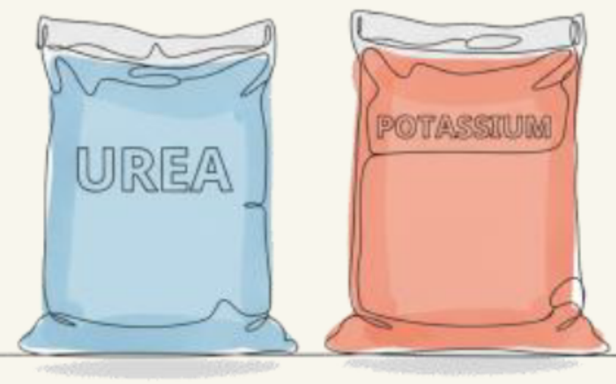
Points to note when introduce the Improved DOA nutrient package:

(1) On-time applications of balanced nutrients

On-time applications of balanced nutrients are crucial for maximizing crop growth, optimizing yields, and maintaining soil health. It ensures that crops receive consistent nutrients throughout their growth cycle. Applying nutrients at the correct growth stages ensures that plants have access to the necessary nutrients when they need them most. This promotes efficient nutrient uptake, leading to healthy growth and high yields.

(2) Split application of N and K fertilizers

Split application of fertilizers involves dividing the total amount of fertilizer into multiple doses, applied at different stages of plant growth. Split application reduces the risk of nutrient leaching and volatilization, which can occur with a single large dose of fertilizer. It can improve fertilizer use efficiency, reducing waste and the overall cost of fertilizer inputs. Further it minimizes the environmental impact of fertilizers by reducing the amount of excess nutrients that may runoff into waterways, preventing water pollution.



(3) Area specific nutrient application

This is the practice of applying fertilizers and nutrients tailored to the specific needs of different areas, rather than using a uniform application across the country. By applying nutrients where they are most needed, farmers can avoid over-application in areas that don't require them, leading to better resource utilization. This practice helps in reducing nutrient runoff or leaching, which can be harmful to the environment, especially in water bodies.

(4) Consideration of surroundings

When applying organic fresh manure, it should be de-composed, otherwise it can cause for nutrient imbalances, produce strong odors, attract houseflies, and cause discomfort for nearby residents. To mitigate these issues, fresh manure should be avoided. Additionally, after application, the manure should be covered to reduce odor and prevent nutrient loss, ensuring a more effective and neighbor-friendly application.

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