RESEARCH PROPOSAL FOR THE DEVELOPMENT AND EVALUATION OF A POWER WEEDER

Introduction:

Weeding is a crucial operation in agriculture that requires significant labor and time. Traditional manual weeding methods are time-consuming and labor-intensive, leading to increased crop production costs. More so, environmental degradation and pollution of: atmospheric air, underground water table and surface water bodies have been associated with the use of agro-chemicals for weeding operation purpose. Mechanical intervention in crop production is increasing rapidly in Nigeria. In order to reduce the drudgery involved in weeding operation and non-availability of labour, assert the necessity for the introduction of power weeder. Researchers are finding ways to manage weeds in farms using suitable mechanical devices instead of conventional hand weeding and chemical control. Mechanical weed control is effective in controlling weeds as well as it benefits the crop by breaking up the surface crust, aeration of soil, stimulating the activity of soil microflora, reducing the evaporation of soil moisture and facilitating the infiltration of rainwater. A power weeder machine can potentially reduce labor requirements, increase weeding operations efficiency, and in-turn, increase crop yields in quality and quantity (food security). This research proposal aims to develop and evaluate a power weeder machine that can improve the efficiency and productivity of small-scale agriculture.

Objectives:

1. Design and develop a power weeder machine suitable for small-scale agriculture.

2. Evaluate the performance of the machine in terms of weeding efficiency, fuel consumption, and crop damage.

3. Compare the economic and ergonomic viabilities of the power weeder machine with traditional manual weeding methods.

Methodology:

1. Literature review of existing weeding technologies and their limitations.

2. Material selection

3. Design and development of a power weeder machine with adjustable cutting width and depth.

3. Field experiments to evaluate:

   a) Machine's performance on sandy, loamy and clayey soil types and moisture conditions
   b) Machine performance on different cropping patterns and conditions
   c) Extent of machine operation to planted crops
   d) Weeding depth and width
   e) Ergonomics of the weeder

4. Data analysis to compare the machine's overall performances with manual weeding methods.

Expected Outcomes:

1. A functional power weeder machine that reduces labor requirements and increases weeding efficiency.

2. Improved crop yields and reduced production costs.

3. The findings will serve as decision making support tools for further improvement and optimization of the machine.

Significance:

The power weeder machine can benefit small-scale farmers by reducing labor costs, increasing efficiency, and improving crop yields. This technology can contribute to food security, sustainable agriculture, and rural development.

S/No	Activities	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7	WK 8	WK 9	WK 10	WK 11	WK 12	WK 13	WK 14	WK 15	WK 16	WK 17	WK 18	WK 19	WK 20
1	Literature review and design	←———————————→																			
2	Machine development and testing						←—————————————————→														
3	Field experiments and Data collection														←———————→						
4	Data Analysis, Writing and																←——————————————→				

	submission of research report																	

Work Plan Gantt Chart

Budget:

The budget for the power weeder will cover:

1. Design and development of the power weeder machine

2. Equipment materials procurement

3. Field experiments and data collection

4. Data Analysis

4. Personnel and labor costs

5. Miscellaneous costs