POLITEKNIK MALAYSIA

SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Jabatan
Kejuruteraan Mekanikal

June 2019 session

Topic:

FRUITY POLE

Group member :

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DECLARATION OF AS COPYRIGHT

TOPIC : FRUITY POLE

SESSION : JUNE 2019

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The Final Year Project as diploma student in Mechanical Engineering of Packaging, Department of Mechanical Engineering, Polytechnic Sultan Salahuddin Abdul Aziz Shah.

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We agree to transfer the FRUITY POLE intellectual property to the Polytechnic Sultan Salahuddin Abdul Aziz Shah to fulfill the requirement for us to be awarded the Diploma in Mechanical Engineering of Packaging.

Made and truly acknowledged
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i. Appreciation

We would like to express our gratitude and appreciation to all those who gave us support and help to complete this report. Special thanks to my supervisor Puan Giha Binti Tardan for her patience and constructive comments that encourage us to finish this project. Her time and effort have been a great contribution can not be forgotten.

We would to thanks to all the staff in mechanical laboratory for their precious comments, sharing idea and knowledge during this project being carried out. We also want acknowledge the assistance of everybody especially students from Diploma of Mechanical Engineering for spending their time in helping us sharing and solve the problem during our hard time in fabricated the project and finishing the report for this final year project. Finally, our profound thanks and gratitude for our family for their continuous support and confidence in our efforts.

ii. ABSTRACT

"Galah" is a tool used by humans in Malaysia to knit fruits from tall trees. However, most existing weeds do not meet the criteria for consumers, especially for farmers and fruit trees. We found that the problem with the existing pest is that the fruit falling to the ground will cause damage to the fruit. Second, the farmers' safety will be affected. Third, producing poor quality fruit and wasting time. Our goal is to ensure the safety of the farmer from injury while knitting. Therefore, to reduce the damage of fruit and make a design of fruity pole. In this project, we designed for farmer with fruit tree up to 3 meters height. The fruity pole is ideal for knitting mangoes, mangosteen and rambutan, and the time taken is expected to take about 10 second per 1 fruit. As a result of this project we have learned that fruity poles are very important in our project innovation for farmer.

Chapter 1:

1.1 Introduction

Fruit picker is a kind of tool used to pick fruit on a tree. It is done by holding a fruit picker at a certain angle, and is directed at this fruit taken. It can be done by striking, twisting, clamping and so on depending on the type of eye used. Fruit picker are usually made of bamboo or plastics because of its low cost and can be found in various sizes and altitudes. It depends on its use and the type of fruit to be taken.

At the end of the fruit picker, there are special tools for picking fruit such as twigs, fruit pickers, baskets or nets. For example, baskets and nets are used for fruit that are in the form of stems like rambutan, mango and apple. The purpose of this basket or nets is to cover a lot of fruit when quoted.

While tools such as pickers are used in non-sticky fruit such as apples, mangosteen, mango and so on. So far, there are different types of fruit picker that have been produced by different manufacturers.

1.2 Problem statement

A **problem statement** is a concise description of an issue to be addressed or a condition to be improved upon. It identifies the gap between the current (problem) state and desired (goal) state of a process or product. Focusing on the facts, the problem statement should be designed to address the five ws. The first condition of solving a problem is understanding the problem, which can be done by way of a problem statement.

Problem statements are widely used by businesses and organizations to execute process improvement projects. A simple and well-defined problem statement will be used by the project team to understand the problem and work toward developing a solution. It will also provide management with specific insights into the problem so that they can make appropriate project-approving decisions. As such, it is crucial for the problem statement to be clear and unambiguous.

1. **Fruits fall and caused damage and rotten**
   - When the farmers used a ordinary fruit picker, the fruit will continue to fall to the ground and break down due to the falling between the fruit and the ground.

2. **The safety of the farmer is affected**
   - A fruit knitted without protection will be at high risk for falls on the workers body.

3. **Producing non-quality fruits**
   - Fruits that fall to the ground will have severe side effects such as pores, bumps and scratches.

4. **Waste time, and manpower**
   - Time wasting occurs when the fruit falling to the ground will cause the farmer to collect the fruit one by one and it will cause a waste of time.

1.3 Objective

A specific result that a person or system aims to achieve within a time frame and with available resources.

In general, objectives are more specific and easier to measure than goals.

Objectives are basic tools that underlie all planning and strategic activities. They serve as the basis for creating policy and evaluating performance. Some examples of business objectives include minimizing expenses, expanding internationally, or making a profit.

1. **Employee(farmer) safety is more secure**

- Worker's safety is more secure because this fruity pole has a net where the fruit will continue to fall into the net, so the fruit will not be in of falling on the worker's body.

2. **Fallen fruits and damage fruits decreased**

- Mounted nets reduce the impuls force on the fruit when it force compare to when it fall to the ground

3. **Design fabricate**

- Create an appropriate design to innovate on the fruit knitting.

1.4 Project scope

Project scope is the part of project planning that involves determining and documenting a list of specific project goals, deliverable, tasks, costs and deadlines. The documentation of a project's scope, which is called a *scope statement*, *terms of reference* or *statement of work*, explains the boundaries of the project, establishes responsibilities for each team member and sets up procedures for how completed work will be verified and approved. During the project, this documentation helps the project team remain focused and on task. The scope statement also provides the project team with guidelines for making decisions about change requests during the project. Please note, a project's scope statement should not be confused with its charter; a project's charter simply documents that the project exists.

1. Dedicated designed for farmers with fruit trees up to 3meters in height.

- We create a fruit picker in length 3 meters to easy for the farmer knitting a fruit. We added a funnel for fruit fall into it. We change a system like we use a foot pressure to move a cutter blade.

2. To pick mango, mangosteen and rambutan.

- For Fruity Pole, we prefers fruit like mango, mangosteen and rambutan.

3. The time taken to pick a fruits using a pole is less than 10 seconds.

- Fruity pole can reduce time taken to knitting a fruit and more efficient for farmers to pick a fruit in large quantity.

Chapter 2 : Literature Review

2.1 Introduction

This chapter will explain the research done by individuals behind this project. This study was selected based on scientific operations related to the picking of the fruit to be designed. In addition, this chapter also describes the component components that will be used in this project. This study is also conducted to ensure that the project is in good working order.

2.2 Gantt Chart

L:Tarikh rencana

R:Tarikh laksana

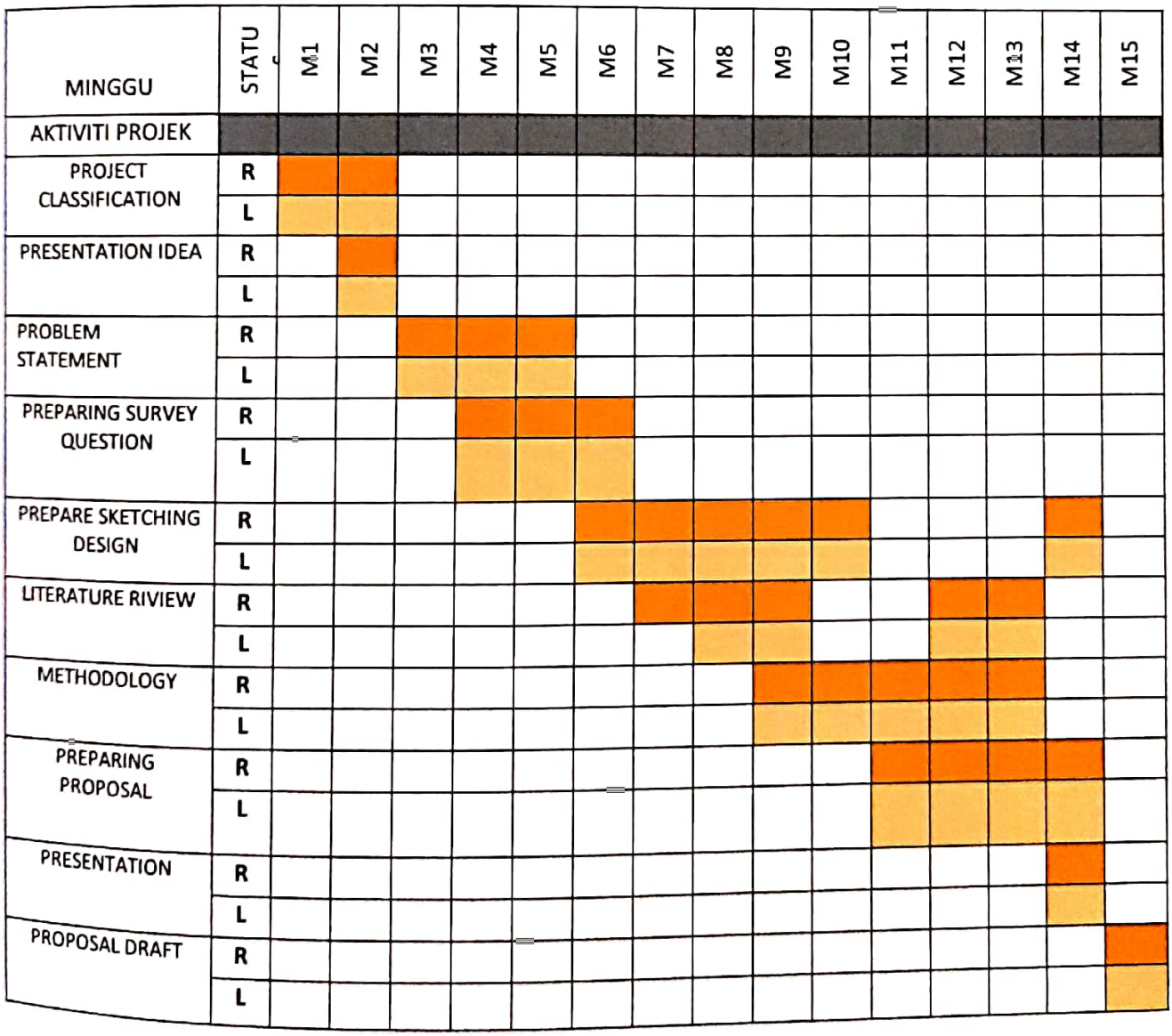

Figure 2.1: Gantt chart

2.3 Types of pole in market

1. Jagged jigsaw pocket
2. Fruit Picker (Twister Fruit Picker)

2.3.1 Jagged jigsaw pocket

This easy-to-use tool will allow users to pick fruit from trees without climbing a ladder. As can be seen in fig. 2.1, this picker has a metal basket with jagged fingers that allow the user to choose the fruit. This fruit will go into the baskets. This tool comes with 4 'extra handle.

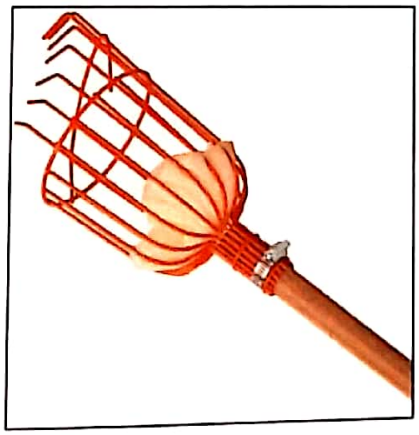

Figure 2.4: Jagged jigsaw pocket

2.3.2 Fruit picker (twister fruit picker)

Twister Fruit Picker is designed to choose small or large fruits, soft-skinned, along with most other types of fruit trees. Twister Fruit Picker can pick the fruit as small as 1 inch in diameter quickly, easily and not damage the fruit taken.

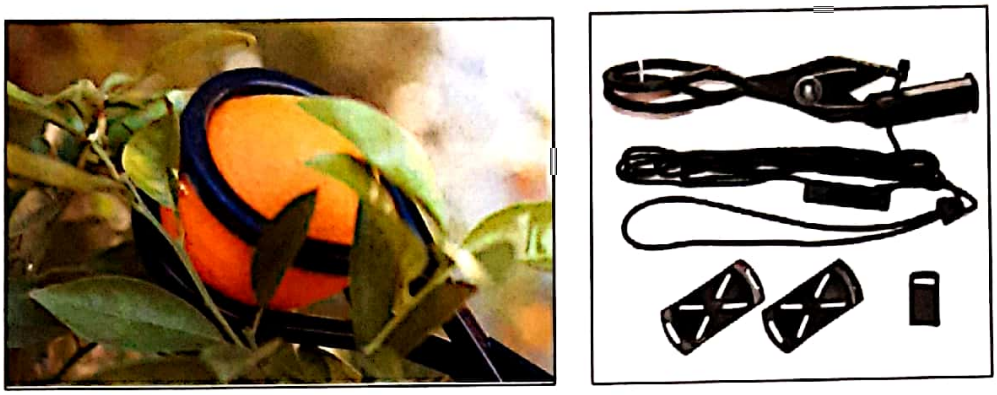

Figure 2.5: Fruit picker (twister fruit picker)

Referring to diagram 2.5, it is apparent that this tool has 2 loop functions to pick the fruit and make it easy for the user to target the fruit to be picked. It is also designed so that users can pick the fruit slowly with two hands. Additionally, fruit damage or damage to trees is not an issue and it takes on soft or hard fruits with no damage to the fruit. This can be done by twisting the fruit from the plant slowly with two hands.

2.4 Comparison

Fruity pole		Jagged Jigsaw Pocket	Twister Fruit Picker
3 meter	**Long**	3 meter	3 meter
Stainless steel	**Material**	➢ Wood ➢ Iron	Stainless steel
Medium heavy	**Weight**	Not heavy	Heavy
Foot press/hand pull	**System**	Pull	Twist and pull the string
Medium expensive	**Cost**	Cheap	Expensive
Has a funnel for fruit fall into it.	**Advantages**	Has a basket to picker fruit	Has a 2 loop to pick a fruit

Figure 2.6: comparison

From figure 2.6 ,First a length from 3 pruit picker is same. A material uses, for fruity pole is stainless steel. for jagged jigsaw pocket is wood and iron. For twister fruit picker is stainless steel. For the weight, fruity pole are medium heavy, jagged jigsaw pocket in not heavy and for twister fruit picker is heavy. For the system uses, the fruity pole is foot press/hand pull, for jagged jigsaw pocket is pull and for twister fruit picker is twist and pull string. For the cost, the fruity pole are medium expensive, for jagged jigsaw pocket is cheap and the twister fruit picker is expensive. For advantages, the fruity pole has a funnel for fruit, for jagged jigsaw pocket has a basket and twister fruit picker has a 2 loop. For the conclusion, the fruity pole is more reasonable compare to other fruit picker.

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SUPERVISOR: PN GIHA BINTI TARDAN

Chapter 3: Methodology

3.1 Introduction

Introduction Methodology can be the 'analysis of the principles of methods, rules, and postulates employed by a discipline', 'the systematic study of methods that are, can be, or have been applied within a discipline' or 'a particular procedure or set of procedures'.

Methodology includes a philosophically coherent collection of theories, concepts or ideas as they relate to a particular discipline or field of inquiry. Methodology refers to more than a simple set of methods, rather it refers to the rationale and the philosophical assumptions that underlie a particular study relative to the scientific method. This is why scholarly literature often includes a section on the methodology of the researchers.

Each step of project is a process to complete the project. Every step must be followed one by one and must be done carefully. If some error occurs it can make a project probably could not operate or do not look neat and perfect. Before the project finish, various process needs to be done according to properprocedures to ensure that projects do not have any problems. Among the measures the work done in preparing this project are.

3.2 Components

- Wire rope
- Hand cutter tools
- PVC for push (using leg)
- Steel tube
- Plate L blacket (PVC holder)
- Bolt and nut 40mm
- PVC bottle cap
- Cable ties
- Rubber for hold

Prepared By: MUHAMMAD HIDAYAT (08DMP17F1134)

3.2.1 Wire rope

Cable wires are used to bear mechanical loads or electricity and telecommunications signals. Cable wire is commonly formed by drawing the metal through a hole in a die or draw plate. Wire gauges come in various standard sizes, as expressed in terms of a gauge number. Cable wire comes in solid core, stranded, or braided forms.

- 1.5 stainless steel wire rope
- 20meter/lot
- 304 stainless steel wire rope Anti rust line

Figure 3.1 : Cable wire

3.2.2 Cutter tools

Hand cutter tools are commonly used for cut the twigs of plant. For this project, we install the cutter into steel. It is strong enough to trim hard branches of trees and shrubs, sometimes up to two centimeters thick. They are used in gardening, arboriculture, farming, flower arranging and nature conservation, where fine-scale habitat management is required.

- 5 inch blade length
- 0.9 x 1.9 x 5.6 inches dimension
- 0.3 kg of weight
- Stainless steel material
- 1.5 cm spring length

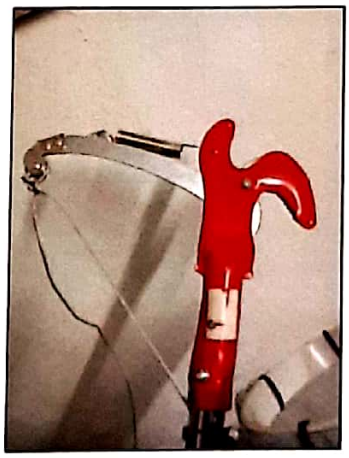


Figure 3.2: Hand cutter tools

3.2.3 PVC for push (using leg)

Is used to pull the wire from the cutter so that it can move the knife to the cutter using the PVC tracing method.

- Diameter : 30cm
- Lightweight
- Material : PVC

Figure 3.3 : PVC for pull

3.2.4 Steel tube

Steel pipes are long, hollow tubes that are used for a variety of purposes. They are produced by two distinct methods which result in either a welded or seamless pipe. In both methods, raw steel is first cast into a more workable starting form. It is then made into a pipe by stretching the steel out into a seamless tube or forcing the edges together and sealing them with a weld. Its versatility makes it the most often used product produced by the steel industry. They are used underground for transporting water and gas. Employed in construction to protect electrical wires. While steel pipes are strong, they can also be lightweight. This makes them perfect for use for ours machine. Other places they find utility is in automobiles, refrigeration units, heating and plumbing systems, flagpoles, street lamps, and medicine to name a few.

- Material : stainless steel
- Size: 2000mmx4mm×1mm
- Lightweight
- High strength
- Heat resistance
- Fear arctic and high temperature
- Color silver

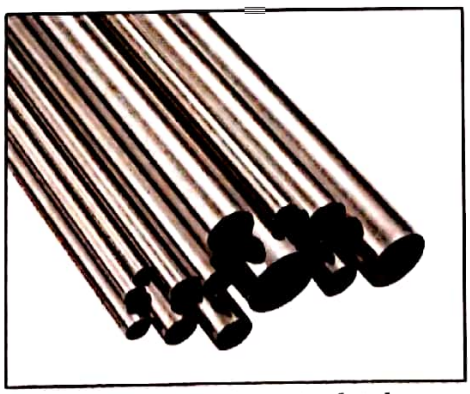


Figure 3.4: steel tube

3.2.5 Plate L blacket (PVC holder)

Plate L blacket was originally used to support shoe shelves, kitchen shelves and more. However, in this project we used plate L blacket to attach PVC for feet.

- Width : 15 mm
- Made of steel, zinc plated finish
- Easy to install by screws. Mounting screws are not included
- Reinforces inside of 90-degree-angle joints
- Easy to use and for immediate support

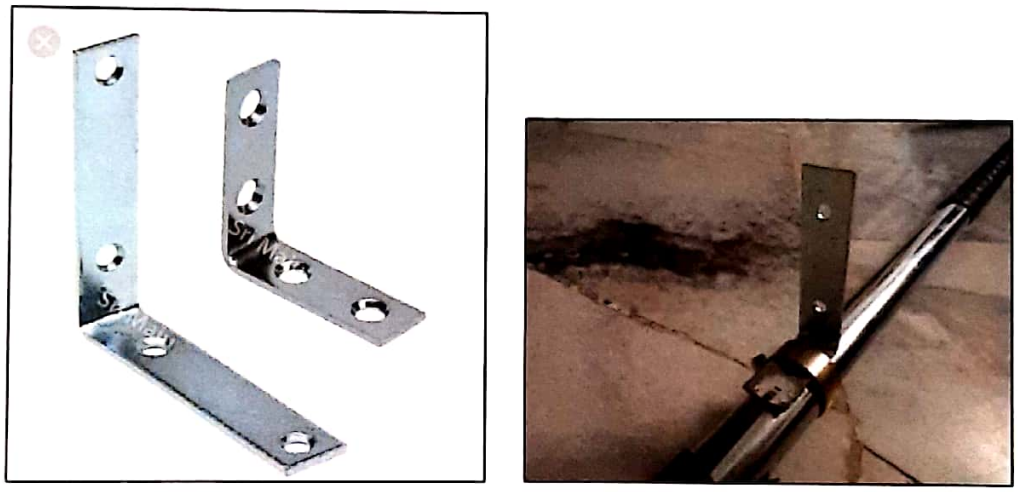


Figure 3.5 : Plate L blacket

3.2.6 Bolt and nuts 40mm

These hex bolt and nut sets are ideal for fastening metal to metal and metal to timber. They are commonly used for securing the two objects where there is access to the backside to install a nut. They are used in a wide range of industrial application. They are driven by a wrench. Grander 316 stainless steel hex bolt and nut washstand rust, allowing the fasteners to be used in coastel areas. High tainsile steel hex bolt and nut enhance strength and thoughtless to reduce change of breaking.

- Model name: pinnacle M6 x 40mm Steel Hex Bolt and Nut
- Metric thread size M6 x thread length 40mm, hex head
- Stainless steel
- Product dimension(mm) : W:50 H:110 L: 30
- Weight : 0.064kg
- Bolt finish : stainless steel
- Bolt size: M6 x 40mm
- Bolt head type : hexagon

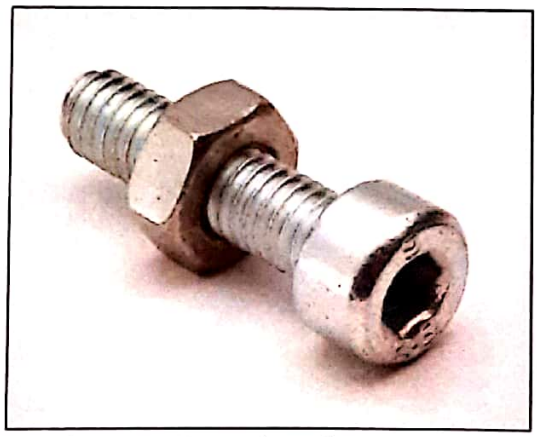


Figure 3.6 : Bolt and nuts 40mm

3.2.7 PVC bottom cap

As the largest manufacturer of PVC caps in the world, StockCap has the most extensive line of PVC caps, plugs, flange covers, and masking products available. Of course, this broad line of products evolved due to the special advantages that PVC caps and plugs have over most hard plastic closures. Here are some of the most common reasons people choose to use PVC when specifying everything from dust caps to plastic closures.

- Flexible material
- PVC bottom cap with high temperatures
- Has a greater chemical resistance
- Easy to install

Figure 3.7: PVC bottom cap

3.2.8 Cable ties

Standard **cable ties** are commonly fabricated from nylon grade 6.6 and are used to harness and bundle items, usually wires. Functioning like straps, **cable ties** are available in miniature sizes for holding small loads, and are also fabricated in long lengths and strong tensile strengths for large items or bundles.

They are used to organize all kinds of **cables**, like those used with a computer, an entertainment system, or in a network. They are usually plastic, nylon, rubber, or velcro strips that are used either used once or that are reusable.

- Material : plastic
- Strong
- Flexible
- High quality

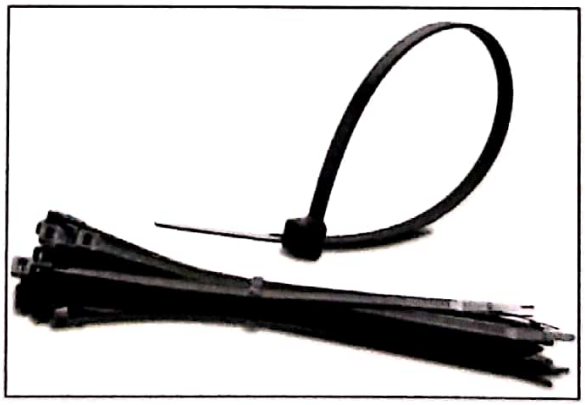


Figure 3.8: Cable ties

3.2.9 Rubber for hold

This rubber was originally used for badminton rackets. However, in this project we use it as a handle on the iron rod to prevent slippage when held. It also provides comfort when held. In addition, it can reduce the risk of harm as it can cause injury.

- Material : rubber
- Anti slip
- Strength
- Long
- Soft

Figure 3.9: Rubber for hold

3.2.10 Net

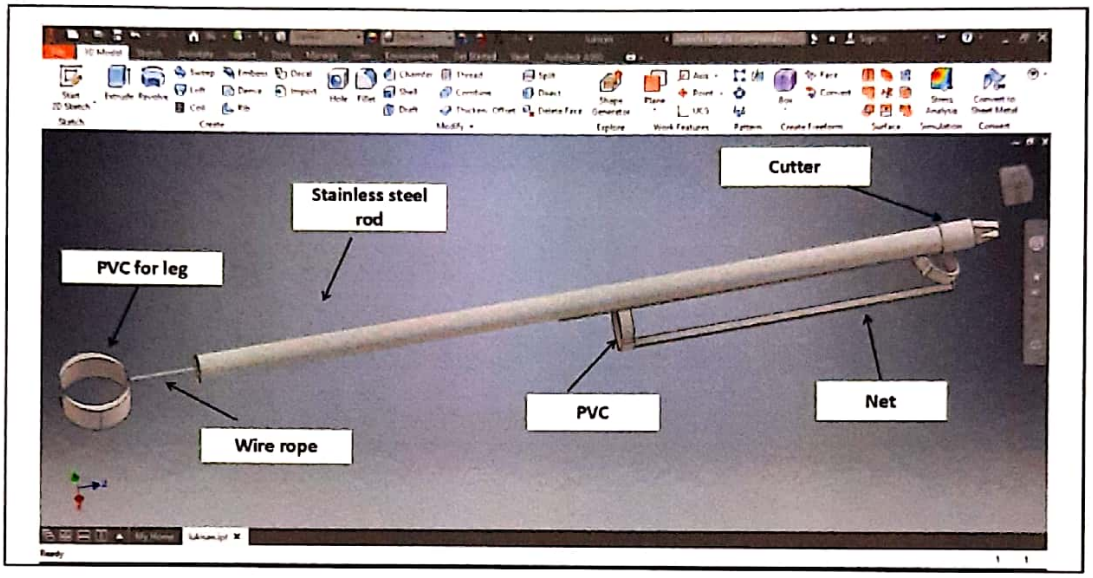
In this project we use a net so that the fruit picked goes into the funnel of the net. This is because we want to reduce the risk of the fruit being picked.

- Material : plastic
- Flexible
- Strong
- 1.5 meter

Figure 3.10: Net

3.3 Design of project

Project design is an early phase of the project where a project's key features, structure, criteria for success, and major deliverables are all planned out. The point is to develop one or more designs which can be used to achieve the desired project goals.



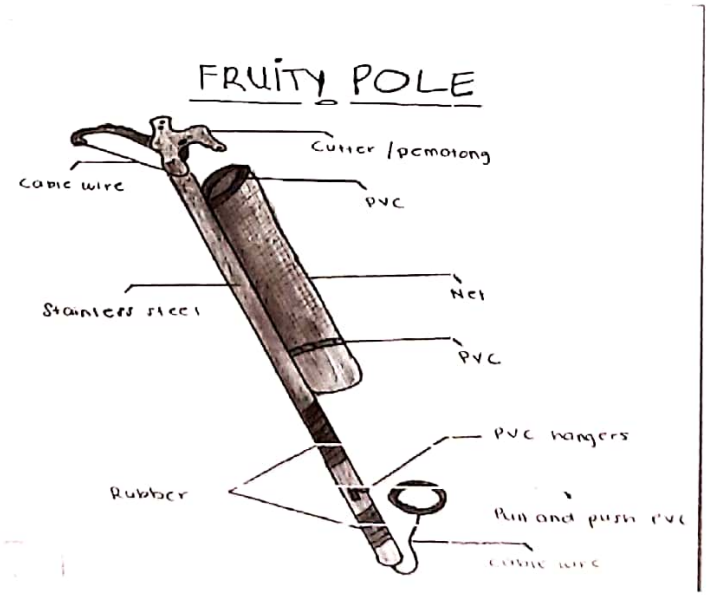


Figure 3.11 : Design of project

3.4 Flow chart plan for project

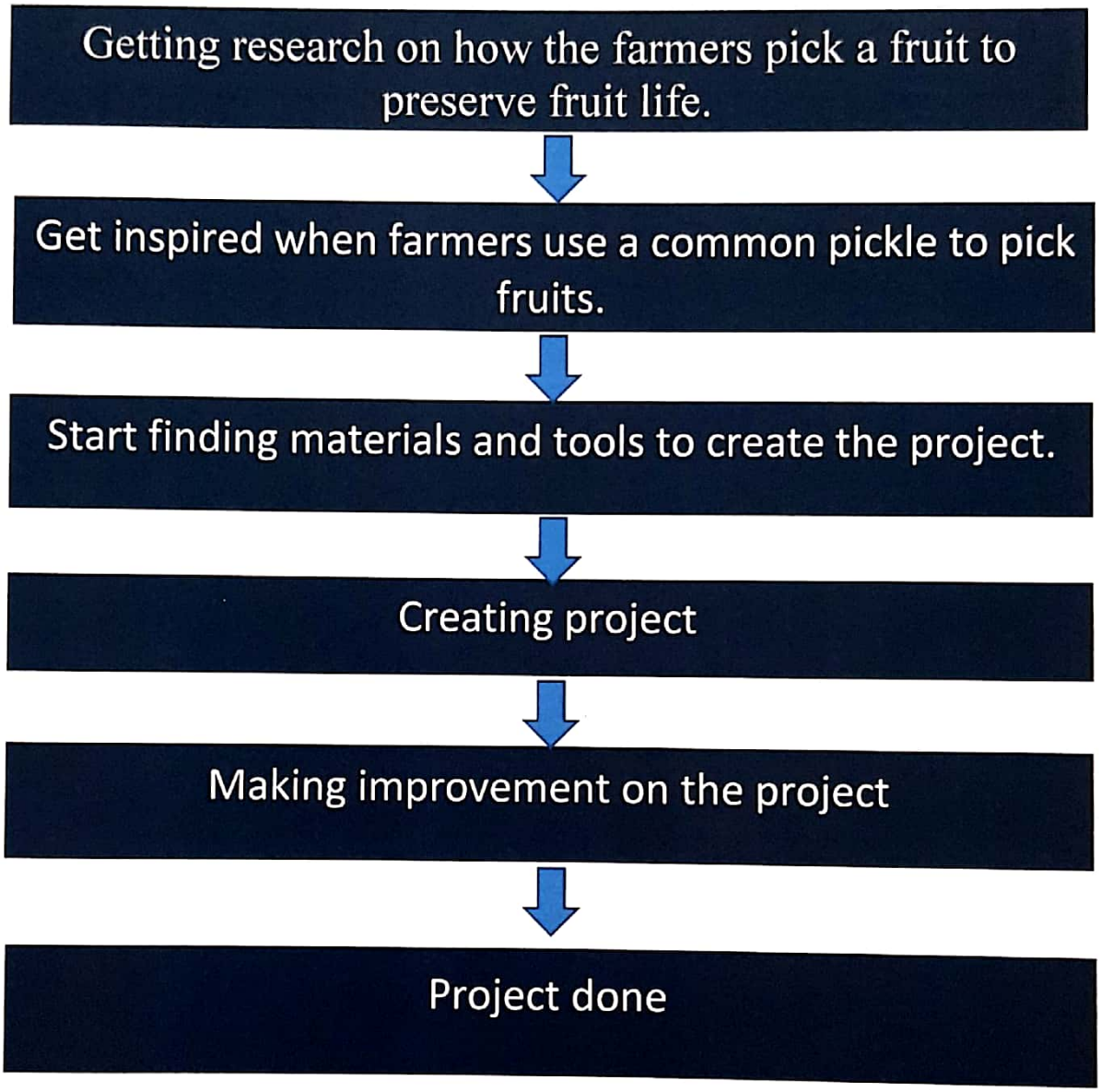
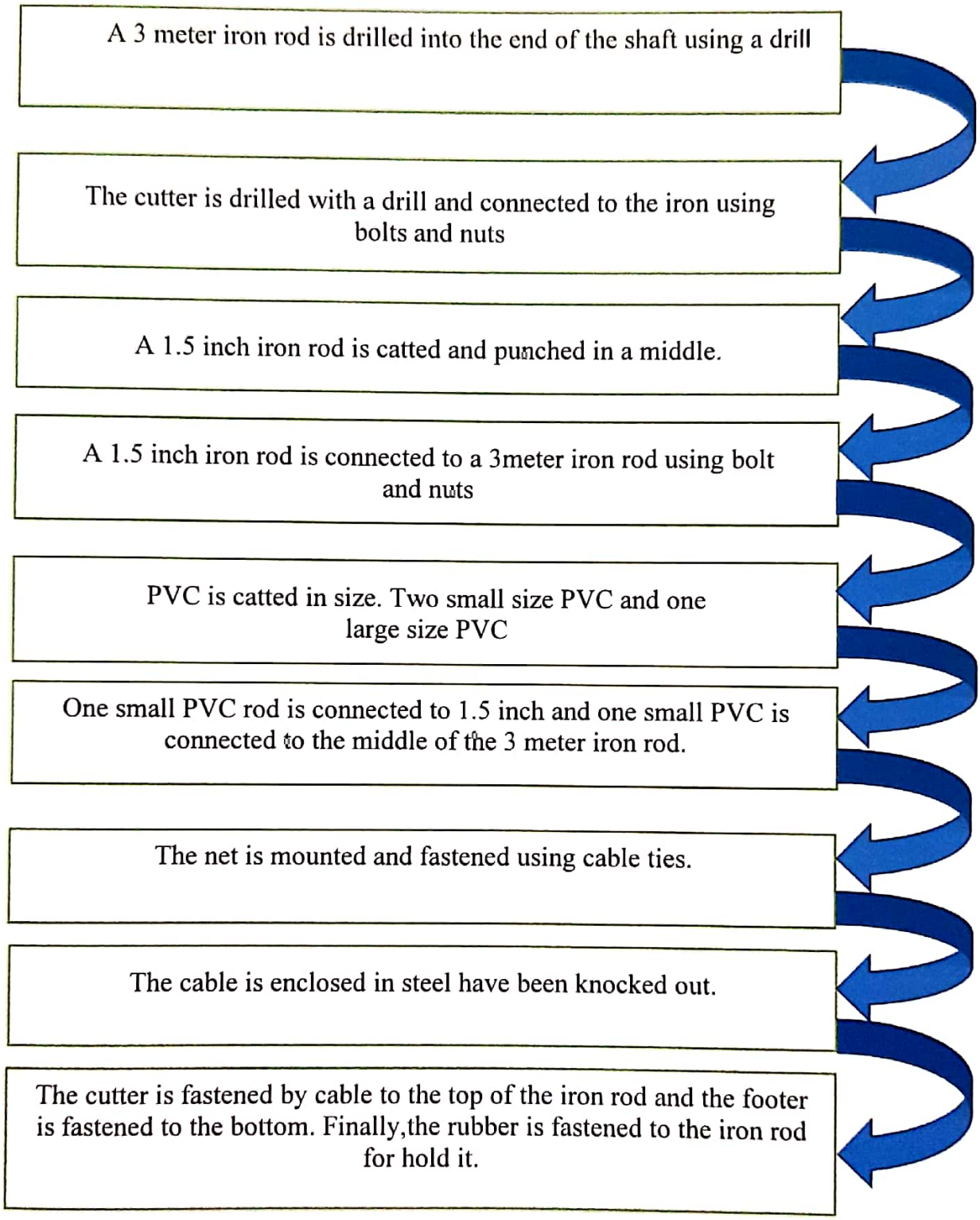


Figure 3.12 : Flow chart plan of project

3.5 Flow chart of project construction



3.6 Cost of project

COMPONENT	COST
Bolt and nuts 40mm	RM 4
Cable Wire	RM 10
Net	RM 10
PVC	RM 10
Stainless Steel Rod	RM 20
Cutter	RM 25
Rubber for Hold	RM 18
Cable Ties	RM 4
PVC Hangers	RM 3
PVC Bottom Cap	RM 1.20
TOTAL	**RM 105.20**

Table 3.6: Cost of project

From the Table 3.6, we find that the price of each component is very affordable and affordable. It also allowed us to create a budget for Fruity Pole. The result from table 3.6 of the total items is RM 105.20 Which is very affordable.

4.0 Data and Analysis

4.1 Introduction

Once all the data and information was obtained, the analysis was performed to see the effectiveness of fruity pole to pickup a fruit like mango, apple, and mangosteen for farmers.

The results obtained in this chapter are the results obtained from the questionnaire and experiments conducted in the study area. The results of the experiment in the study area are analyzed in more detail to draw conclusion based on the stated objectives of the study.

The result has been get a 351 respondents from PSA student, farmers and netizen. There are several aspects that are the main focus:

- Respondent demographics (people, and gender)
- Survey question

4.2 i Respondent demographics

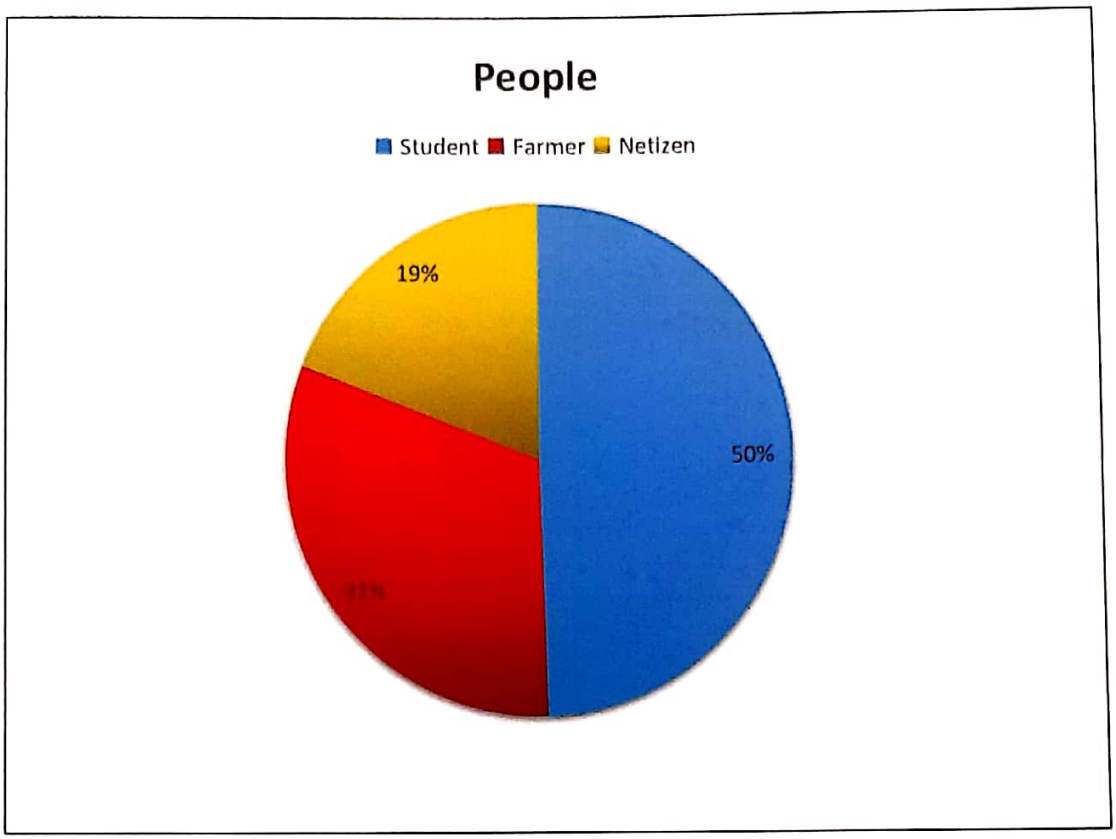


Figure 4.2 i : People

Figure 4.2 I shows the number of civilians who responded to the study. A total of 50% respondents were 176 students. 32% respondents were 120 is a farmers. And lastly a 19% respondents were 55 is a netizen.

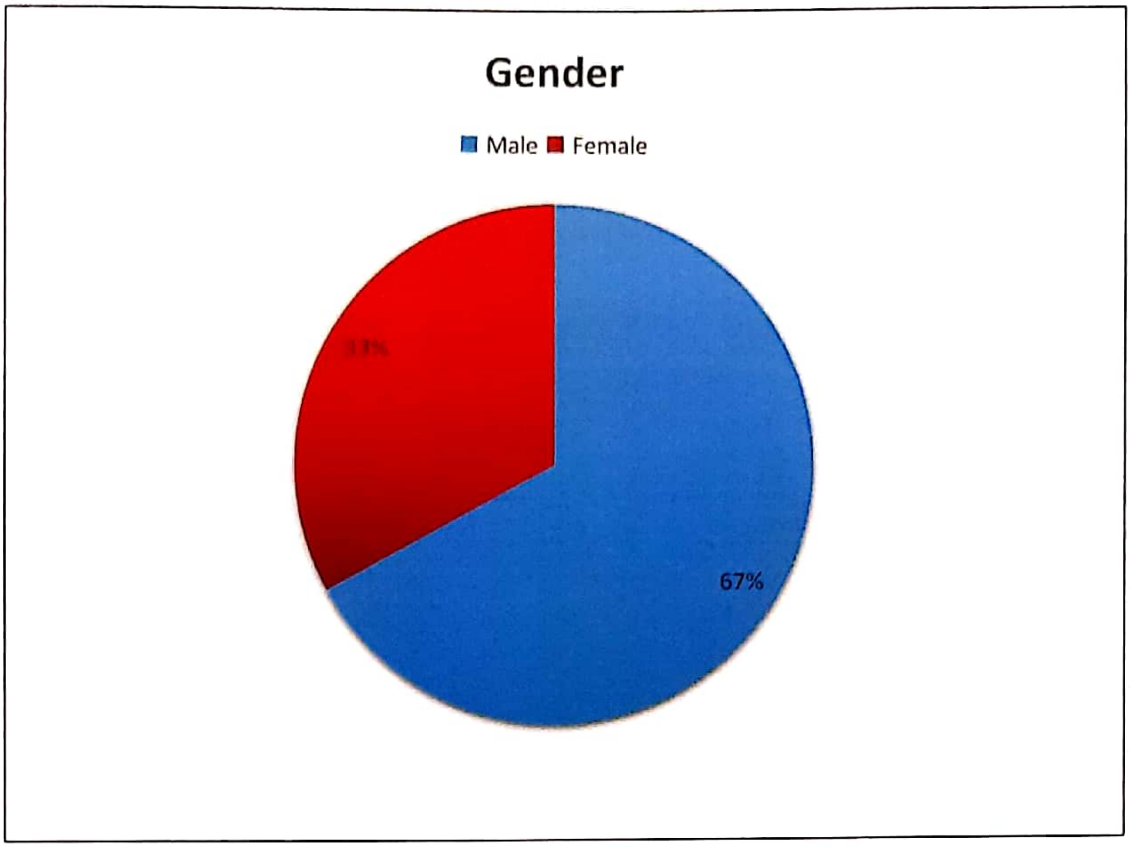


Figure 4.2 ii : Gender

Figure 4.2 ii shows the number of gender who responded to the study. 67% of the respondents were 235 is male. For female with 33% has been respondents with 116 for female.

4.3 Data from servey question

4.3 i Difficulty to knitting fruit

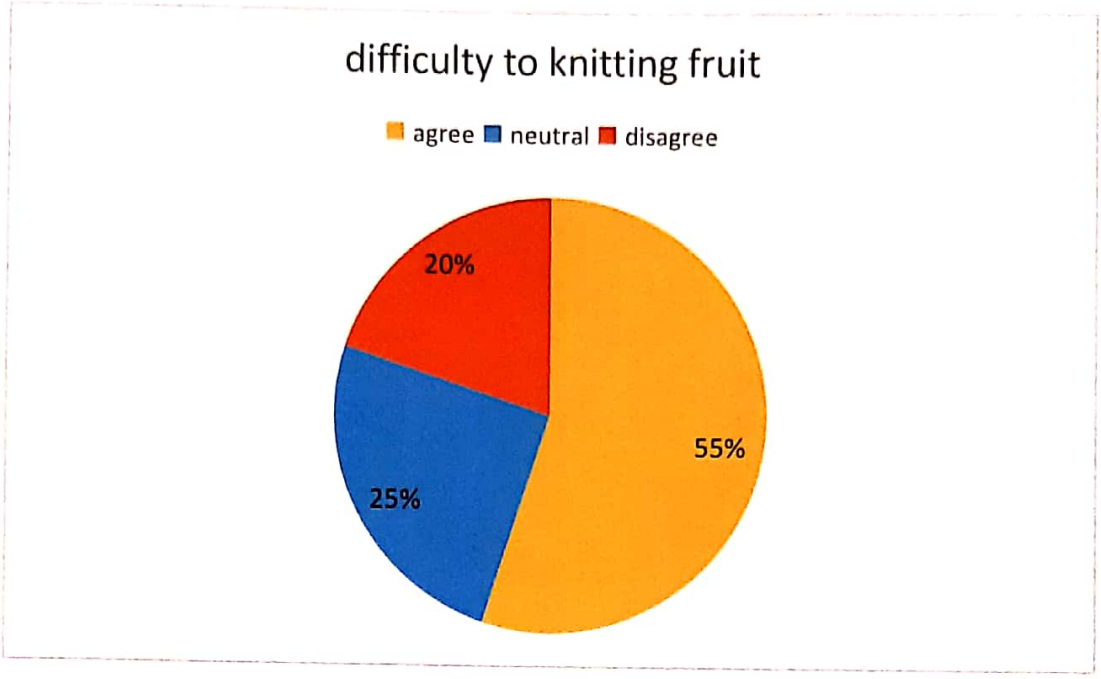


Figure 4.3 i : Difficulty to knitting fruit

From the **Figure 4.3 i** is shown the analysis of the difficulty to knitting fruit by using ordinary fruit picker. From the analysis, 55% respondent agree with the statement. 25% respondent for natural with the difficulty using the ordinary fruit picker. 20% respondent for disagree with the statement.

4.3 ii Does your body feel sick during or after knitting fruit

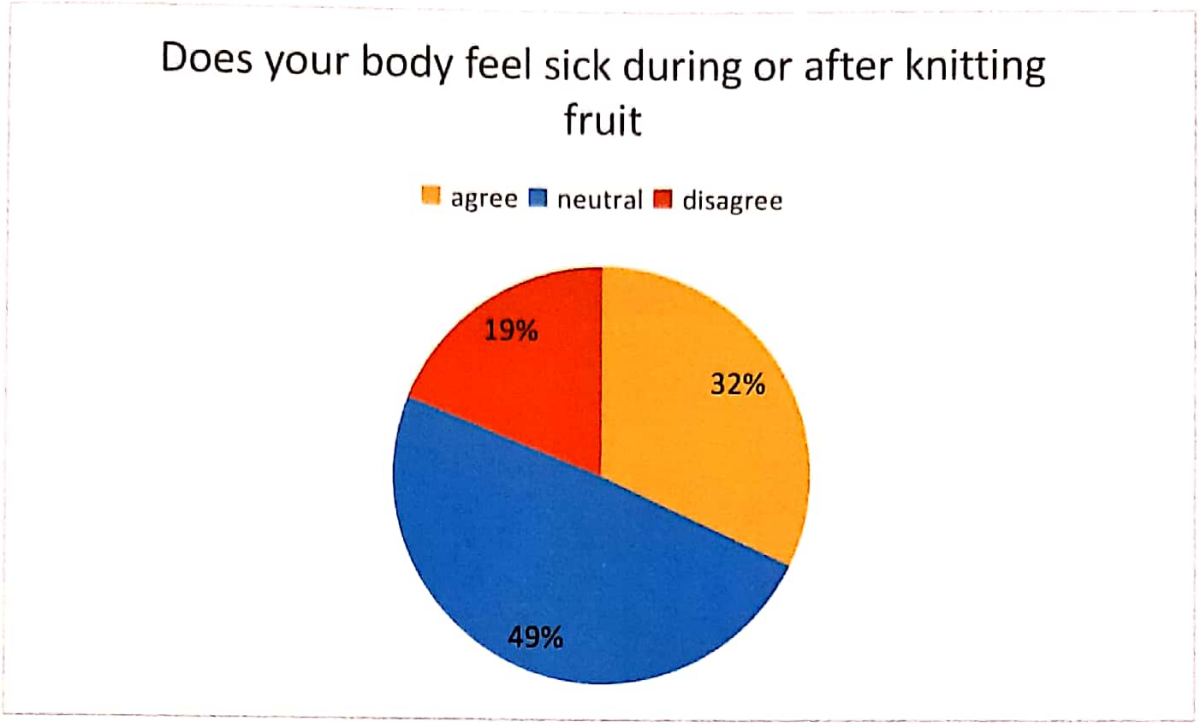


Figure 4.3 ii : Does your body feel sick during or after knitting fruit

From the graph beside is shown the analysis of the Does your body feel sick during or after knitting fruit by using ordinary fruit picker. From the analysis, 49% respondent neutral with the statement. 32% respondent for agree with the statement. 19% respondent for disagree with the statement.

4.3 iii Will your fruit be damaged due to falling when kitting the fruit

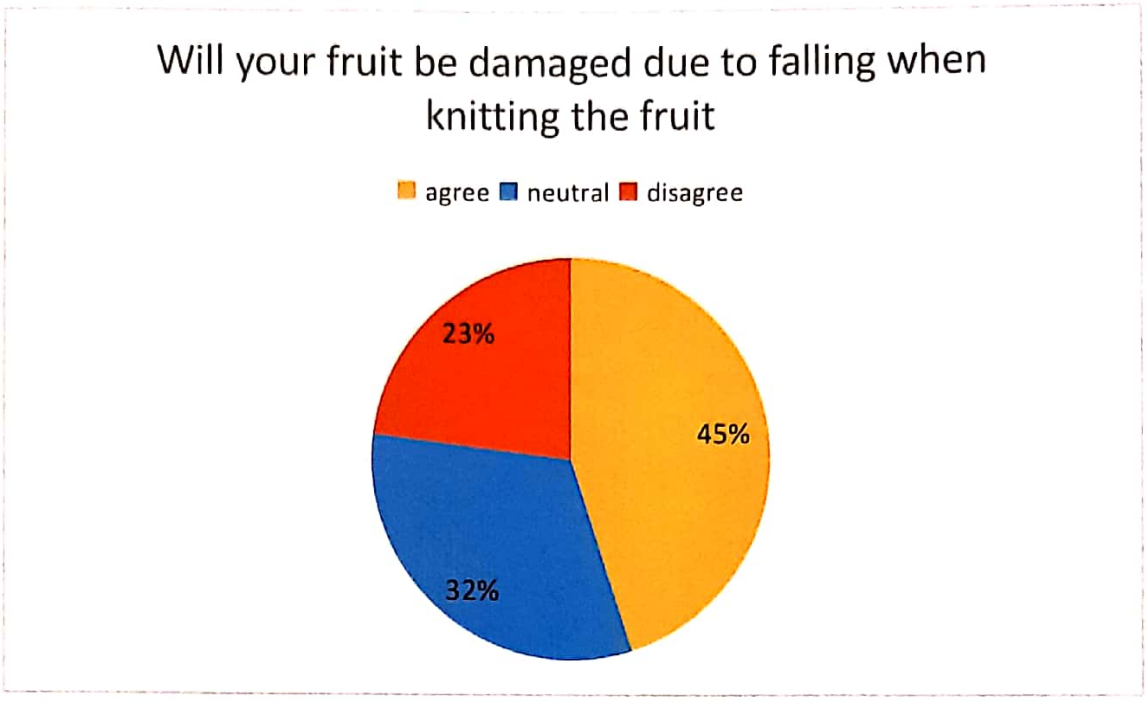


Figure 4.3 iii : Will your fruit be damaged due to falling when kitting the fruit

From the graph beside is shown the analysis of the Will your fruit be damaged due to falling when knitting the fruit by using ordinary fruit picker. From the analysis, 45% respondent agree with the statement. 32% respondent for natural with the statement. 23% respondent for disagree with the statement.

4.3 iv Do you take a long time to knitting the fruit

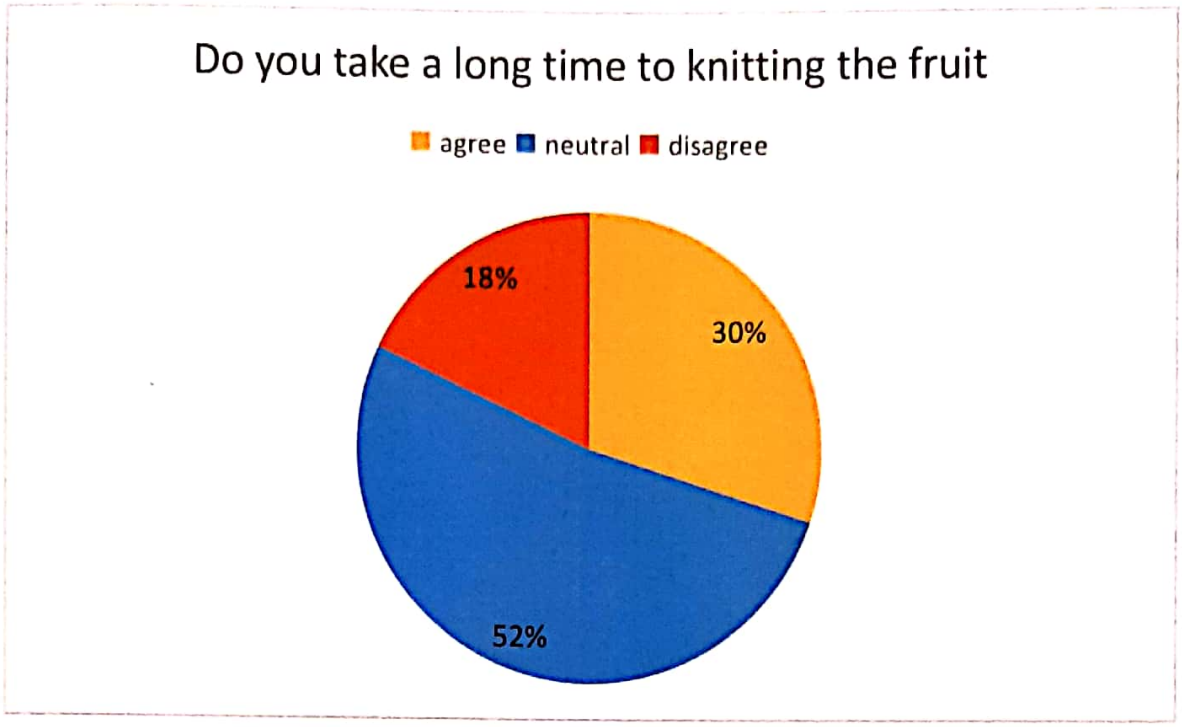


Figure 4.3 iv : Do you take a long time to knitting the fruit

From the graph beside is shown the analysis of the Do you take a long time to knitting the fruit by using ordinary fruit picker. From the analysis, 52% respondent neutral with the statement. 30% respondent for agree with the statement. 18% respondent for disagree with the statement.

4.3 v Are you comfortable using the ordinary fruit picker

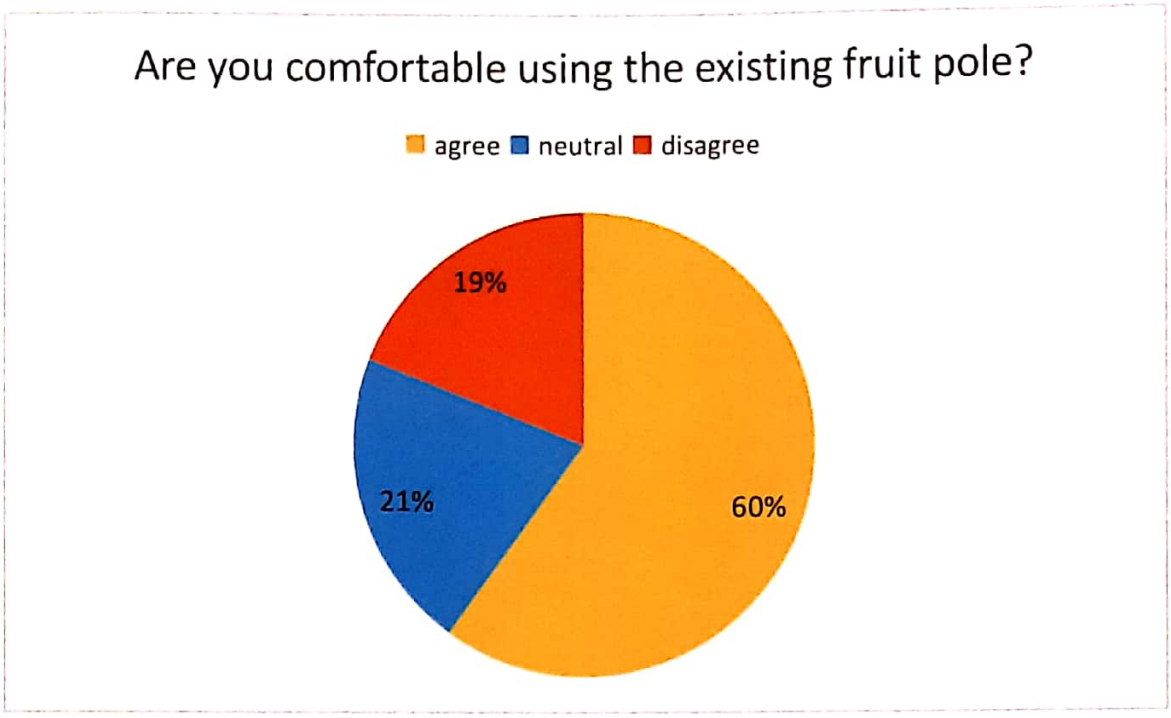


Figure 4.3 v: Are you comfortable using ordinary fruit picker

From the graph beside is shown the analysis of the Are you comfortable using ordinary fruit picker. From the analysis, 60% respondent agree with the statement. 21% respondent for natural with the statement. 19% respondent for disagree with the statement.

4.3 vi Is the ordinary fruit picker too heavy?

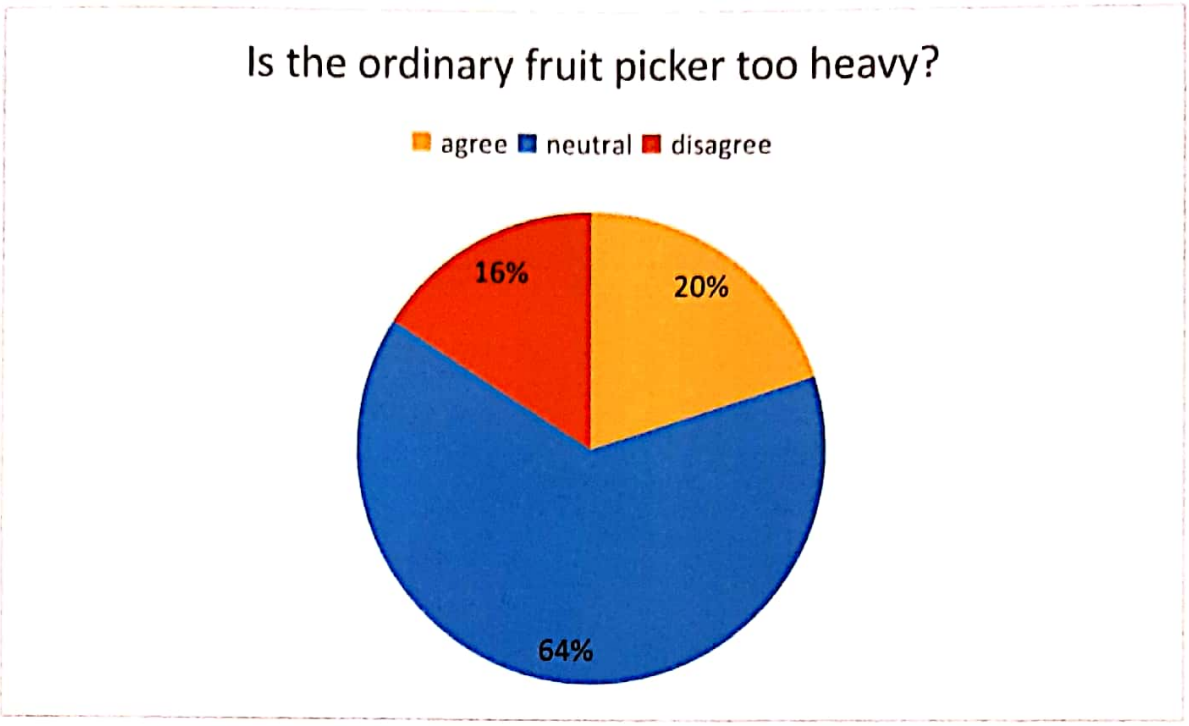


Figure 4.3 vi: Is the ordinary fruit picker too heavy?

From the graph beside is shown the analysis of the ordinary fruit picker is too heavy. From the analysis, 64% respondent neutral with the statement. 20% respondent for agree with the statement. 16% respondent for disagree with the statement.

4.3 vii Is it easy to use the ordinary fruit picker?

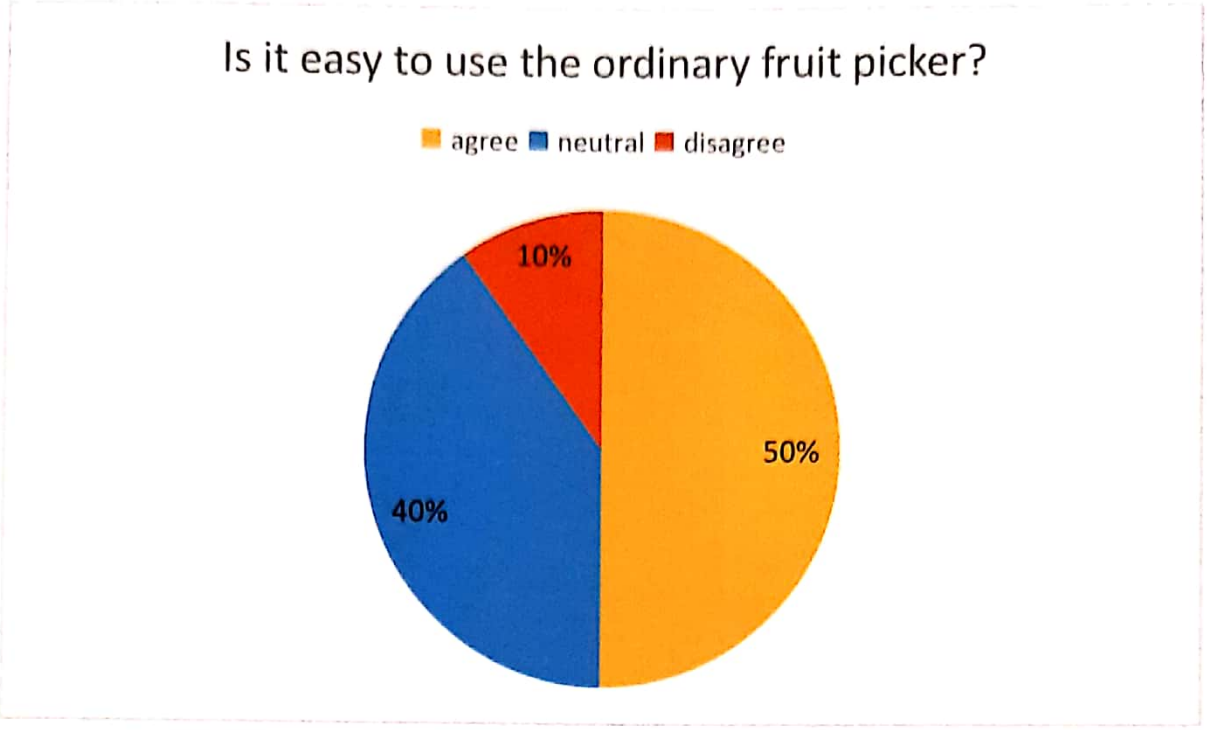


Figure 4.3 vii : Is it easy to use the ordinary fruit picker?

From the graph beside is shown the analysis of the it easy to using ordinary fruit picker. From the analysis, 50% respondent agree with the statement. 40% respondent for natural with the statement. 10% respondent for disagree with the statement.

4.3 viii Do you use a ordinary fruit picker?

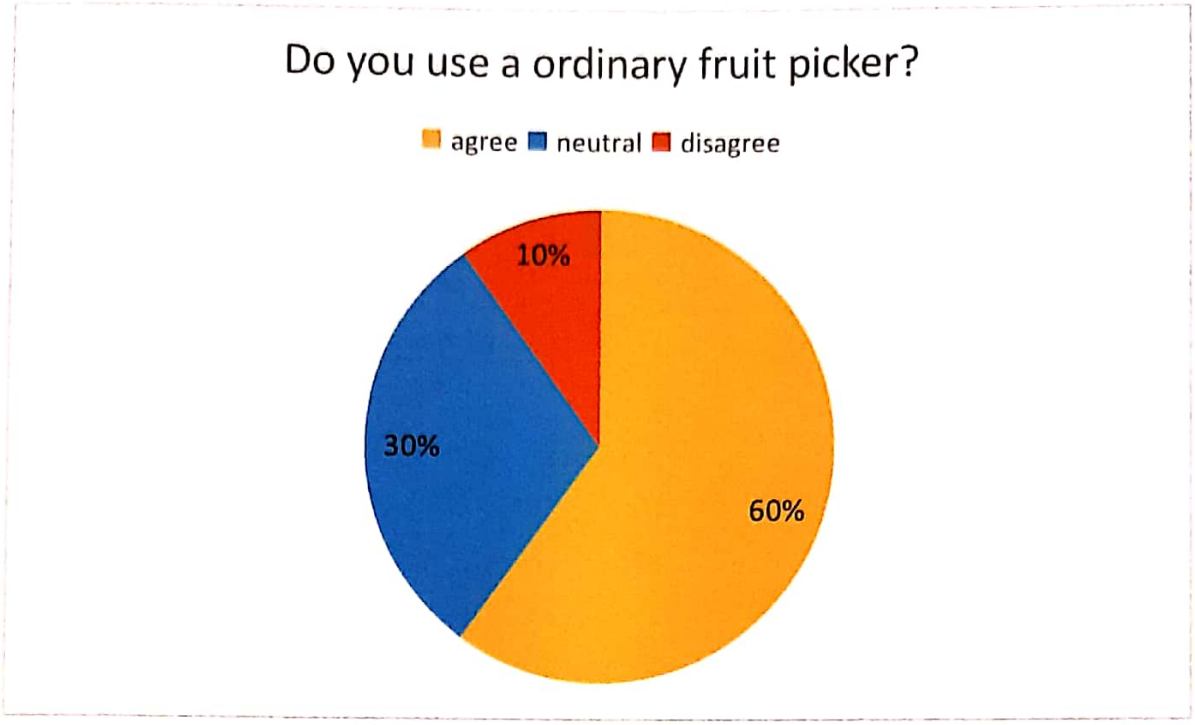


Figure 4.3 viii : Do you use a ordinary fruit picker?

From the graph beside is shown the analysis of the respondent still using a ordinary fruit picker. From the analysis, 60% respondent agree with the statement. 30% respondent for natural with the statement. 10% respondent for disagree with the statement.

4.3 ix Do you use a modern-day pole?

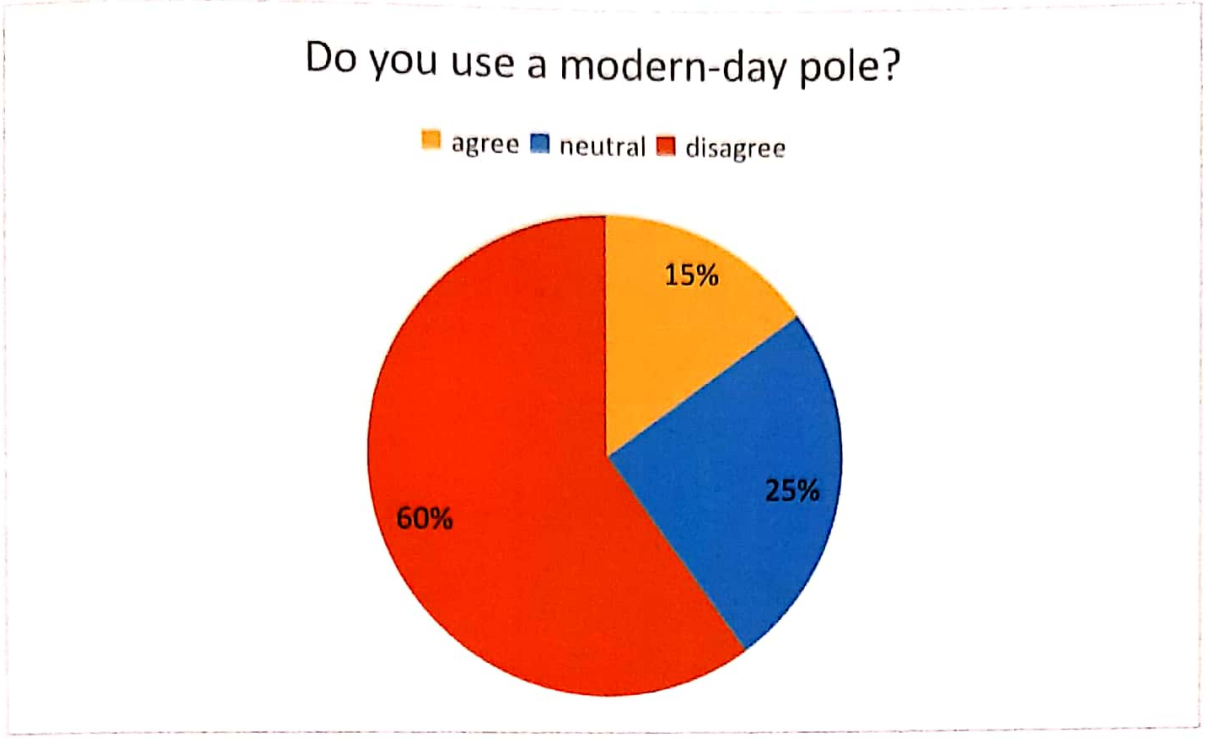


Figure 4.3 ix: Do you use a modern-day pole

From the graph beside is shown the analysis of the respondent did their use a modern fruit picker. From the analysis, 60% respondent disagree with the statement. 25% respondent for natural with the statement. 15% respondent for agree with the statement.

4.3 x Have you ever heard of modern pole?

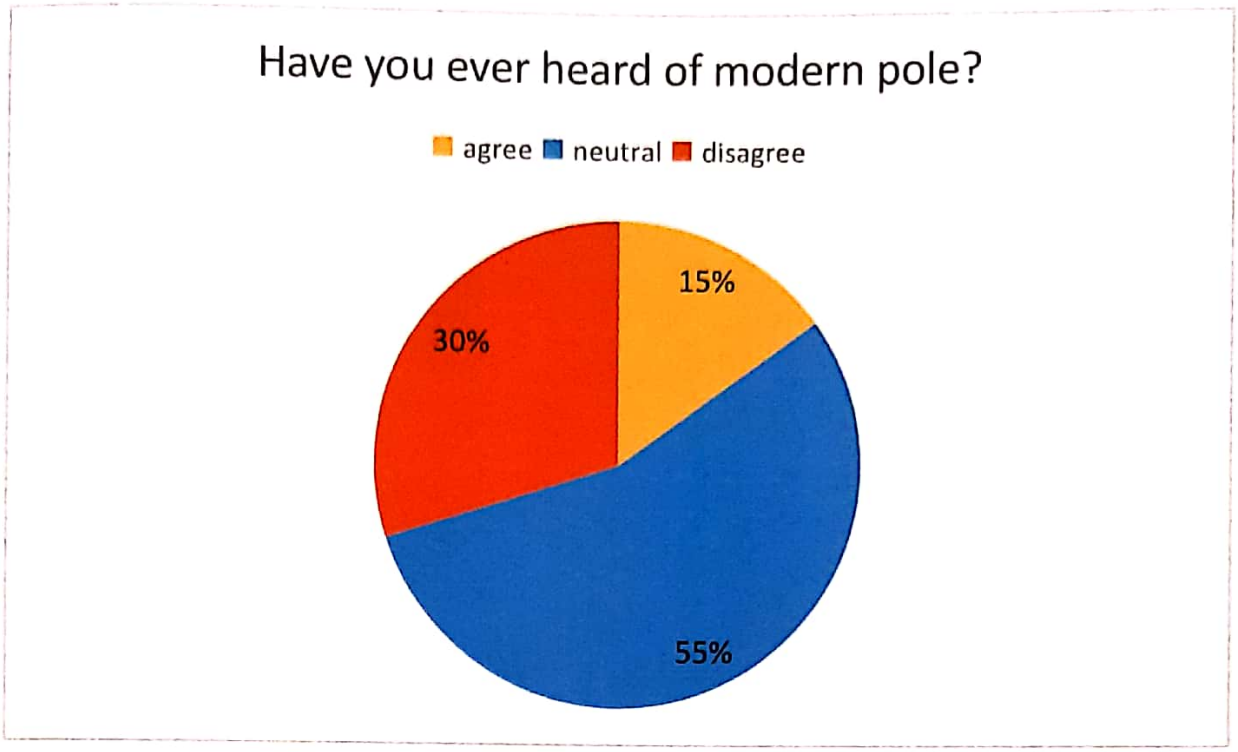


Figure 4.3 x: Have you ever heard of modern pole?

From the graph beside is shown the analysis of the respondent have heard a modern fruit picker. From the analysis, 55% respondent neutral with the statement. 30% respondent for disagree with the statement. 15% respondent for agree with the statement.

4.3 xi Are modern pole too expensive?

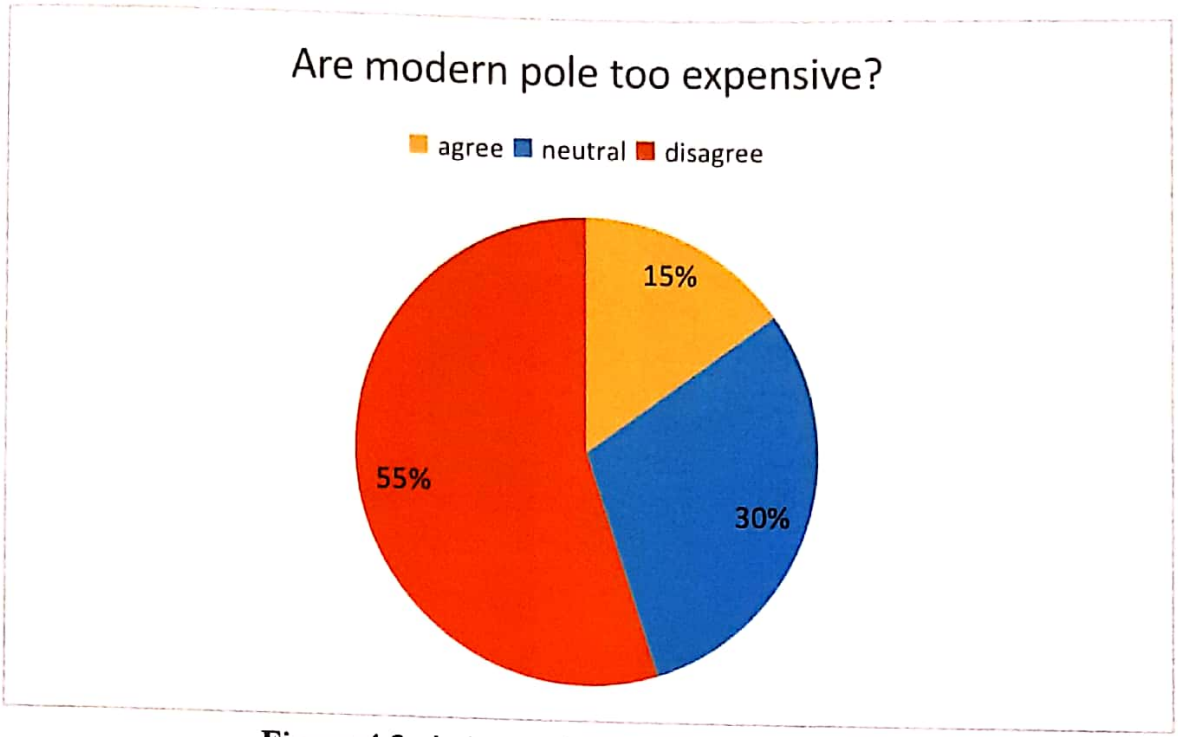


Figure 4.3 xi :Are modern pole too expensive?

From the graph beside is shown the analysis of the modern pole too expensive. From the analysis, 55% respondent disagree with the statement. 30% respondent for natural with the difficulty using the ordinary fruit picker. 15% respondent for agree with the statement.

4.3 xii If we innovate the existing pole, will you support it?

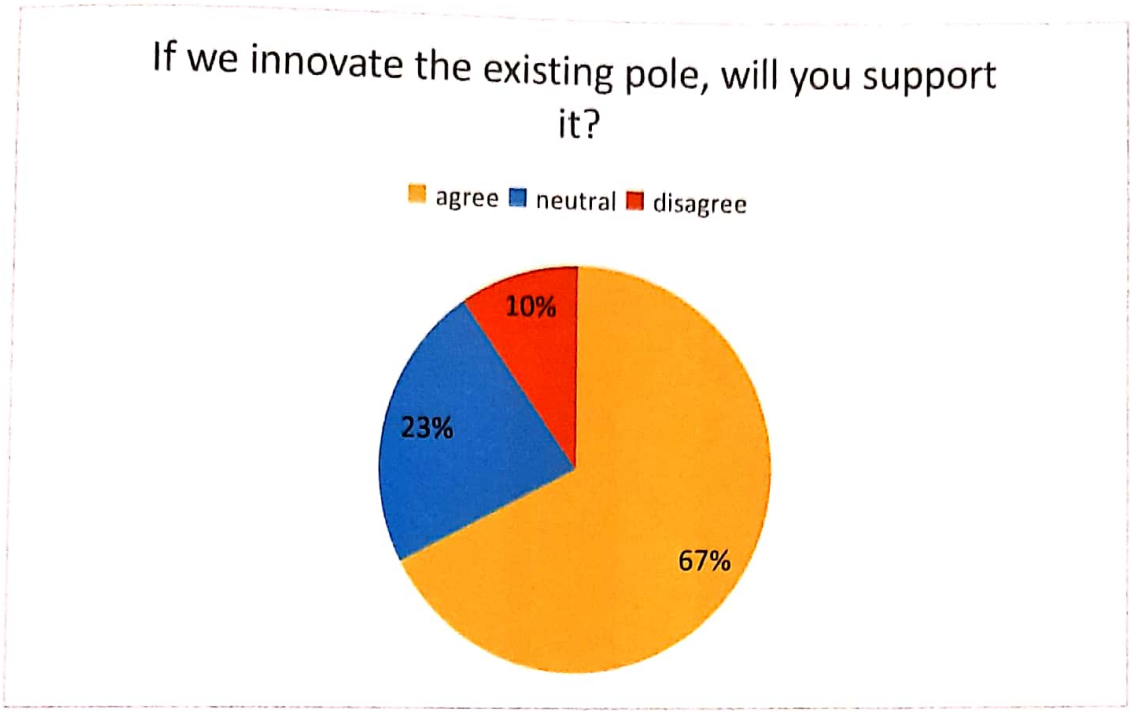
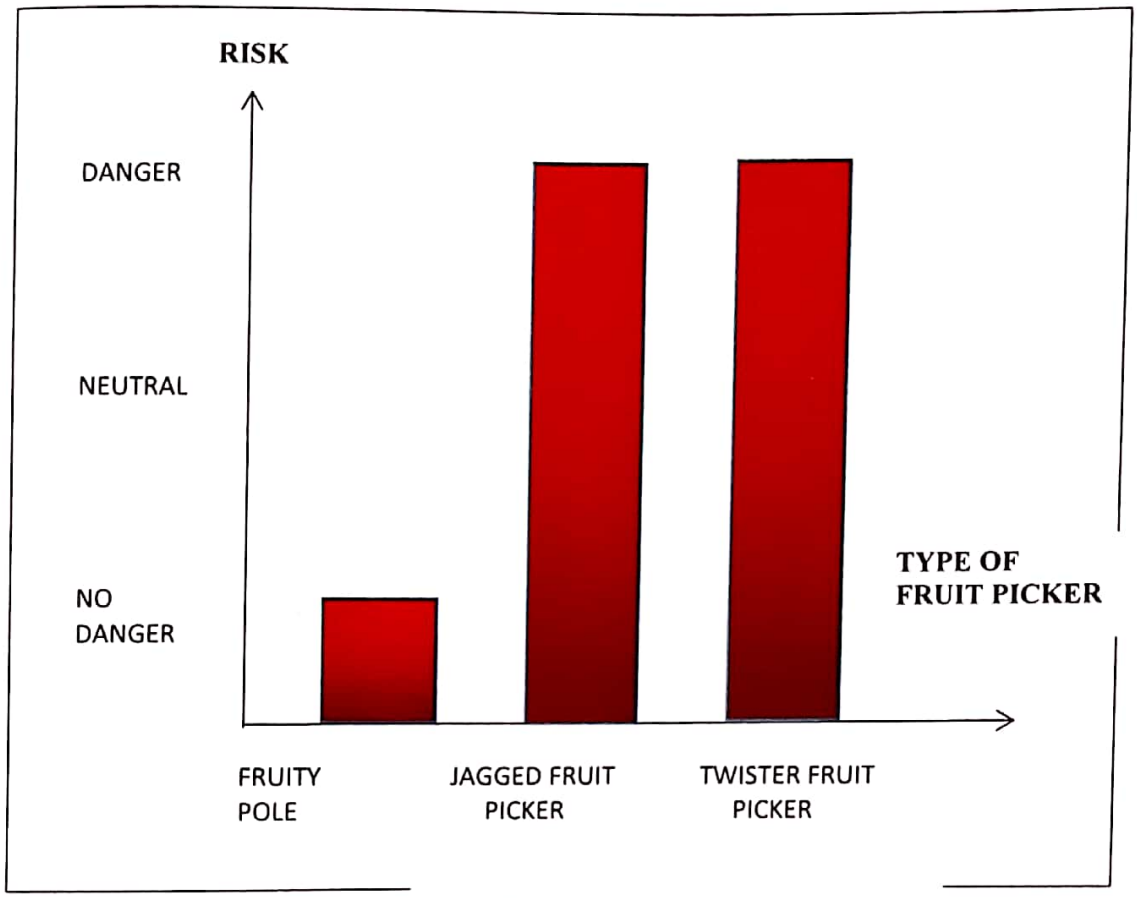


Figure 4.3 xii: If we innovate the existing pole, will you support it?

From the graph beside is shown the analysis of the will their support the innovate the ordinary fruit picker. From the analysis, 67% respondent agree with the statement. 23% respondent for natural with the statement. 10% respondent for disagree with the statement.

4.4 Data objective

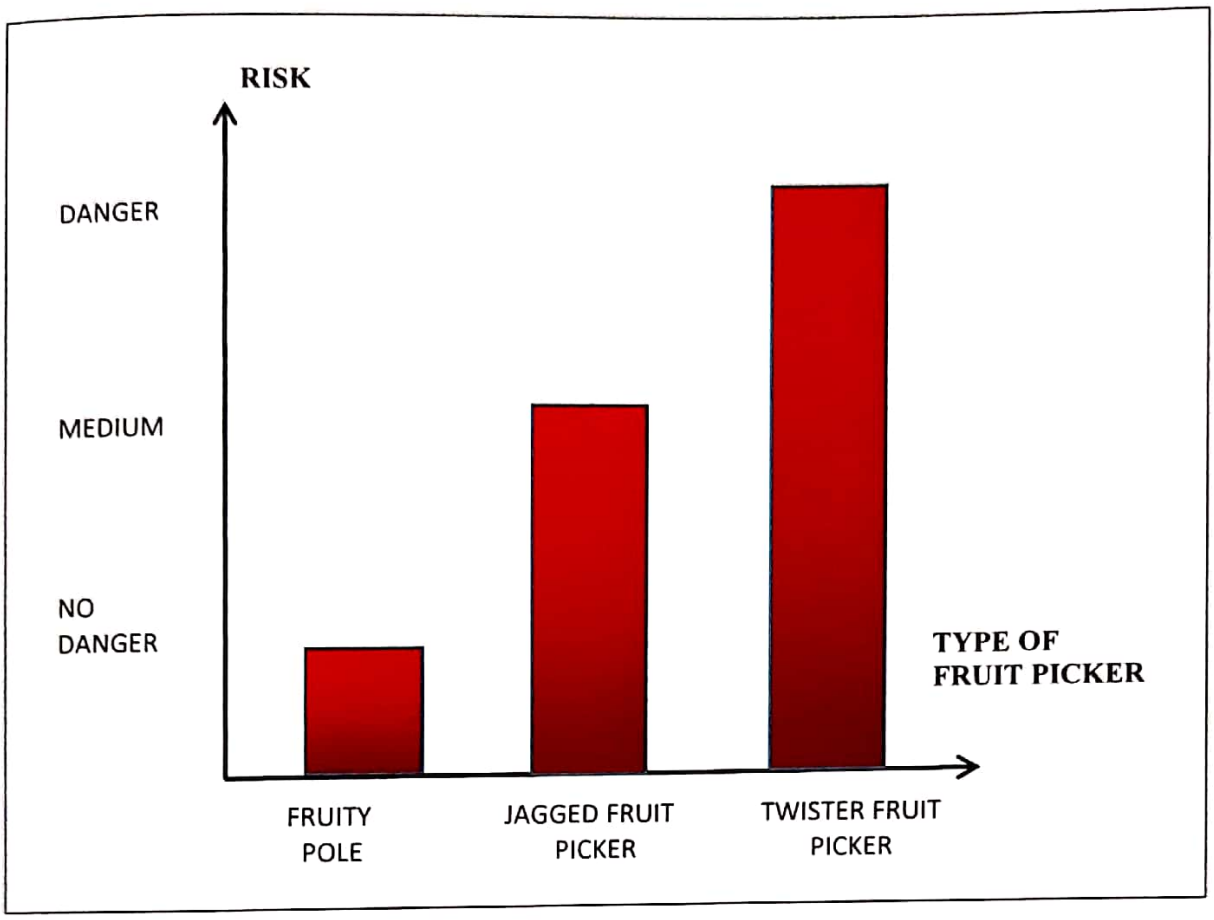
4.4.1 Length



Graph 4.4.1: Length

The **graph 4.4.1** above showed that Jagged fruit picker and twister fruit picker are heavier than fruity pole. Fruity pole are more light weight and easy to use while knitting fruit. This situation prevent danger to the farmer to get injuries like hand bleeding and more. Light weight of fruity pole will prevent the danger risk to the farmer. For the jagged fruit picker the risk of farmer is high to get injuries because the net were set at the top and when the fruit fall inside the net, these will make the fruit picker become more heavy and not stable to hold. For the twister fruit picker does not have the net/funnel for fruit and very danger for the farmer. For example, if the fruit falling down it may hit the farmer's body parts and will cause injuries.

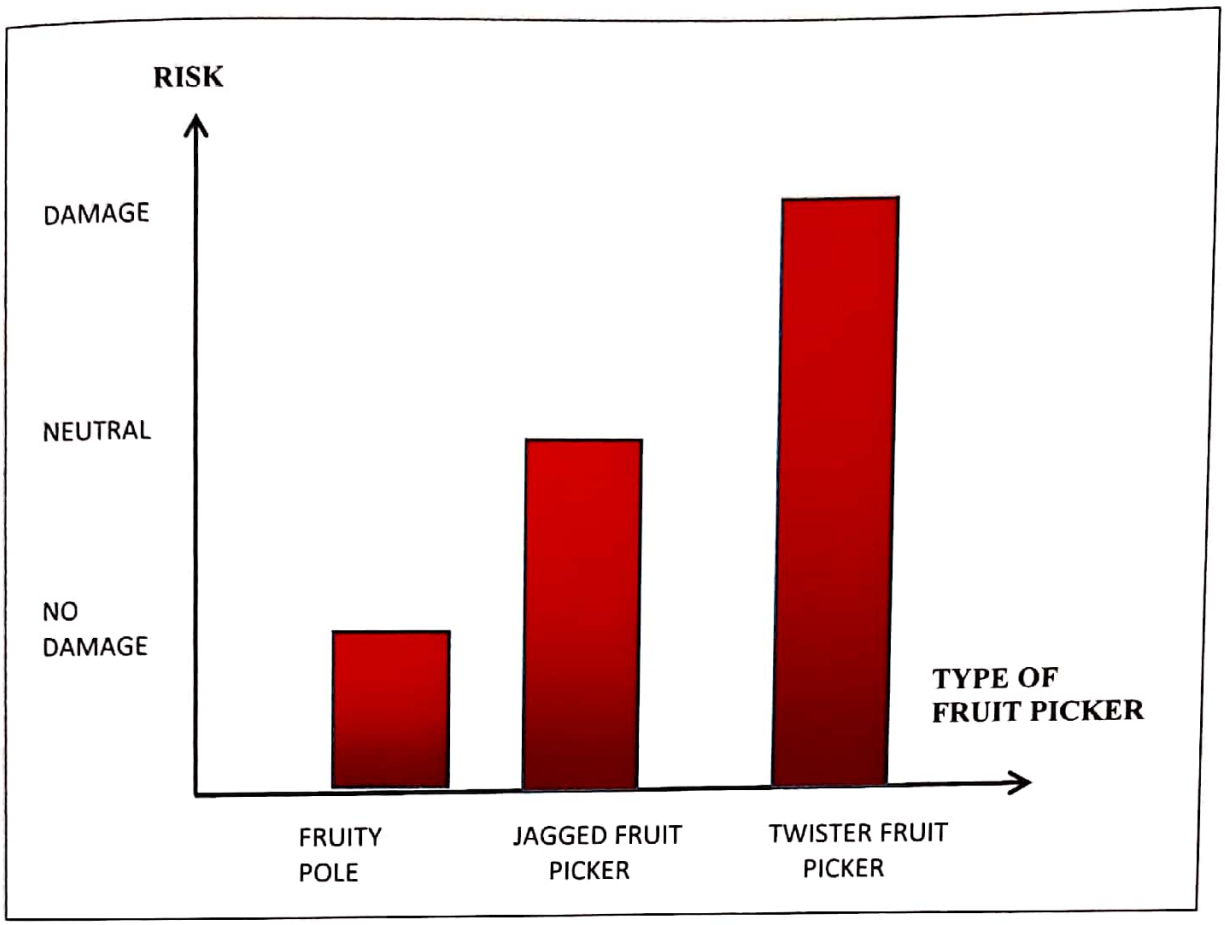
4.4.2 The holder



Graph 4.4.2: the holder

The graph above showed that the Fruity Pole has no danger . For the jagged fruit picker its be at neutral and a most danger fruit picker is a twister fruit picker. Because the Fruity pole has rubber on the holder so the farmers can confortable when their hold the holder. For the Jagged fruit picker its medium because the wood still has friction to hold. And lastly, a most danger fruit picker is Twister fruit picker because the holder is smooth and there is no have a friction.

4.4.3 The falling fruits



Graph 4.4.3: the falling fruits

The graph above showed that the Fruity Pole has not destroy when the fruit is falling because fruity pole already has a funnel for fruit to falling in. Funnel were added to the fruity pole to prevent fruit from fall to the ground which will decrease the number of fruit damage. For the jagged fruit picker, the risk is at neutral because these type of fruit picker has a net for fruit to fall into but not enough secure to prevent fruits from damage. For the twister fruit picker has no net and the fruits will fall down to the ground and the fruit will damage.

4.4.4 Fruit Damage

	1ST FRUIT	2ND FRUIT	3RD FRUIT	4TH FRUIT	5TH FRUIT	6TH FRUIT	7TH FRUIT	8TH FRUIT	TOTAL
FRUITY POLE	0	0	0	0	0	0	0	0	0/8
ORDINARY FRUIT PICKER	1	0	0	1	1	1	0	0	4/8

TABLE 4.4.4

the data we collected is in the table 4.4.4 to comparing fruits damage between fruity pole and ordinary fruit picker. From the data we collected, fruity pole has no fruit damage. For ordinary fruit picker, the result show 4 fruit has been damages. From the table, It prove that the fruity pole can protect the fruit from damages.

4.4.5 Time

	1ST FRUIT	2ND FRUIT	3RD FRUIT	4TH FRUIT	5TH FRUIT	6TH FRUIT	7TH FRUIT	8TH FRUIT
FRUITY POLE (MINUTE)	1	1.30	2.00	2.40	3.20	3.40	4.10	4.30
ORDINARY FRUIT PICKER (MINUTE)	1.10	1.50	2.25	2.58	3.40	3.56	4.50	5.39

TABLE 4.4.5

The data we collected is in the table 4.4.5 to comparing time of fruit collected between fruity pole and ordinary fruit picker. From the data we collected, fruity pole has collected 8 fruit for 4.30 minute. For ordinary fruit picker is taking more time to collect fruit. From the table, It prove that the fruity pole is more saving time to collect fruit.

5.0 CONCLUSION

The entire contents of this report include the introduction, objective, problem statement and material uses
of the fruity pole. Nowadays, the convenience of doing and solving a job is more of a priority uses. So, we've have been innovating the ordinary fruit picker by adding a funnel for fruit fall into to prevent the fruit from damages. We've also have innovating the ordinary fruit picker from using hand to foot to move the cutting blade. This project is implemented to facilitate users to minimize problems when the farmers pick fruits by using old technology of fruit picker. One of the problem that can be minimized is damaged to the fruit by scraping the funnel. The concept of movement and control of fruity pole only uses feet to move the cutting blades.

The objective of the project is to minimized the damaged of the fruit. The research methodology is used and and guided by the flow chart in the process of planning, production, design and testing of project. The result by following by correct steps and procedures of the project was successfully implemented.

5.1 SUGGESTION

Fruity pole is use for knitting fruit/picking fruit and to protect the fruit from damage. A good fruit without damage can be sell at the market and not easily rotten. Fruity pole is easy and safe to be use which will not cause injuries to the farmer while knitting fruit. Fruity pole also can reduce time taken while picking fruit and can collect fruit in large quantity.

There is some factors can be suggested to improve the fruity pole to make it become more efficient in future :-

1. **Fruits fall and caused damage and rotten**
   - When the farmers used a ordinary fruit picker, the fruit will continue to fall to the ground and break down due to the falling between the fruit and the ground.

2. **The safety of the farmer is affected**
   - A fruit knitted without protection will be at high risk for falls on the workers body.

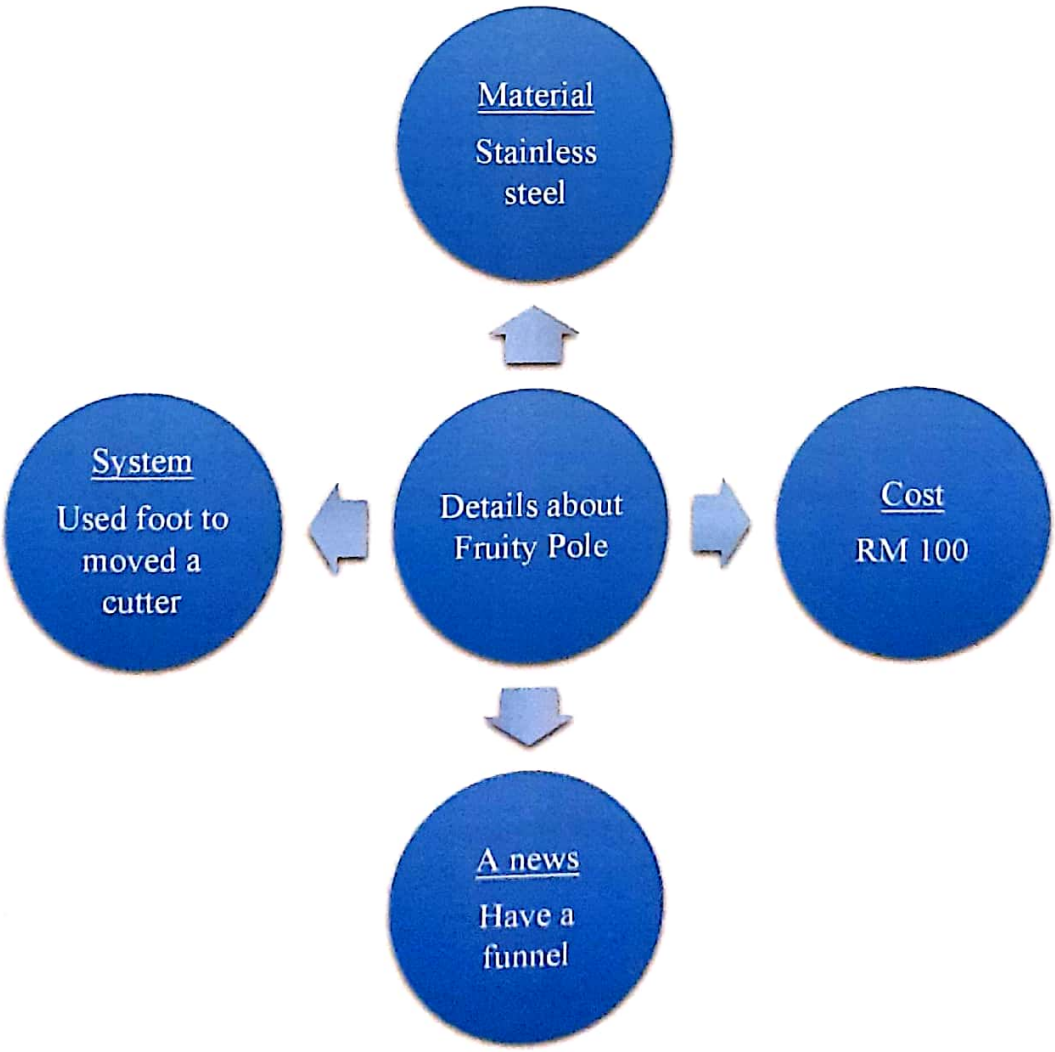
3. **Producing non-quality fruits**
   - Fruits that fall to the ground will have severe side effects such as pores, bumps and scratches.

4. **Waste time, and manpower**
   - Time wasting occurs when the fruit falling to the ground will cause the farmer to collect the fruit one by one and it will cause a waste of time.

5.2 Details of the proposed Fruity Pole

This Fruity Pole is designed according to the shape and size used, This Fruity fruity pole .

This fruit picker (Fruity Pole) have the ability to save a quality of fruit when the fruit has been knitting because the Fruity pole have a funnel to reduce a damage impact for fruit. In addition, Fruity Pole also save a time for farmers like the farmers no need bow to pickup a fruit that fell to the ground. And lastly, Fruity pole used a new system to knitting a fruit. Fruity pole used a foot to moved a cutter blade .



5.3 References

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POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Jabatan
Kejuruteraan Mekanikal

June 2019 session

Topic:

FRUITY POLE

NAME	No. MATRIK
AIN ZUBAIDAH BINTI MUHAMMAD KHIR	08DMP17F1O73

SUPERVISOR: PN GIHA BINTI TARDAN

Chapter 3: Methodology

3.1 Introduction

The methodology is the general research strategy that outlines the way in which research is to be undertaken and, among other things, identifies the methods to be used in it. These methods, described in the methodology, define the means or modes of data collection or, sometimes, how a specific result is to be calculated. Methodology does not define specific methods, even though much attention is given to the nature and kinds of processes to be followed in a particular procedure or to attain an objective.

When proper to a study of methodology, such processes constitute a constructive generic framework, and may therefore be broken down into sub-processes, combined, or their sequence changed.

Each step of project is a process to complete the project. Every step must be followed one by one and must be done carefully. If some error occurs it can make a project probably could not operate or do not look neat and perfect. Before the project finish, various process needs to be done according to proper procedures to ensure that projects do not have any problems. Among the measures the work done in preparing this project are.

Prepared By: AIN ZUBAIDAH (08DMP17F1073)

3.2 Components

- Wire rope
- Hand cutter tools
- PVC for push (using leg)
- Steel tube
- Plate L bracket (PVC holder)
- Bolt and nut 40mm
- PVC bottle cap
- Cable ties
- Rubber for hold

Prepared By: AIN ZUBAIDAH (08DMP17F1073)

3.2.1 Wire rope

Wire rope is several strands of metal wire twisted into a helix forming a composite "rope", in a pattern known as "laid rope". Larger diameter wire rope consists of multiple strands of such laid rope in a pattern known as "cable laid".

In stricter senses, the term "wire rope" refers to a diameter larger than 3/8 inch (9.52 mm), with smaller gauges designated cable or cords.[1] Initially wrought iron wires were used, but today steel is the main material used for wire ropes.

- 1.5 stainless steel wire rope
- 20meter/lot
- 304 stainless steel wire rope Anti rust line

Figure 3.1 : Cable wire

3.2.2 Cutter tools

Cutting tool materials must be harder than the material which is to be cut, and the tool must be able to withstand the heat generated in the metal-cutting process. Also, the tool must have a specific geometry, with clearance angles designed so that the cutting edge can contact the work piece without the rest of the tool dragging on the work piece surface. The angle of the cutting face is also important, as is the flute width, number of flutes or teeth, and margin size. In order to have a long working life, all of the above must be optimized, plus the speeds and feeds at which the tool is run

- 5 inch blade length
- 0.9 x 1.9 x 5.6 inches dimension
- 0.3 kg of weight
- Stainless steel material
- 1.5 cm spring length

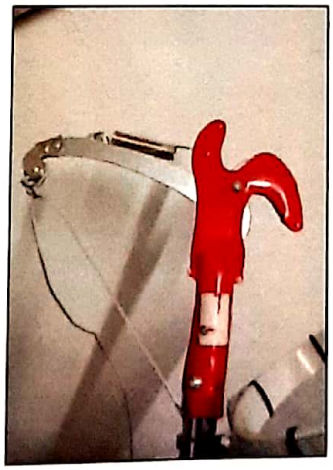


Figure 3.2: Hand cutter tools

3.2.3 PVC for push (using leg)

Is used to pull the wire from the cutter so that it can move the knife to the cutter using the PVC tracing method.

- Diameter : 30cm
- Lightweight
- Material : PVC

Figure 3.3 : PVC for pull

3.2.4 Steel tube

Steel tubing can be welded or seamless. Seamless tubes are made by passing the molten steel over a piercing rod to create a hollow tube. Welded tubes are made from curling a rolling plate and welding the seam together. In the past, seamless tubes were stronger than welded tubes. However advances in technology have allowed welded tubes to have sufficient strength to replace welded tubes for many applications.

- Material : stainless steel
- Size: 2000mmx4mm×1mm
- Lightweight
- High strength
- Heat resistance
- Fear arctic and high temperature
- Color silver

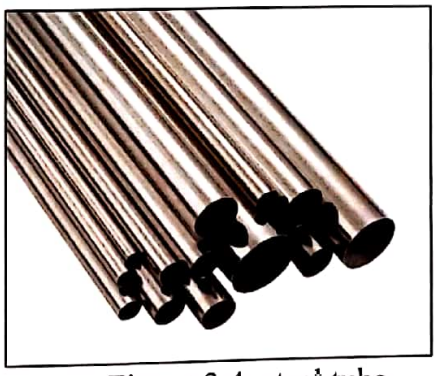


Figure 3.4: steel tube

3.2.5 Plate L bracket (PVC holder)

An angle bracket or angle brace or Angle Cleat is an L-shaped fastener used to join two parts generally at a 90 degree angle. It is typically made of metal but it can also be made of wood or plastic. The metallic angle brackets feature holes in them for screws. Its typical use is to join a wooden shelf to a wall or to join two furniture parts together.

- Width : 15 mm
- Made of steel, zinc plated finish
- Easy to install by screws. Mounting screws are not included
- Reinforces inside of 90-degree-angle joints
- Easy to use and for immediate support

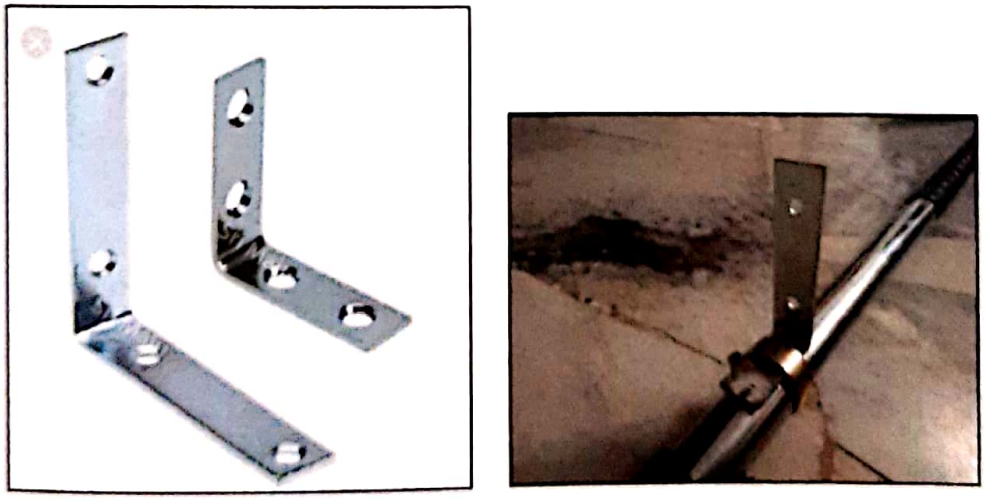


Figure 3.5 : Plate L bracket

3.2.6 Bolt and nuts 40mm

Bolts and nuts are used in several applications, with a primary function to hold things or components together. A bolt, also known as a screw, does not always have to be used together with a nut; however, a nut is always used together with a bolt. Nuts and bolts serve as the fundamental components in several construction projects as they provide strong bonds that do not break even under great amounts of pressure.

- Model name: pinnacle M6 x 40mm Steel Hex Bolt and Nut
- Metric thread size M6 x thread lenght 40mm, hex head
- Stainless steel
- Product dimension(mm) : W:50 H:110 L: 30
- Weight : 0.064kg
- Bolt finish : stainless steel
- Bolt size: M6 x 40mm
- Bolt head type : hexagon

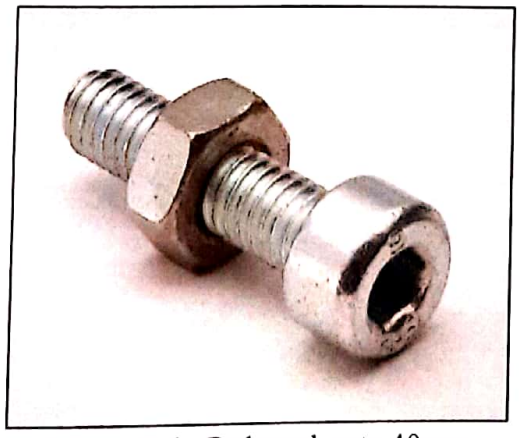


Figure 3.6 : Bolt and nuts 40mm

3.2.7 PVC bottom cap

A polyvinyl chloride (PVC) cap is a mixture of plastic and vinyl material. The pipes are durable, do not get damaged easily, and can be used for a long time. The PVC material does not get damaged so easily. Hence, PVC is commonly used in water piping systems, underground wiring, and drain lines. To prevent the PVC pipes from leaks, you must cover the top of the PVC pipe with PVC cap. The cap is generally available for pipes of two inches in diameter or more.

- Flexible material
- PVC bottom cap with high temperatures
- Has a greater chemical resistance
- Easy to install

Figure 3.7: PVC bottom cap

3.2.8 Cable ties

A cable tie (also known as a hose tie, or zip tie, and by the brand names Ty-Rap) is a type of fastener, for holding items together, primarily electrical cables or wires. Because of their low cost and ease of use, cable ties are ubiquitous, finding use in a wide range of other applications.

- Material : plastic
- Strong
- Flexible
- High quality

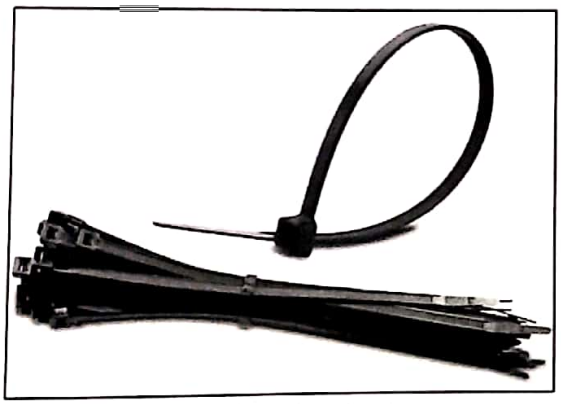


Figure 3.8: Cable ties

3.2.9 Rubber for hold

This rubber was originally used for badminton rackets. However, in this project we use it as a handle on the iron rod to prevent slippage when held. It also provides comfort when held. In addition, it can reduce the risk of harm as it can cause injury.

- Material : rubber
- Anti slip
- Strength
- Long
- Soft

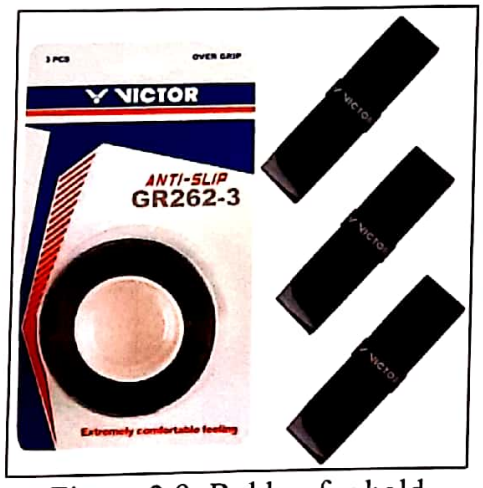


Figure 3.9: Rubber for hold

3.2.10 Net

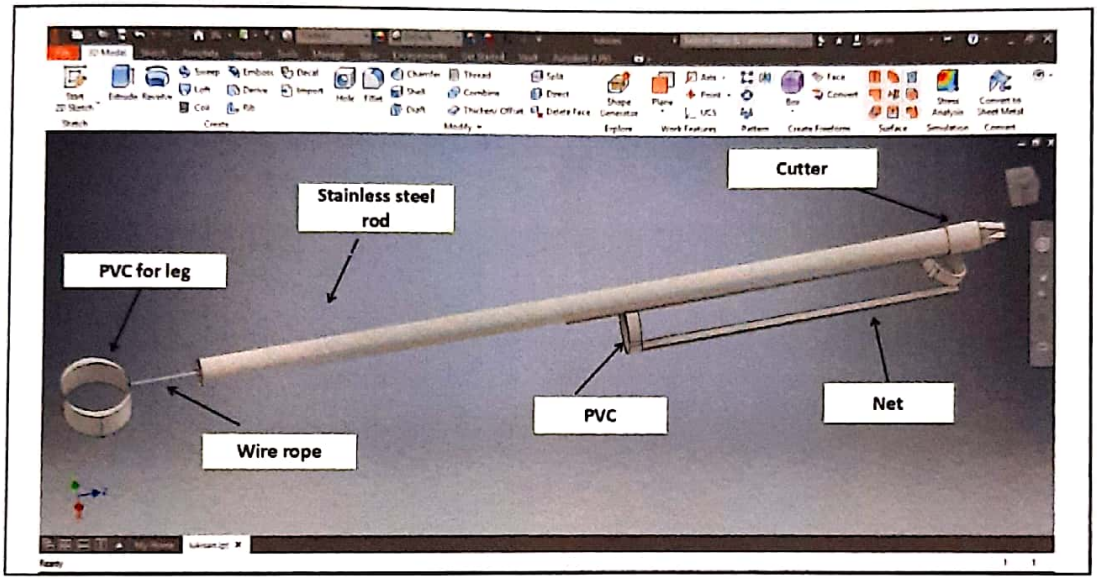
In this project we use a net so that the fruit picked goes into the funnel of the net. This is because we want to reduce the risk of the fruit being picked.

- Material : plastic
- Flexible
- Strong
- 1.5 meter

Figure 3.10: Net

3.3 Design of project

A document which describes in detail the planning of a carbon project and how it meets each of the requirements of a particular carbon project standard. It is required by standard and certification schemes for project registration and aids the validation of project activities.



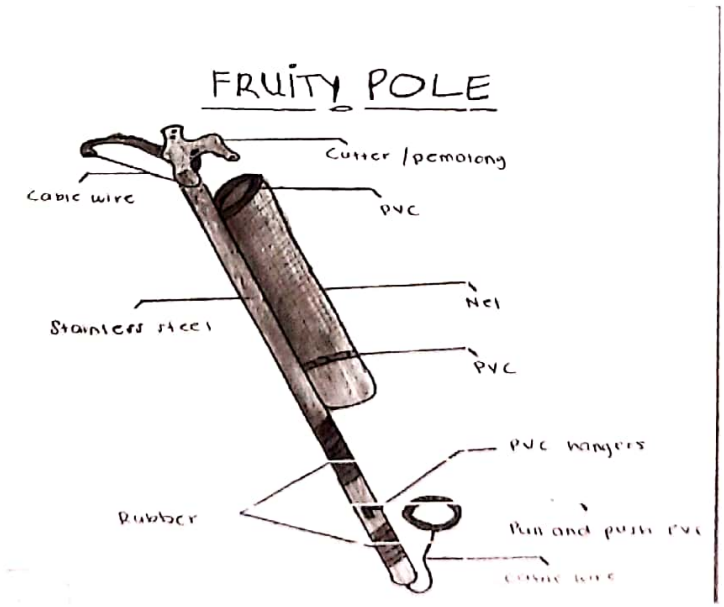


Figure 3.11 : Design of project

3.4 Flow chart plan for project

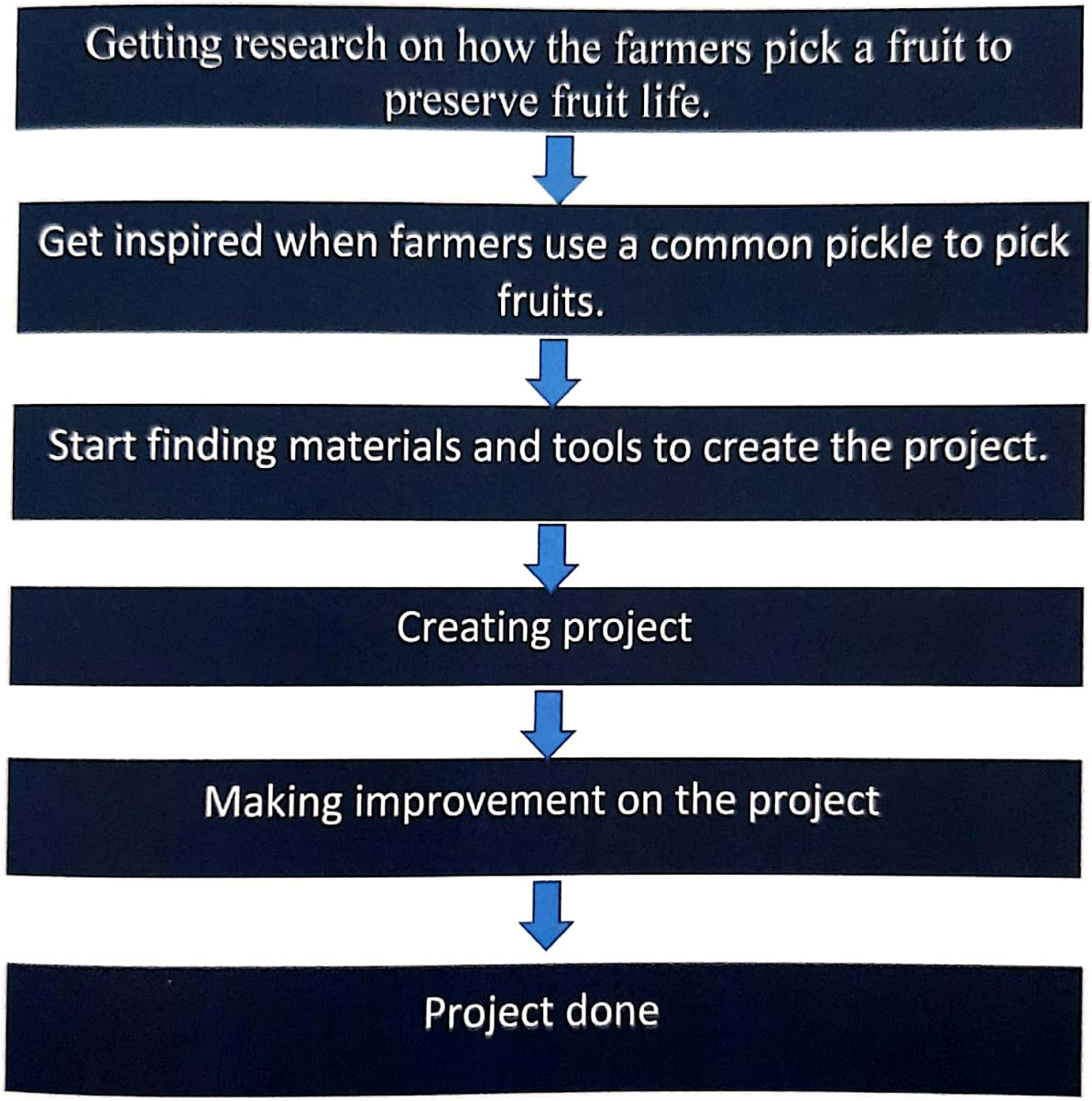
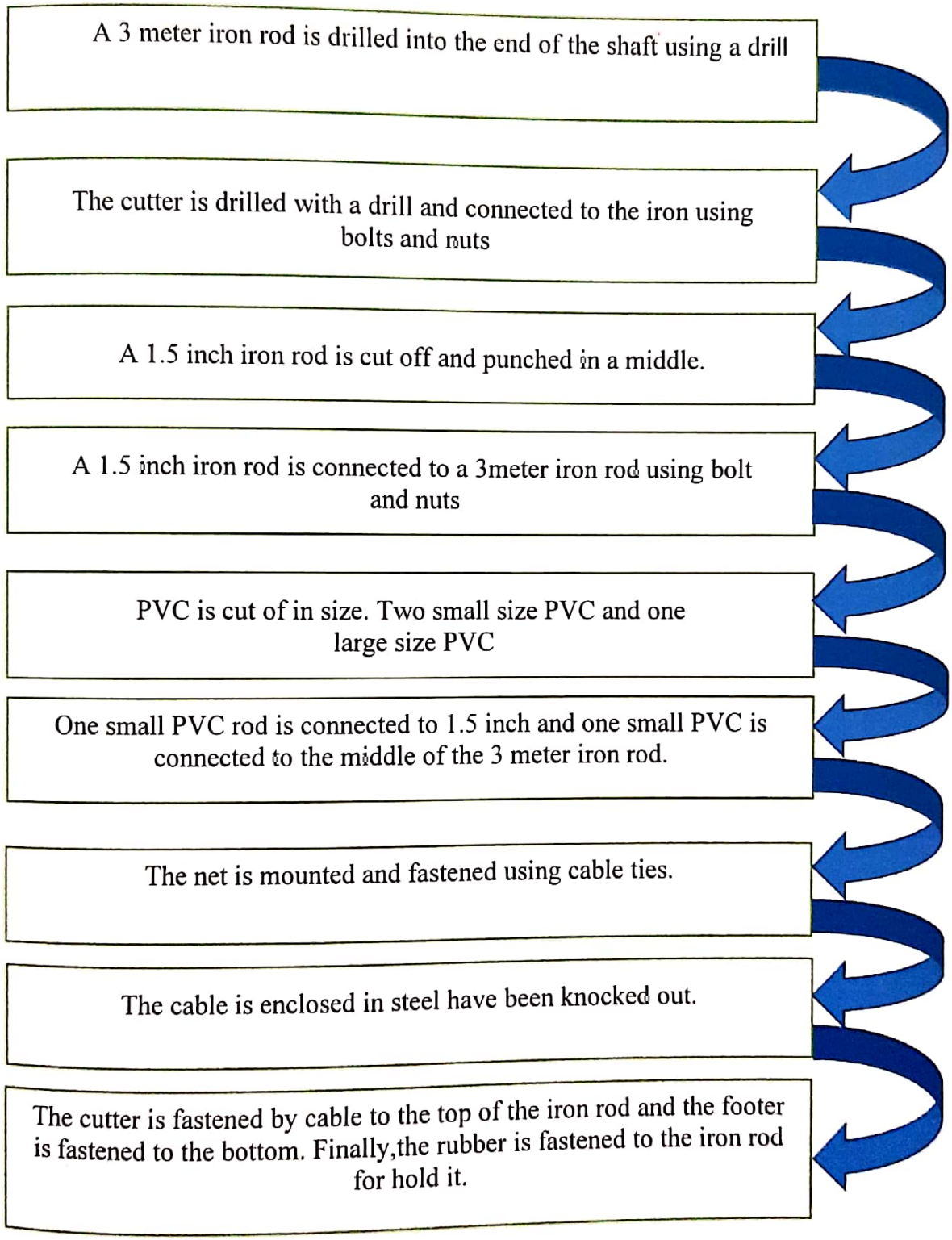


Figure 3.12 : Flow chart plan of project

3.5 Flow chart of project construction



3.6 Cost of project

COMPONENT	COST
Bolt and nuts 40mm	RM 4
Cable Wire	RM 10
Net	RM 10
PVC	RM 10
Stainless Steel Rod	RM 20
Cutter	RM 25
Rubber for Hold	RM 18
Cable Ties	RM 4
PVC Hangers	RM 3
PVC Bottom Cap	RM 1.20
TOTAL	**RM 105.20**

Figure 3.6 : Cost of Project

From the diagram above shows the cost of materials allocated to implement the FRUITY POLE project. 6 bolt bolts and nuts are used from 11 bolts. The cable wire used is 3.5 meters. Net used 4meter, stainless steel rod 3meter, rubber for hold 20cm. The total total cost is RM105.20.

4.0 Data and Analysis

4.2 Introduction

Data analysis is a process of inspecting, cleansing, transforming and modeling data with the goal of discovering useful information, informing conclusion and supporting decision-making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, and is used in different business, science, and social science domains. In today's business world, data analysis plays a role in making decisions more scientific and helping businesses operate more effectively.

- Respondent demographics (people, and gender)
- Survey question

4.2 i Respondent demographics

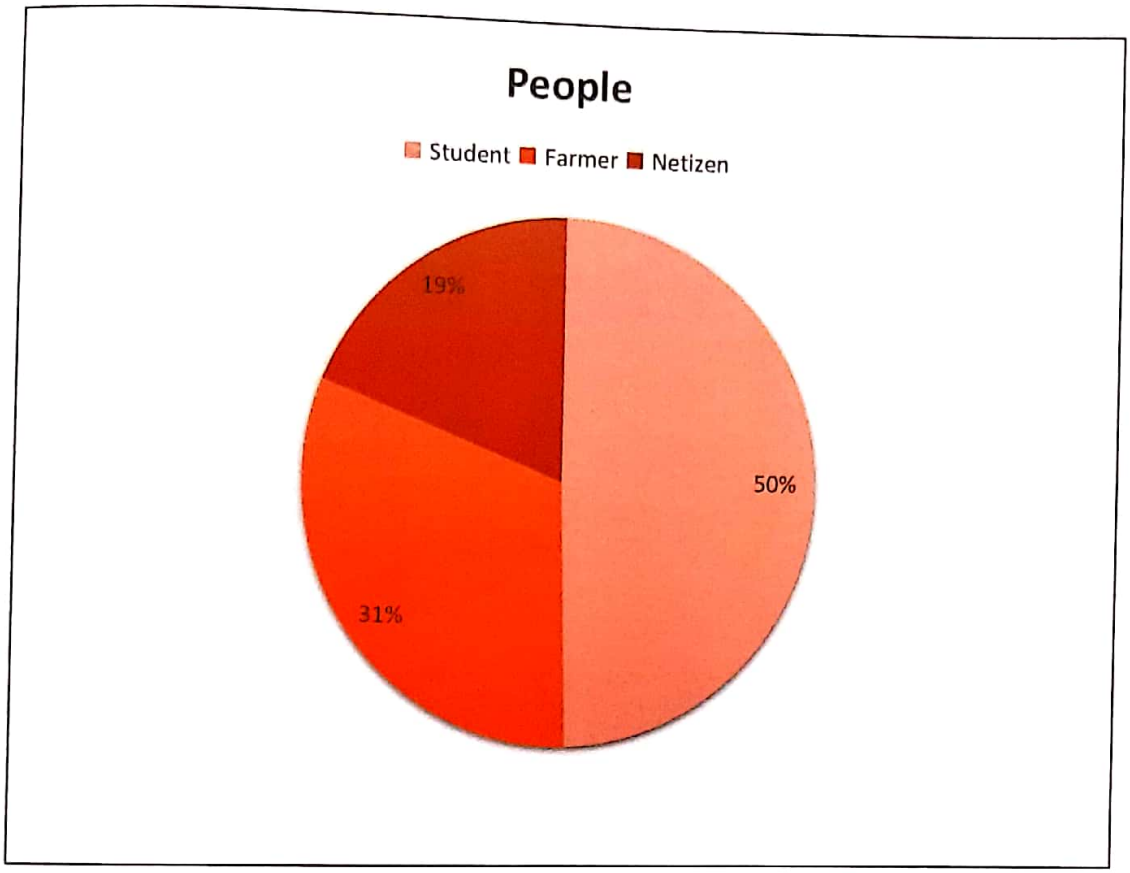


Figure 4.2 i : People

Figure 4.2 I shows the number of civilians who responded to the study. Percentage of students shows 50% higher than farmer and netizen. Farmer's percentage shows 31% higher than netizen and lower than student.

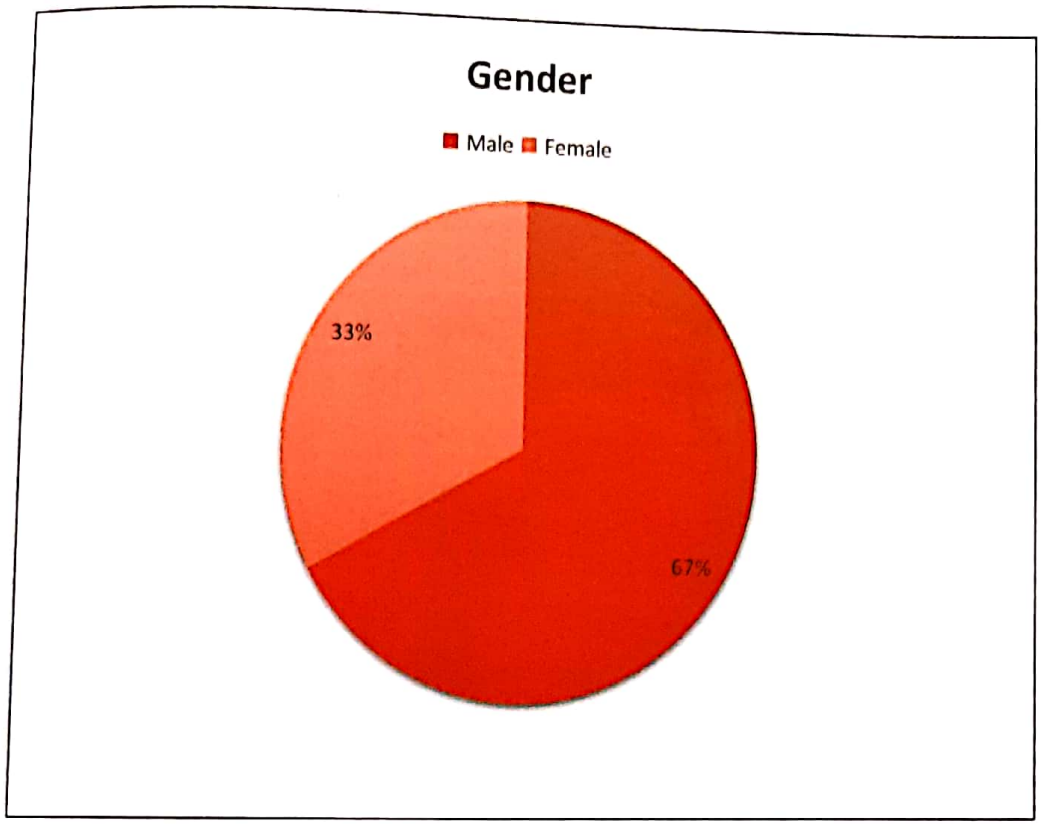


Figure 4.2 ii : Gender

Figure 4.2 ii shows the number of gender who responded to the study. Percentage for males shows 67% which is higher than females which is 33%.

4.3 Data from survey question

4.3 i Difficulty to knitting fruit

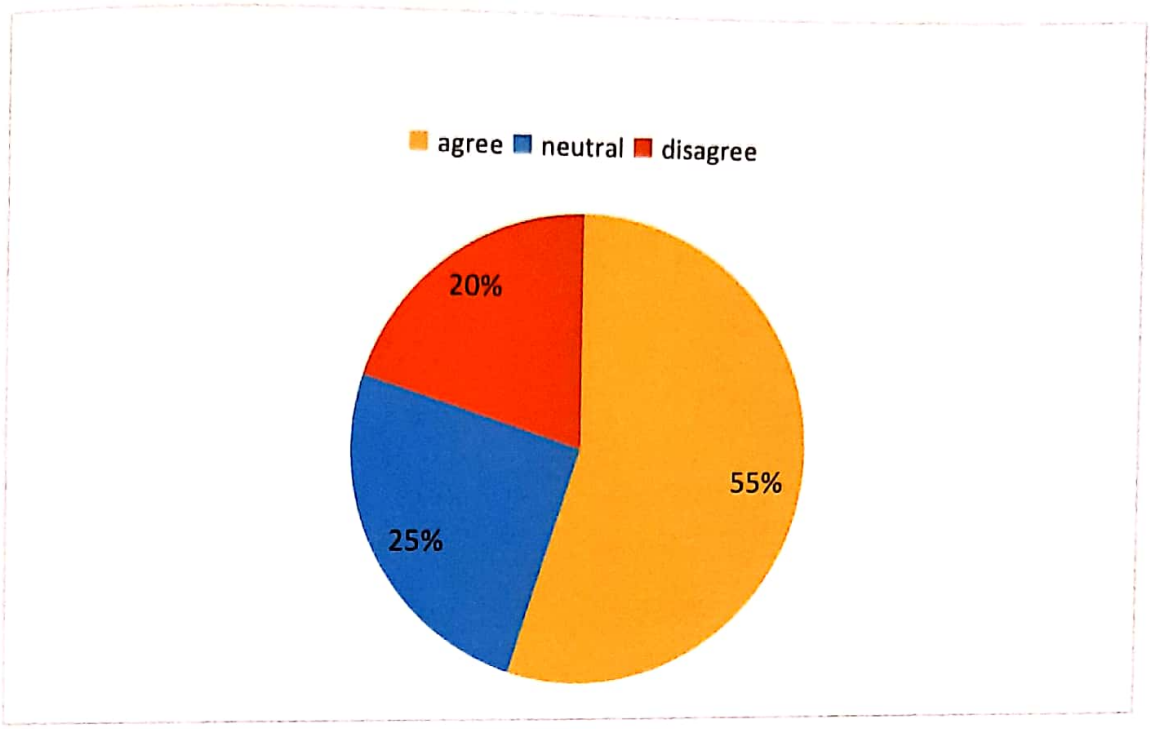


Figure 4.3 i : Difficulty to knitting fruit

From the **Figure 4.3 i** is shown the analysis of the difficulty to knitting fruit by using ordinary fruit picker. From the analysis, the percentage of agree is 55% which is higher than neutral and disagree. The percentage of neutral is 25% which is higher than disagree which is 20% but lower than agree.

4.3 ii Does your body feel sick during or after knitting fruit

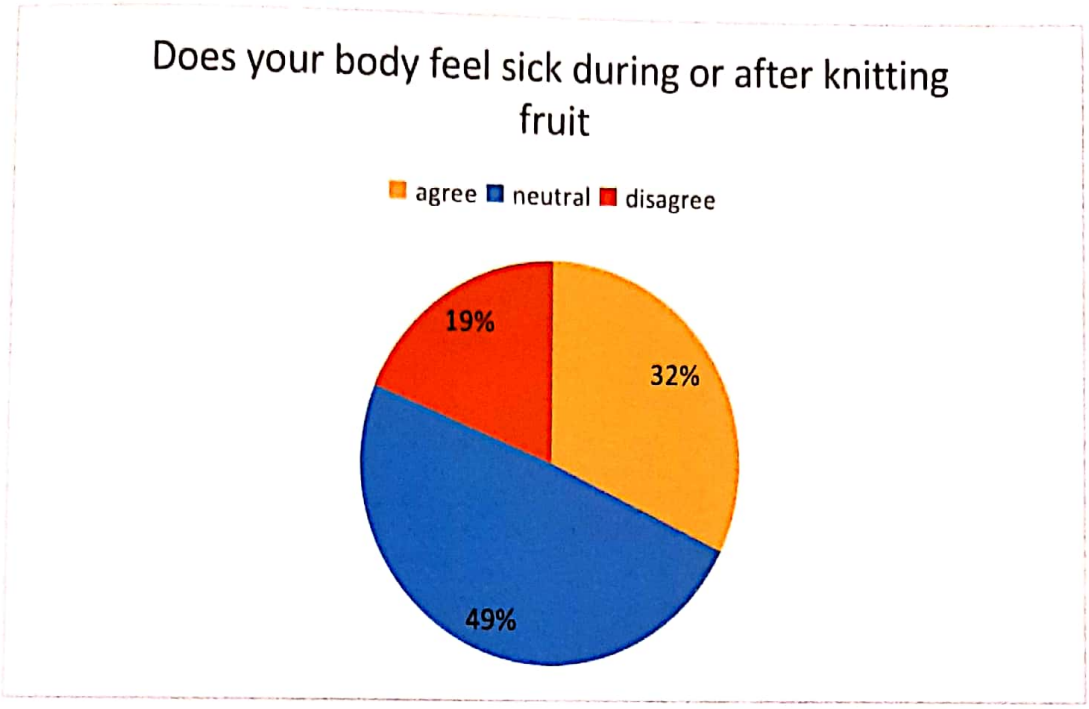


Figure 4.3 ii : Does your body feel sick during or after knitting fruit

From the graph beside is shown the analysis of the Does your body feel sick during or after knitting fruit by using ordinary fruit picker. The percentage of neutral is 49% which is higher than agree and disagree. The percentage of agree is 32% which is higher than disagree with 19% but lower than neutral.

4.3 iii Will your fruit be damaged due to falling when kitting the fruit

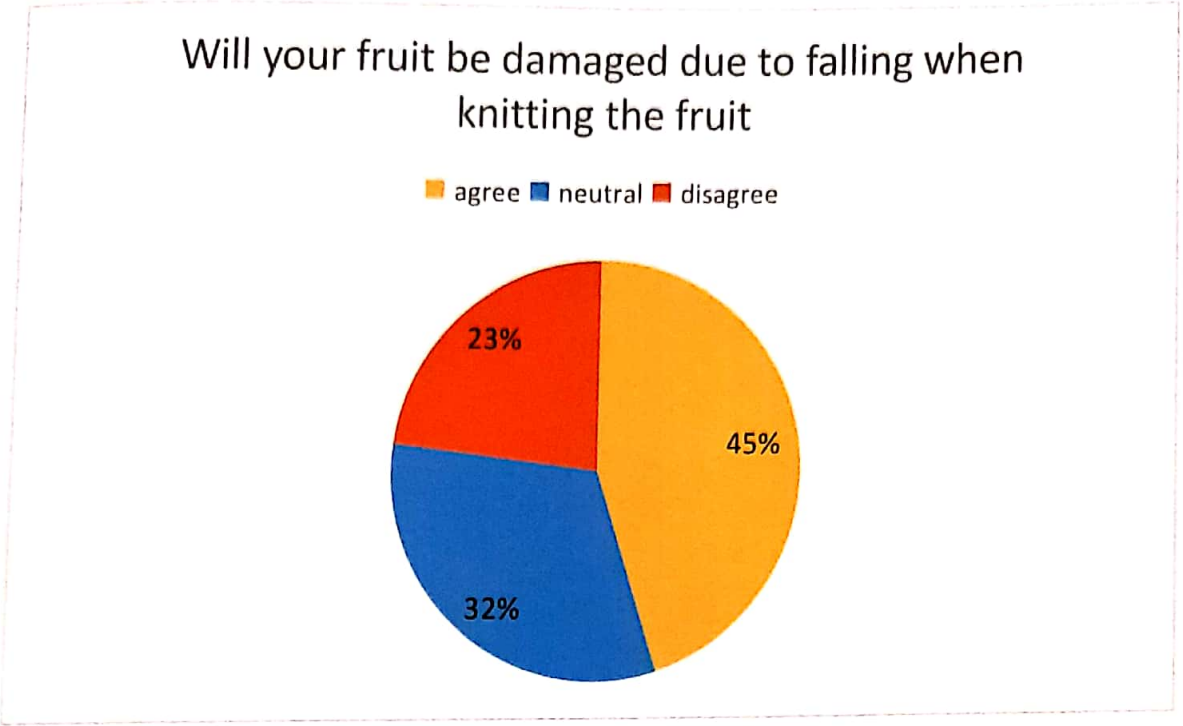


Figure 4.3 iii : Will your fruit be damaged due to falling when kitting the fruit

From the graph beside is shown the analysis of the Will your fruit be damaged due to falling when knitting the fruit by using ordinary fruit picker. From the analysis, the percentage of agree is 45%which is higher than neutral and disagree. The percentage of neutral is 32% which is higher than disagree with 23% but lower than agree.

4.3 iv Do you take a long time to knitting the fruit

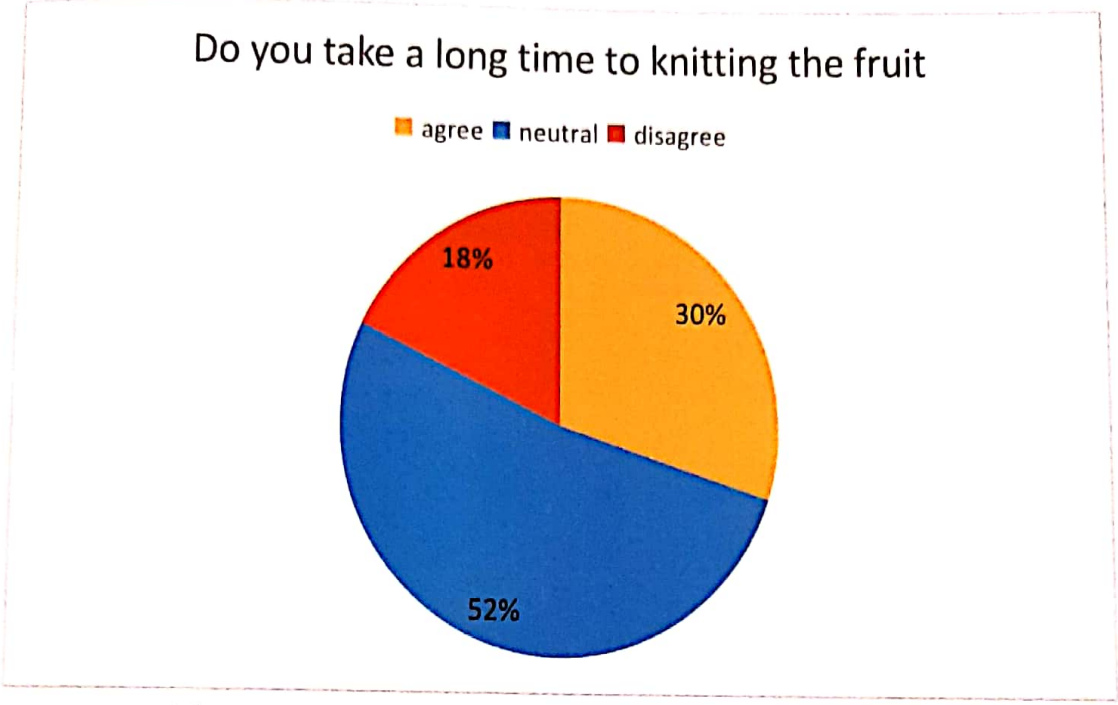


Figure 4.3 iv : Do you take a long time to knitting the fruit

From the graph beside is shown the analysis of the Do you take a long time to knitting the fruit by using ordinary fruit picker. From the analysis, the percentage of neutral is 52% which is higher than agree and disagree. The percentage of agree is 30% which is higher than disagree with 18% but lower than neutral.

4.3 v Are you comfortable using the ordinary fruit picker

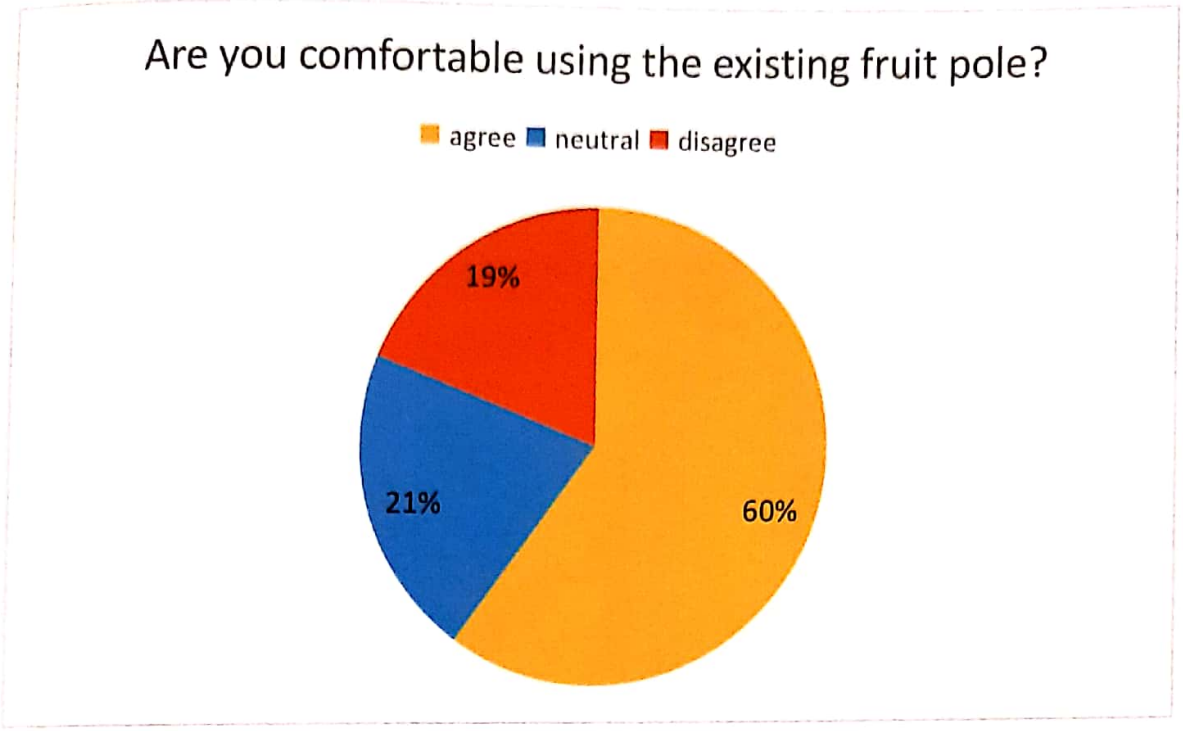


Figure 4.3 v: Are you comfortable using ordinary fruit picker

From the graph beside is shown the analysis of the Are you comfortable using ordinary fruit picker. From the analysis, the percentage of agree is 60% which is higher than neutral and disagree. The percentage of neutral is 21% which is higher than disagree with 19% but lower than agree.

4.3 vi Is the ordinary fruit picker too heavy?

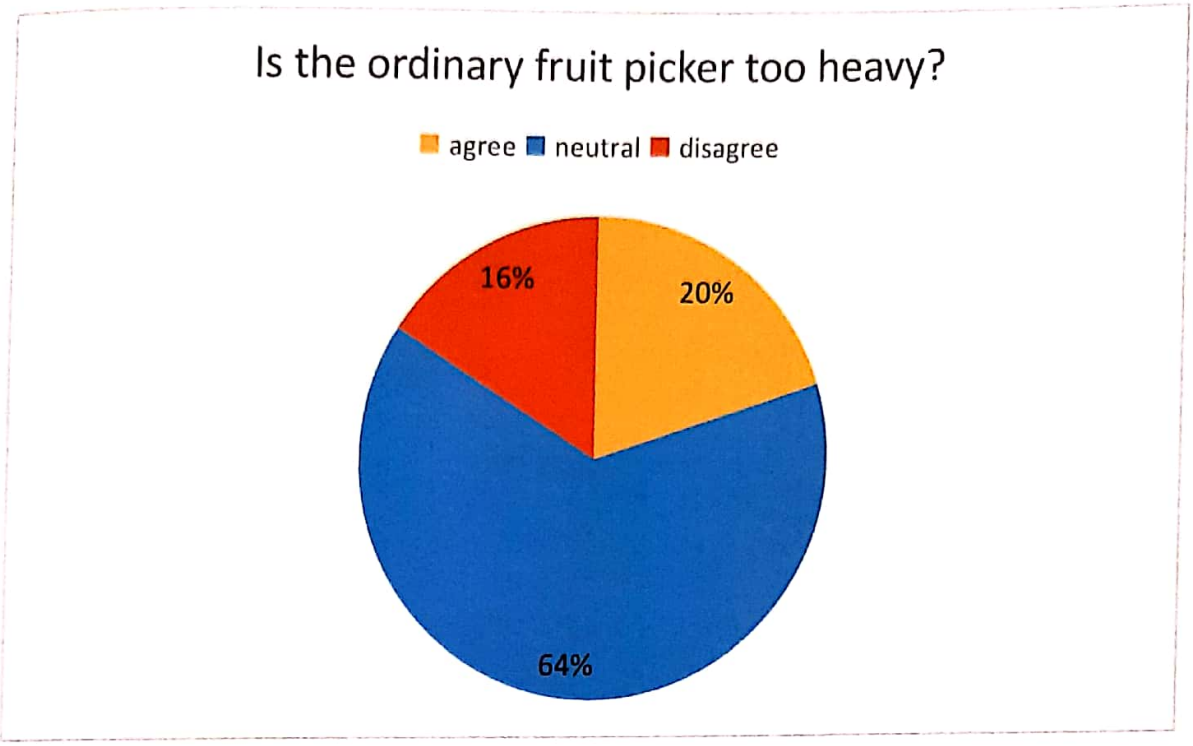


Figure 4.3 vi: Is the ordinary fruit picker too heavy?

From the graph beside is shown the analysis of the ordinary fruit picker is too heavy. From the analysis, the percentage of neutral is 64% which is higher than agree and disagree. The percentage of agree is 20% which is higher than disagree with 16% but lower than neutral.

4.3 vii Is it easy to use the ordinary fruit picker?

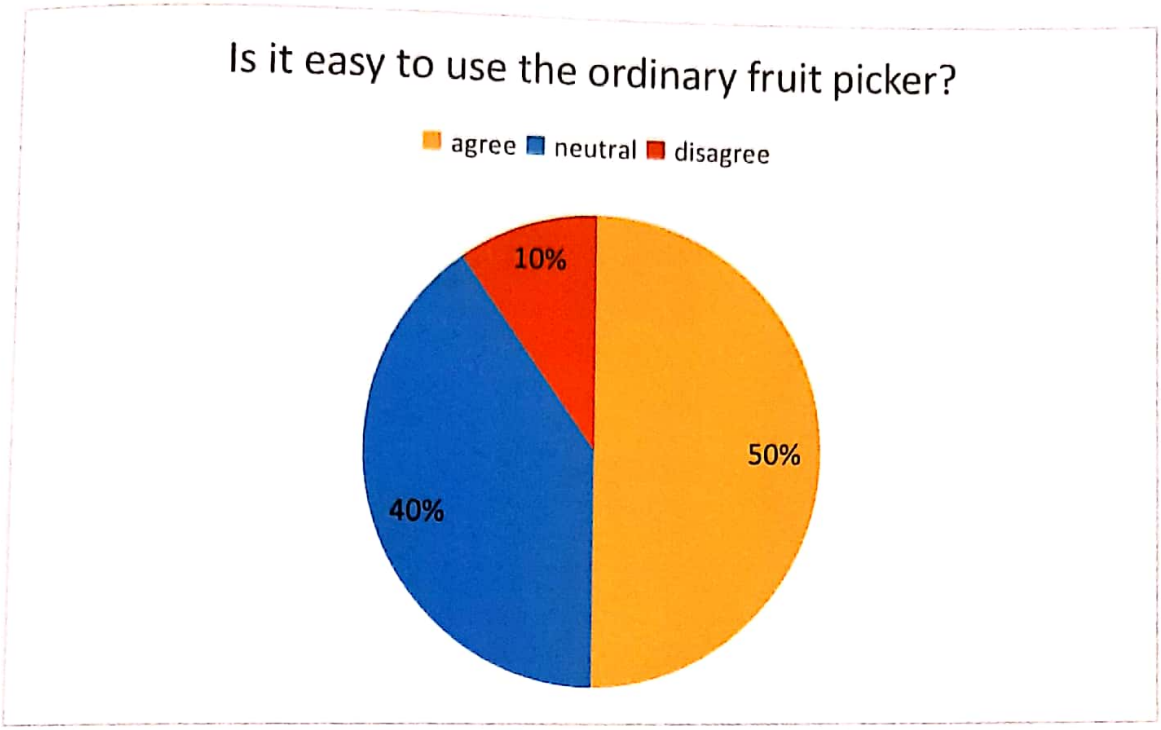


Figure 4.3 vii : Is it easy to use the ordinary fruit picker?

From the graph beside is shown the analysis of the it easy to using ordinary fruit picker. From the analysis,the percentage of agree is 50% which is higher than neutral and disagree. The percentage of neutral is 40% which is higher than disagree with 10% but lower than agree.

4.3 viii Do you use a ordinary fruit picker?

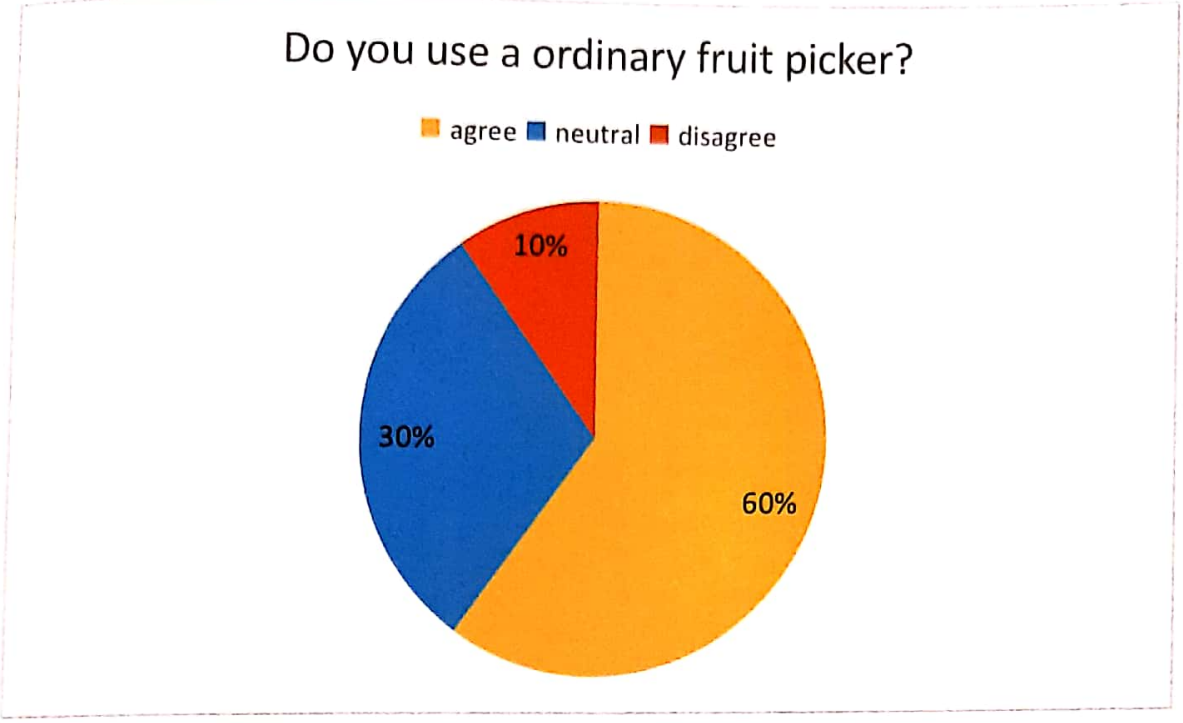


Figure 4.3 viii : Do you use a ordinary fruit picker?

From the graph beside is shown the analysis of the respondent still using a ordinary fruit picker. From the analysis, the percentage of agree is 60% which is higher than neutral and disagree. The percentage of neutral is 30% which is higher than disagree with 10% but lower than agree.

4.3 ix Do you use a modern-day pole?

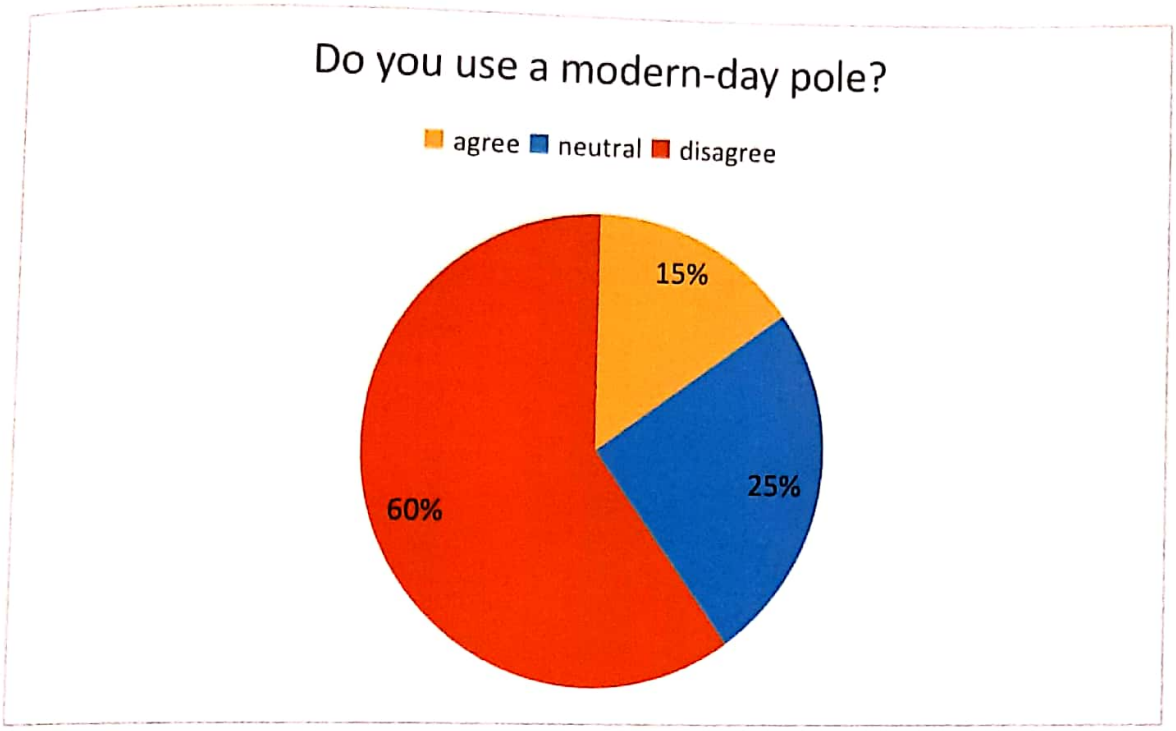


Figure 4.3 ix: Do you use a modern-day pole

From the graph beside is shown the analysis of the respondent did their use a modern fruit picker. From the analysis, the percentage of disagree is 60% which is higher than neutral and agree. The percentage of neutral is 25% which is higher than agree with 15% but lower than disagree.

4.3 x Have you ever heard of modern pole?

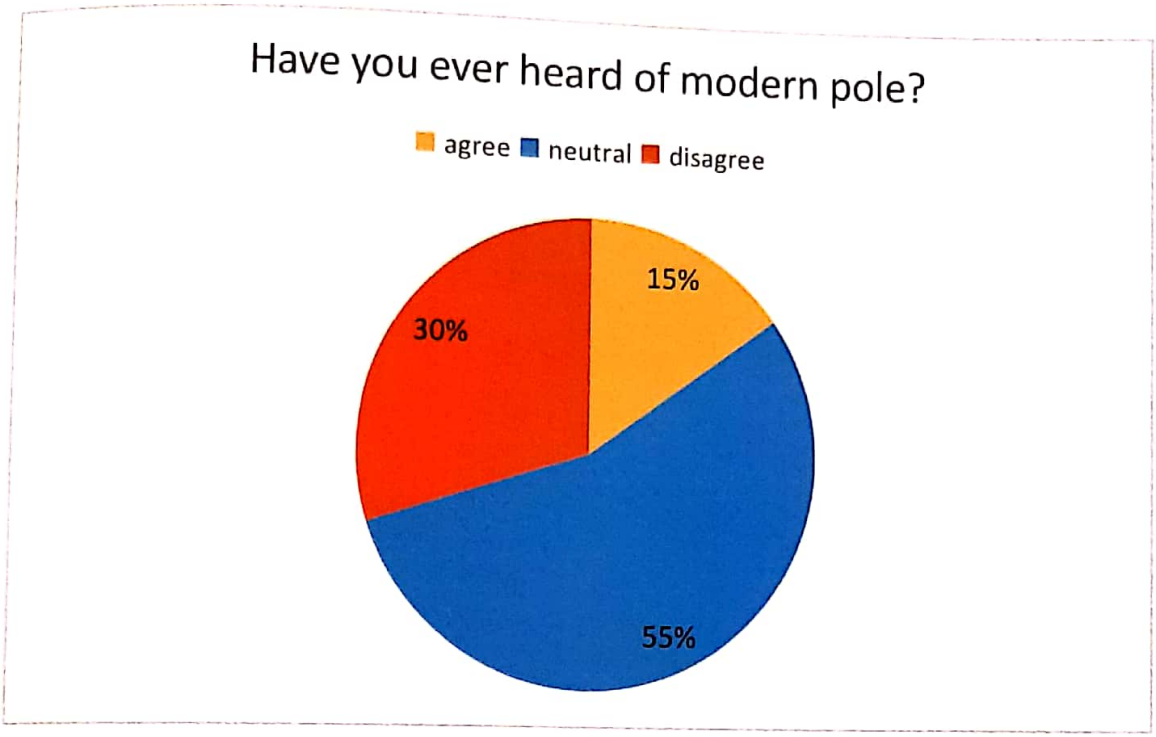


Figure 4.3 x: Have you ever heard of modern pole?

From the graph beside is shown the analysis of the respondent have heard a modern fruit picker. From the analysis, the percentage of neutral is 55% which is higher than agree and disagree. The percentage of disagree is 30% which is higher than agree with 15% but lower than neutral.

4.3 xi Are modern pole too expensive?

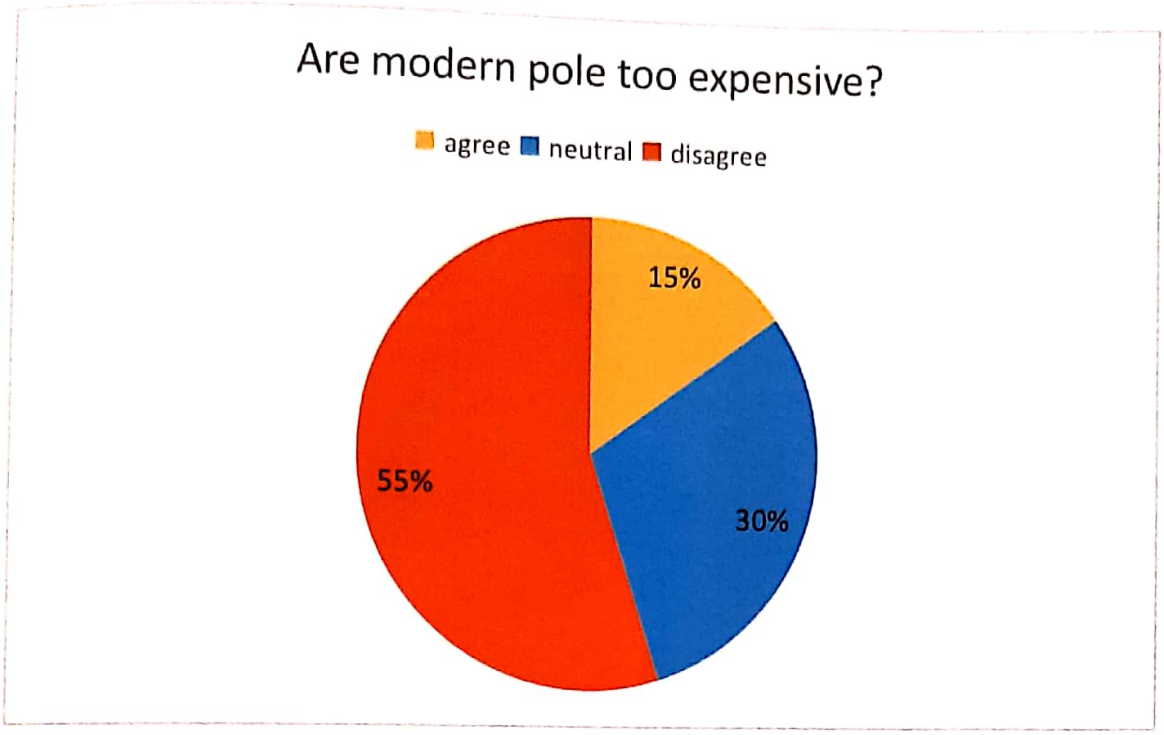


Figure 4.3 xi :Are modern pole too expensive?

From the graph beside is shown the analysis of the modern pole too expensive. From the analysis,the percentage of disagree is 55% which is higher than neutral and agree. The percentage of neutral is 30% which is higher than agree with 15% but lower than disagree.

4.3 xii If we innovate the existing pole, will you support it?

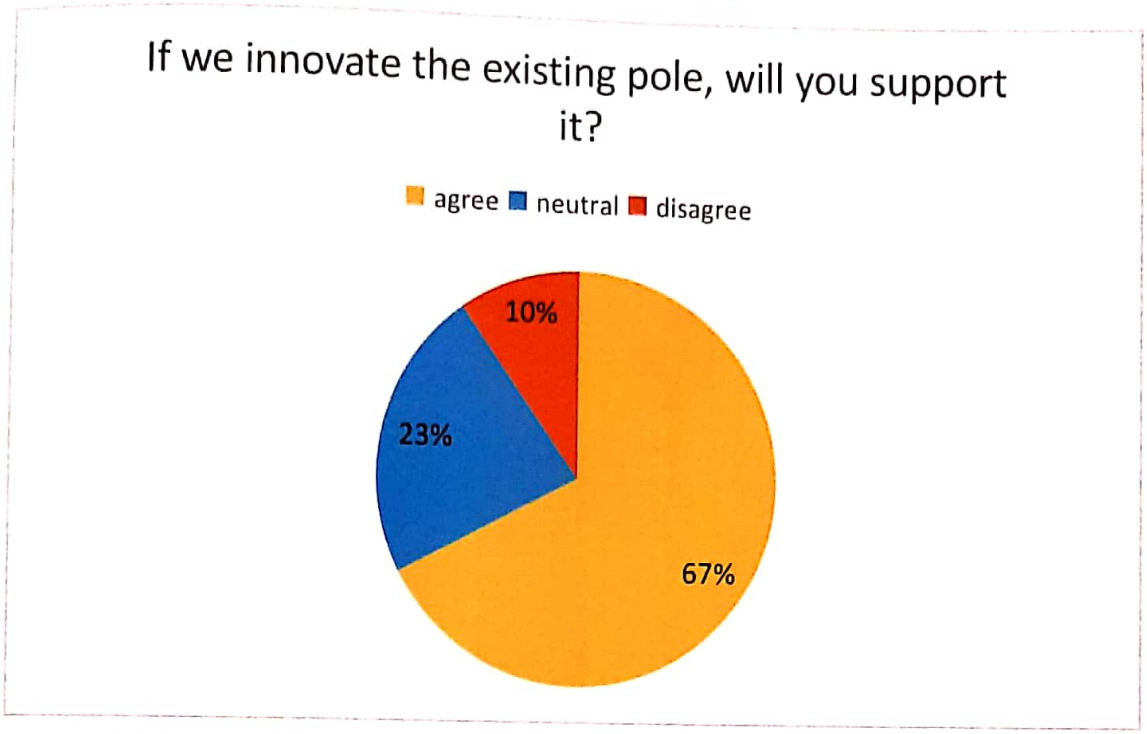
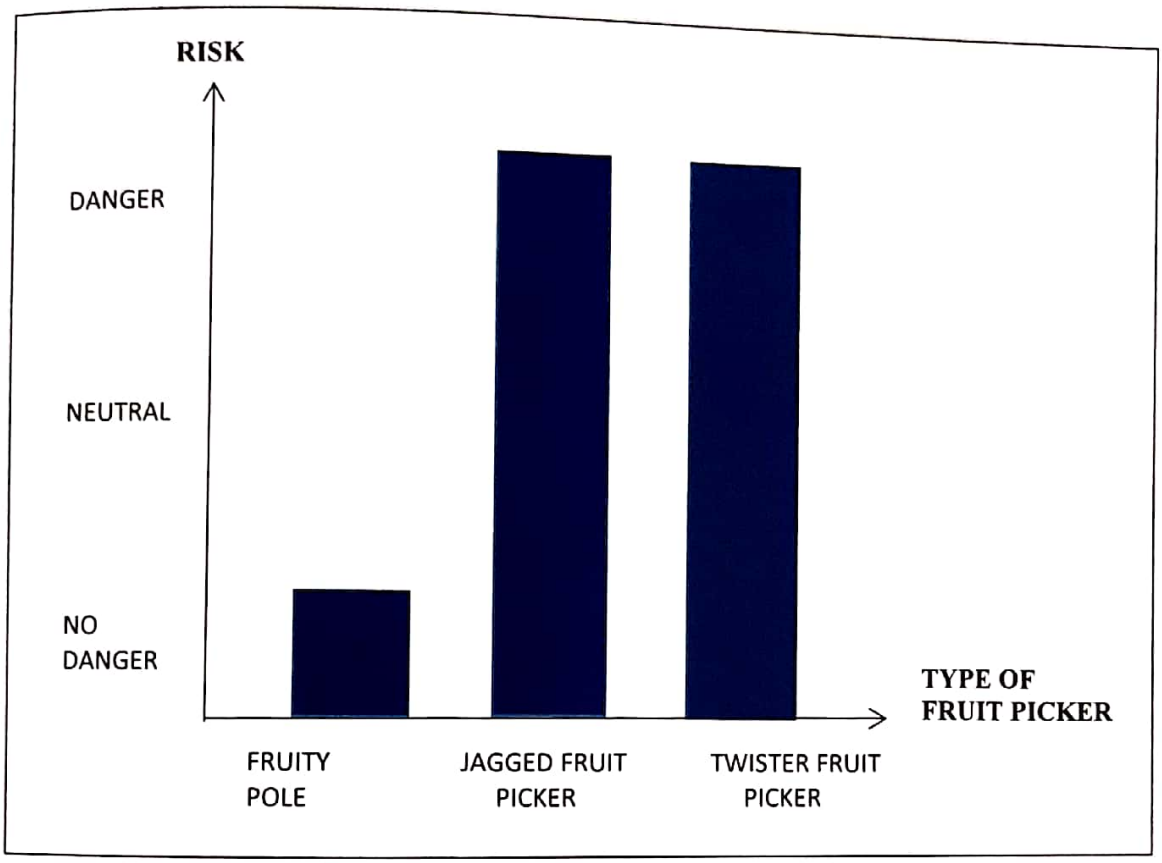


Figure 4.3 xii: If we innovate the existing pole, will you support it?

From the graph beside is shown the analysis of the will their support the innovate the ordinary fruit picker. From the analysis, the percentage of agree is 67% which is higher than neutral and disagree. The percentage of neutral is 23% which is higher than disagree with 10% but lower than agree.

4.4 Data objective

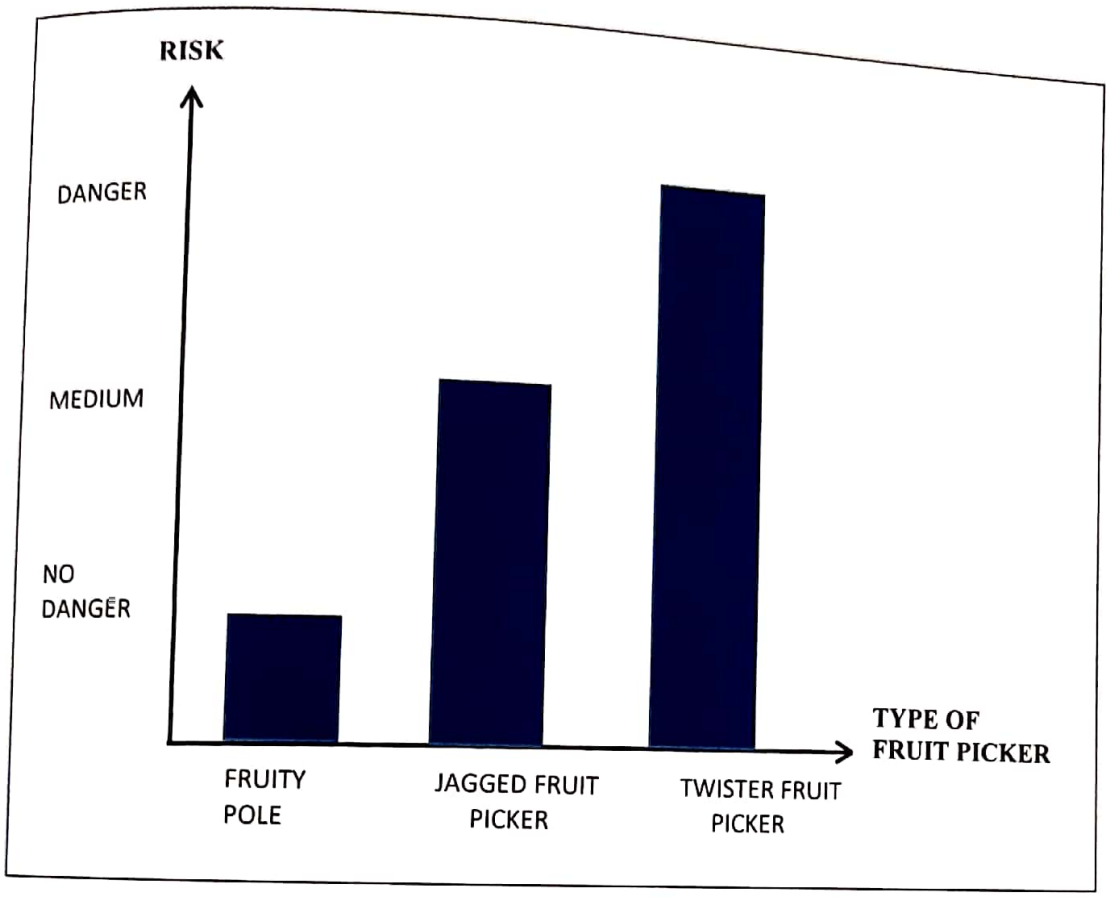
4.4.1 Length



Graph 4.4.1: Length

The **graph 4.4.1** above showed that Jagged fruit picker and twister fruit picker are heavier than fruity pole. Fruity pole shows that there is no danger which is Fruity Pole are more light weight and easy to use while knitting fruit. The jagged fruit picker shows that the risk of farmer is high to get injuries because the net were set at the top and when the fruit fall inside the net, these will make the fruit picker become more heavy and not stable to hold. Lastly, the twister fruit picker shows that there is in danger situation because its does not have the net/funnel for fruit and very danger for the farmer. For example, if the fruit falling down it may hit the farmer's body parts and will cause injuries.

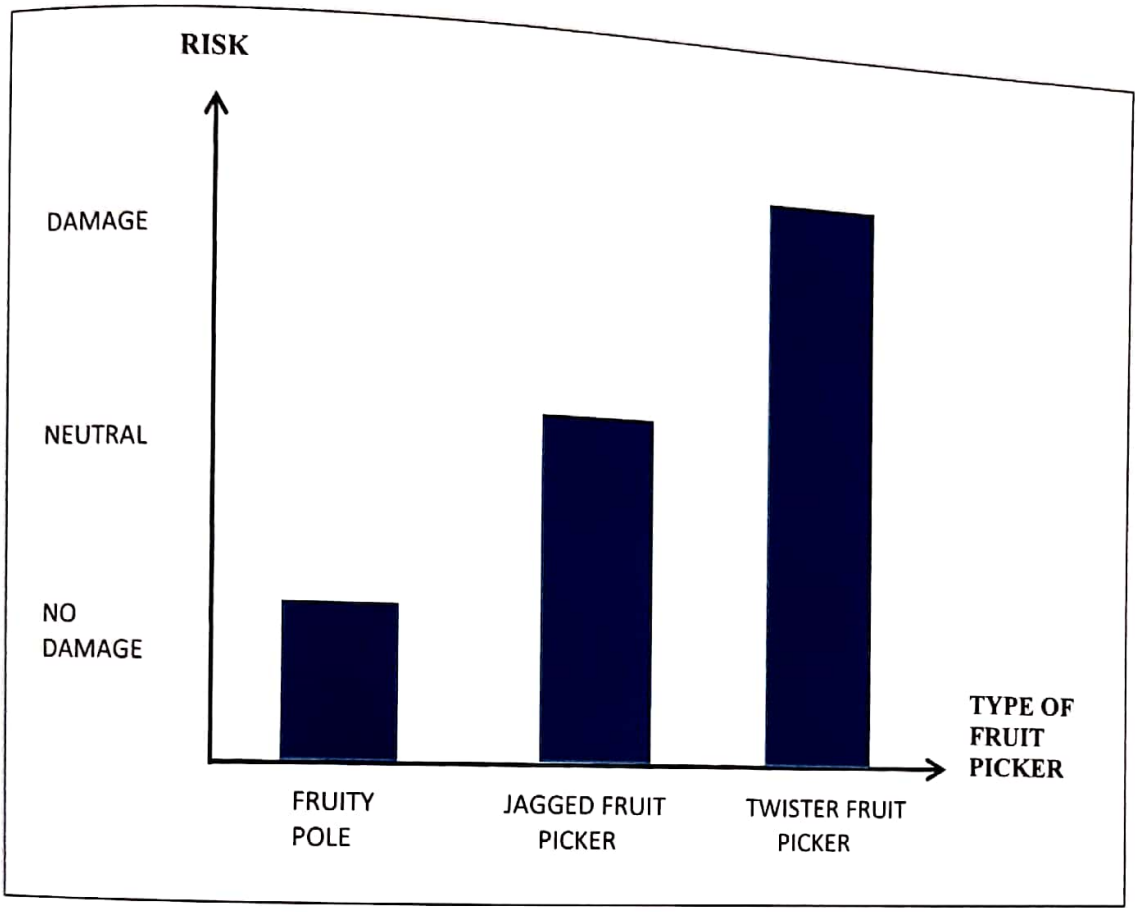
4.4.2 The holder



Graph 4.4.2: The holder

The graph above showed that the risk of the holder to fruit picker. The Fruity Pole shows that there is no danger while the farmer holding the holder because there have a rubber for hold. The jagged picker fruit shows that there is in medium of danger because its may in probability in danger or no danger. The jagged fruit picker used wood where there may have no friction while pick a fruit. And lastly, the twister fruit picker shows that there is in danger situations because its used stainless steel without any friction like rubber that Fruity Pole used.

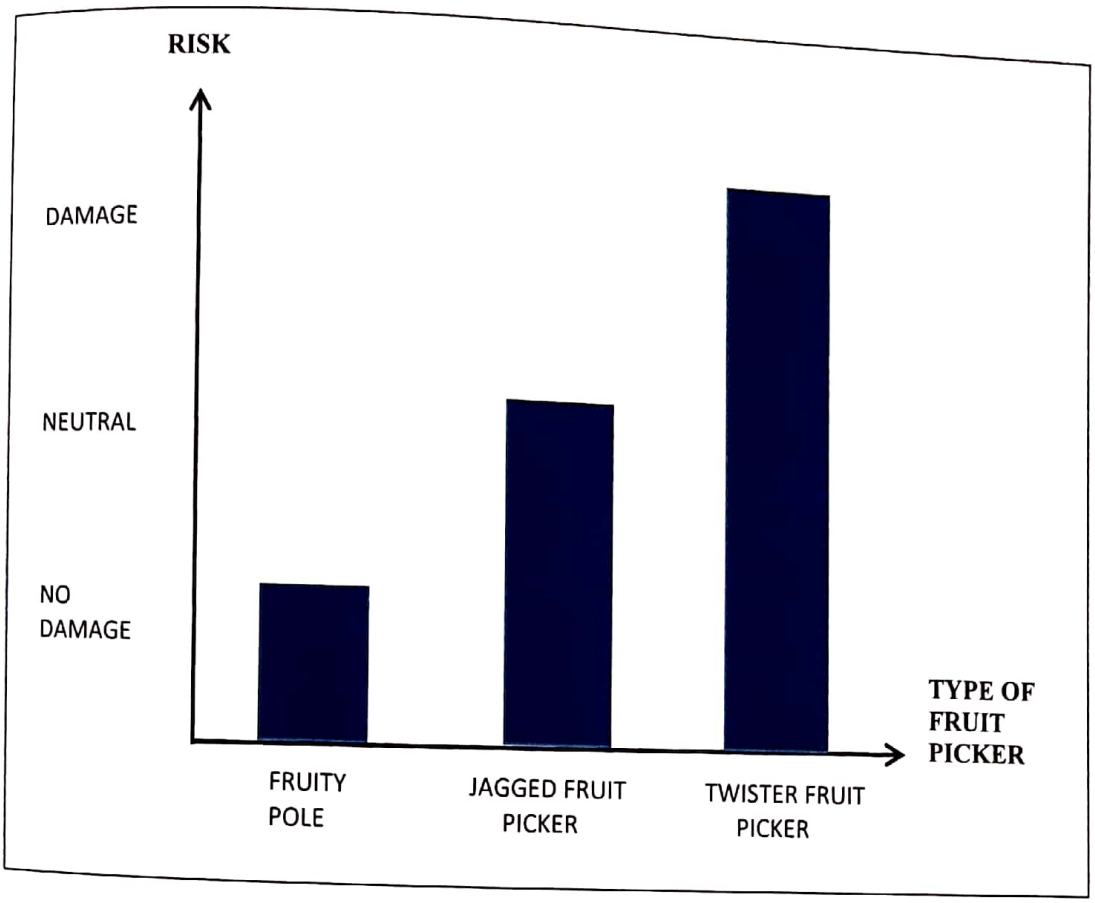
4.4.3 The falling fruits



Graph 4.4.3: the falling fruits

The graph above shows that the Fruity Pole is in no danger situations because its not destroy when the fruit is falling because fruity pole already has a funnel for fruit to falling in. The jagged fruit picker shows that there in neutral situations because these type of fruit picker has a net for fruit to fall into but not enough secure to prevent fruits from damage. And lastly, the twister fruit picker is in the danger situations because there is no net to support the fruits when they falling on the ground.

4.4.3 The falling fruits



Graph 4.4.3: the falling fruits

The graph above shows that the Fruity Pole is in no danger situations because its not destroy when the fruit is falling because fruity pole already has a funnel for fruit to falling in. The jagged fruit picker shows that there in neutral situations because these type of fruit picker has a net for fruit to fall into but not enough secure to prevent fruits from damage. And lastly, the twister fruit picker is in the danger situations because there is no net to support the fruits when they falling on the ground.

4.4.4 Fruit Damage

	1ST FRUIT	2ND FRUIT	3RD FRUIT	4TH FRUIT	5TH FRUIT	6TH FRUIT	7TH FRUIT	8TH FRUIT	TOTAL
FRUITY POLE	0	0	0	0	0	0	0	0	0/8
ORDINARY FRUIT PICKER	1	0	0	1	1	1	0	0	4/8

TABLE 4.4.4

The data we collected is in the table 4.4.4 to comparing fruits damage between fruity pole and ordinary fruit picker. From the data we collected, there is no damage fruit while using Fruity Pole but there is has a damage while using ordinary fruit picker.

4.4.5 Time

	1ST FRUIT	2ND FRUIT	3RD FRUIT	4TH FRUIT	5TH FRUIT	6TH FRUIT	7TH FRUIT	8TH FRUIT
FRUITY POLE (MINUTE)	1	1.30	2.00	2.40	3.20	3.40	4.10	4.30
ORDINARY FRUIT PICKER (MINUTE)	1.10	1.50	2.25	2.58	3.40	3.56	4.50	5.39

TABLE 4.4.5

The data we collected is in the table 4.4.5 to comparing time of fruit collected between fruity pole and ordinary fruit picker. From the data we collected, there is 8 fruit of mango in 4.30 minute when we used Fruity Pole but when we used the ordinary fruit picker, there is taken 5.39 minute to pick 8fruit of mango.

5.0 CONCLUSION

In conclusion, we designed an ordinary fruit picker where we put nets on the body parts. The function of the net is to protect the plucked fruit from falling into it so that the fruit is always in good condition. We also changed this Fruity pole system, where with ordinary fruit picker it uses the hand to move the cutter but for the fruity pole it uses the foot to move the cutter. So with the system developing the fruit from hand to foot it has become a new challenge for farmers when using Fruity Pole. Farmers who have problems with quality care when picking fruit are recommended to use this Fruity pole because according to the data we have this fruity pole is good for keeping fruit quality in a short time.

The main objective of this project is to minimize damage to the fruit and to maintain the quality of the fruit. We follow the correct steps and procedures for successful project implementation. We designed Fruity poles to make them look like fruit mango and mangoes.

5.1 SUGGESTION

Fruity pole is use for knitting fruit/picking fruit and to protect the fruit from damage. A good fruit without damage can be sell at the market and not easily rotten. Fruity pole is easy and safe to be use which will not cause injuries to the farmer while knitting fruit. Fruity pole also can reduce time taken while picking fruit and can collect fruit in large quantity.

There is some factors can be suggested to improve the fruity pole to make it become more efficient in future :-

5. Fruits fall and caused damage and rotten

- When the farmers used a ordinary fruit picker, the fruit will continue to fall to the ground and break down due to the falling between the fruit and the ground.

6. The safety of the farmer is affected

- A fruit knitted without protection will be at high risk for falls on the workers body.

7. Producing non-quality fruits

- Fruits that fall to the ground will have severe side effects such as pores, bumps and scratches.

8. Waste time, and manpower

- Time wasting occurs when the fruit falling to the ground will cause the farmer to collect the fruit one by one and it will cause a waste of time.

5.2 Details of the proposed Fruity Pole

This Fruity Pole is designed according to the shape and size used, This Fruity Pole have a 3 meters length. Likely ordinary fruit picker have a same length with fruity pole .

This fruit picker (Fruity Pole) have the ability to save a quality of fruit when the fruit has been knitting because the Fruity pole have a funnel to reduce a damage impact for fruit. In addition, Fruity Pole also save a time for farmers like the farmers no need bow to pickup a fruit that fell to the ground. And lastly, Fruity pole used a new system to knitting a fruit. Fruity pole used a foot to moved a cutter blade .

Some detailed information on the Fruity Pole:-

- Material - Stainless steel
- Cost - RM 100
- System - used foot to moved a cutter blade
- Methods of maintenance - Human

5.3 References

[1] FCC. Wireless E911 Location Accuracy Requirements, PS Docket No. 07-114, Second Report and Order, 25 FCC Rcd 18909 (2010) (E911 Location Accuracy Second Report and Order) , available at http://www.atis.org/legal/Docs/ESIF%20DOCS/FCC-11_107A1_E911 (last visited October 13, 2014).

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[3] Jagged fruit picker
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POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Jabatan
Kejuruteraan Mekanikal

June 2019 session

Topic:

FRUITY POLE

Group member :

NAME	No. MATRIK
MELVIN CHIRANONT A/L KHAMRON CHIRANONT	08DMP17F1105

SUPERVISOR: PN GIHA BINTI TARDAN

Chapter 3: Methodology

3.2 Introduction

This chapter will explain the method adopted by this research. This chapter will mention every component involved in conducting this research from population, population frame and sampling techniques used for the interview. Finally, this chapter provides a detail explanation of the selected mode of analysis used and data collection method. Methodology is the systematic, theoretical analysis of the methods applied to a field of study. Typically, it encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. A methodology does not set out to provide solutions. Therefore, not the same as a method.

3.1.1 Research design/structure

Generally, research design means a structure to plan and execute a particular research. Research design is the crucial part of the research as it includes all the four important considerations: the strategy, the conceptual framework, the identification of whom and what to study on and the tools and procedures to be used for collecting and analyzed data.

3.2 Components

- Steel Wire
- cutter
- PVC pedal
- Steel tube
- Steel Plate L (PVC holder)
- Bolt and nut 40mm
- PVC cap
- Cable ties
- Rubber grip

3.2.1 STEEL WIRE

Figure 3.1: steel wire

Wire rope is several strands of metal wire twisted into a helix forming a composite "rope", in a pattern known as "laid rope". Larger diameter wire rope consists of multiple strands of such laid rope in a pattern known as "cable laid".In stricter senses, the term "wire rope" refers to a diameter larger than 3/8 inch (9.52 mm), with smaller gauges designated cable or cords. Initially wrought iron wires were used, but today steel is the main material used for wire ropes

- 1.5 inch stainless steel wire
- 20meter long
- An-ti rusty and 304 stainless steel wire rope

3.2.2 CUTTER

Figure 3.2: cutter

Pruning shears, also called hand pruners or secateurs, are a type of scissors for use on plants. They are strong enough to prune hard branches of trees and shrubs, sometimes up to two centimetres thick. For our project we use this cutter as a tool for knitting the fruit. This cutter required a steel wire to moving the blade.

- Stainless steel
- Dimension: 0.9 x 1.9 x 5.6
- Weight 0.3 kg
- 1.5 cm spring length
- 5 inch blade

3.2.3 PVC FOOT PEDAL

Figure 3.3 : PVC foot pedal

Polyvinyl chloride is the world's third-most widely produced synthetic plastic polymer, after polyethylene and polypropylene. About 40 million tonnes are produced per year. PVC comes in two basic forms: rigid and flexible. For this project this pvc is use as a foot pedal to move the cutter blade.

- PVC material
- 30cm of diameter
- Lightweight and easy to handle

3.2.4 STEEL TUBE

Figure 3.4: steel tube

Steel Pipe. Steel pipes are long, hollow tubes that are used for a variety of purposes. They are produced by two distinct methods which result in either a welded or seamless pipe. In both methods, raw steel is first cast into a more workable starting form material: stainless steel

- Stainless steel
- Not heavy (lightweight)
- Size: 2000mmx4mm×1mm
- Heat resistance and hard
- Color silver

3.2.5 STEEL PLATE L (PVC HOLDER)

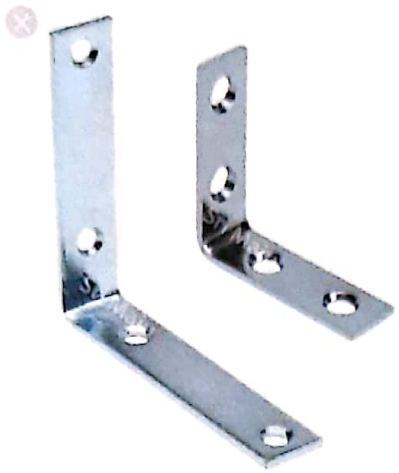


Figure 3.5 : Plate L blacket

Steel plate L is used to support shoe shelves, kitchen shelves and more. For this project this steel plate L is mainly use to hold the PVC foot pedal. This L plate is prevent the pvc from falling ground and cause damage.

- Material: steel
- 15 mm of width
- Reinforces inside of 90-degree-angle joints
- Not heavy (lightweight)

3.2.6 BOLT AND NUTS 40MM

Figure 3.6: Bolt and nuts 40mm

Nut and bolt - a fastener made by screwing a nut onto a threaded bolt. Bolt - a screw that screws into a nut to form a fastener. Fastening, holdfast, fastener, fixing - restraint that attaches to something or holds something in place. Model name: pinnacle M6 x 40mm Steel Hex Bolt and Nut

- Stainless steel (M6 x 40mm)
- Weight : 0.064kg
- dimension : W:50 H:110 L: 30
- Bolt size: M6 x 40mm
- Hexagon shape bolt

3.2.7 PVC CAP

Figure 3.7: PVC cap

PVC is a flexible material. When used as the material for a cap or plug, it provides a much better seal and will not crack or shred like hard plastic closures. This cap is used to close the bottom of the steel tube to prevent the steel from damage.

- Hard and Flexible material
- chemical resistance
- lightweight
- easy to install

3.2.8 CABLE TIES

Figure 3.8: Cable ties

A cable tie (also known as a hose tie, or zip tie, and by the brand names Ty-Rap) is a type of fastener, for holding items together, primarily electrical cables or wires. Because of their low cost and ease of use, cable ties are ubiquitous, finding use in a wide range of other applications. For our project, we use cable ties to assemble the net.

- Material : plastic
- lightweight
- Flexible and easy to use
- High quality and strong

3.2.9 RUBBER GRIP

Figure 3.9: Rubber for hold

Good rubber grips are usually made of synthetic rubbers, such as polyurethane or PU. Some rubber grips are more spongy than others, they also can be stretched or not during the tying process to alter the girth of the grip. This rubber grip is to reduce the risk to get injury and have a very good grip.

- Material :polyurethane
- Flexible
- Lightweight
- Excellent grip

3.2.10 NET

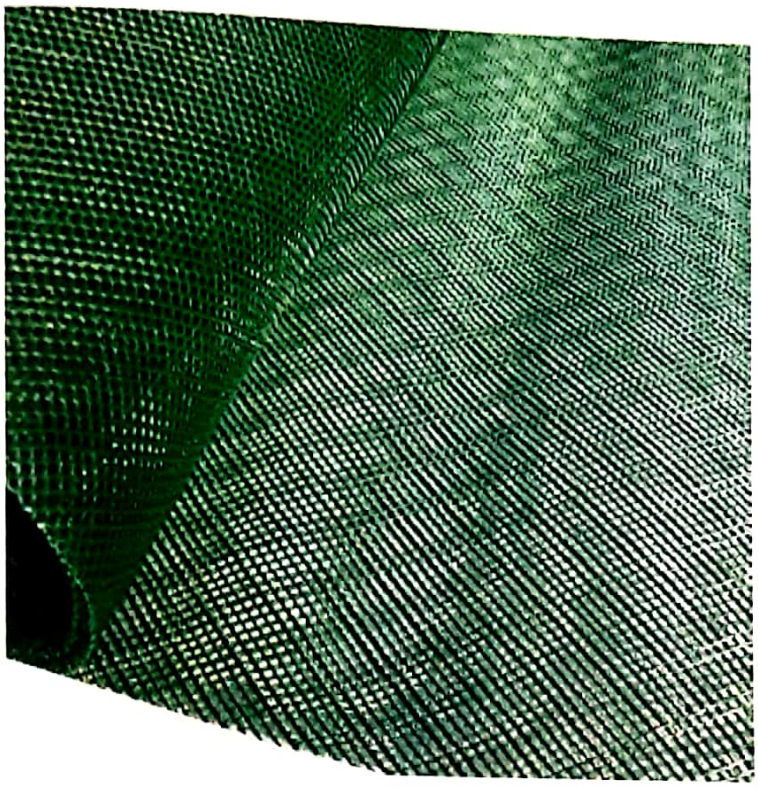


Figure 3.10: Net

A mosquito net made of the right material is a must have if you want ... You can have mosquito mesh for the windows, mosquito nets for the beds ... While mosquito nets might not be as essential in urban households and there are other means of protection as well. This project we use this net as a funnel for fruit.

- 220g/m2 weight
- material : polyethylene (HDPE plastic)
- 1.5 meter
- Lightweight and strong

3.3 Design of project

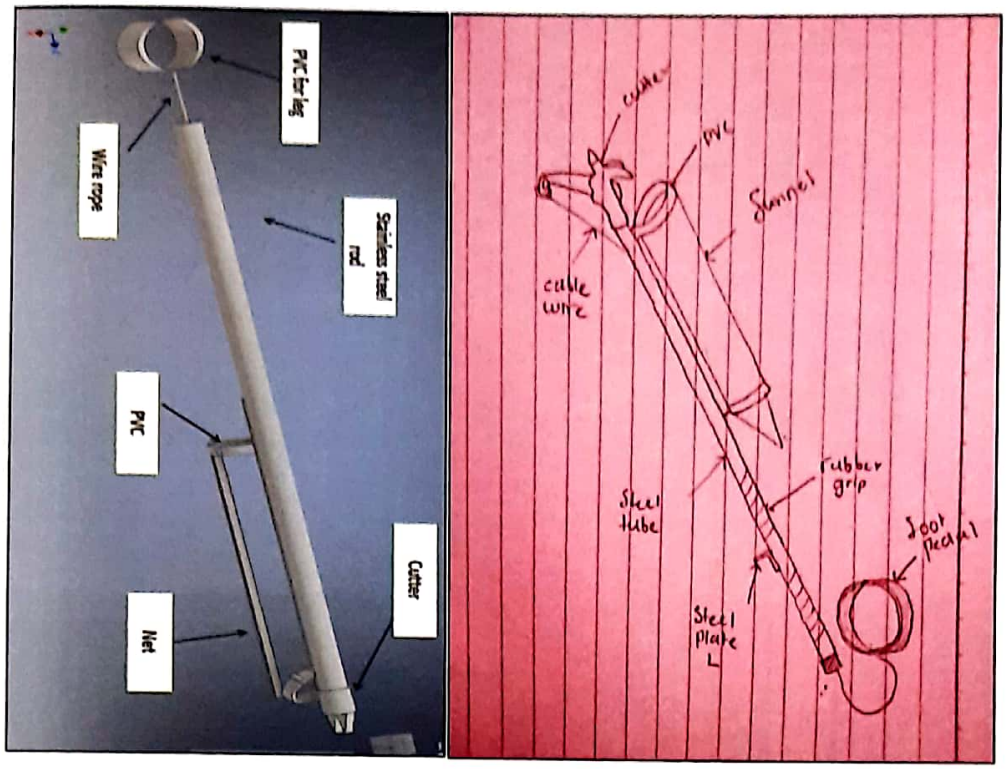


Figure 3.11: Design of project

Project design is an early phase of the project where a project's key features, structure, criteria for success, and major deliverables are all planned out. The point is to develop one or more designs which can be used to achieve the desired project goals. Project design is a major first step towards a successful project. A project design is a strategic organization of ideas, materials and processes for the purpose of achieving a goal. Project managers rely on a good design to avoid pitfalls and provide parameters to maintain crucial aspects of the project, like the schedule and the budget.

Some might rush through the preliminary stages of a project, such as the project design, but that would be a mistake. Any seasoned project manager can tell you from experience that the more you put in the frontend of a project, the better your results will be on the backend.

3.4 Flow chart plan for project

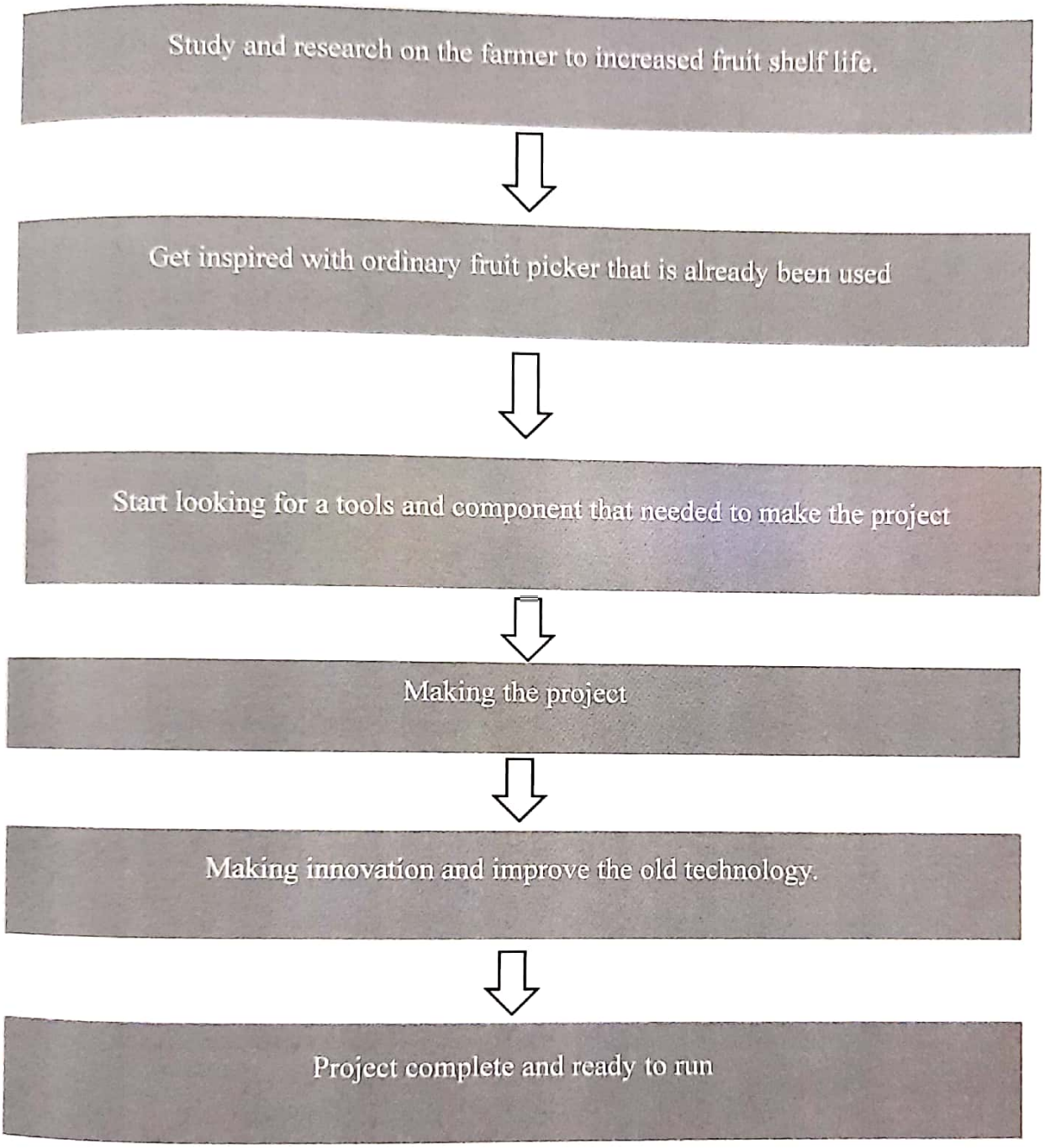


Figure 3.4.1: Flow chart plan of project

3.5 Flow chart of project construction

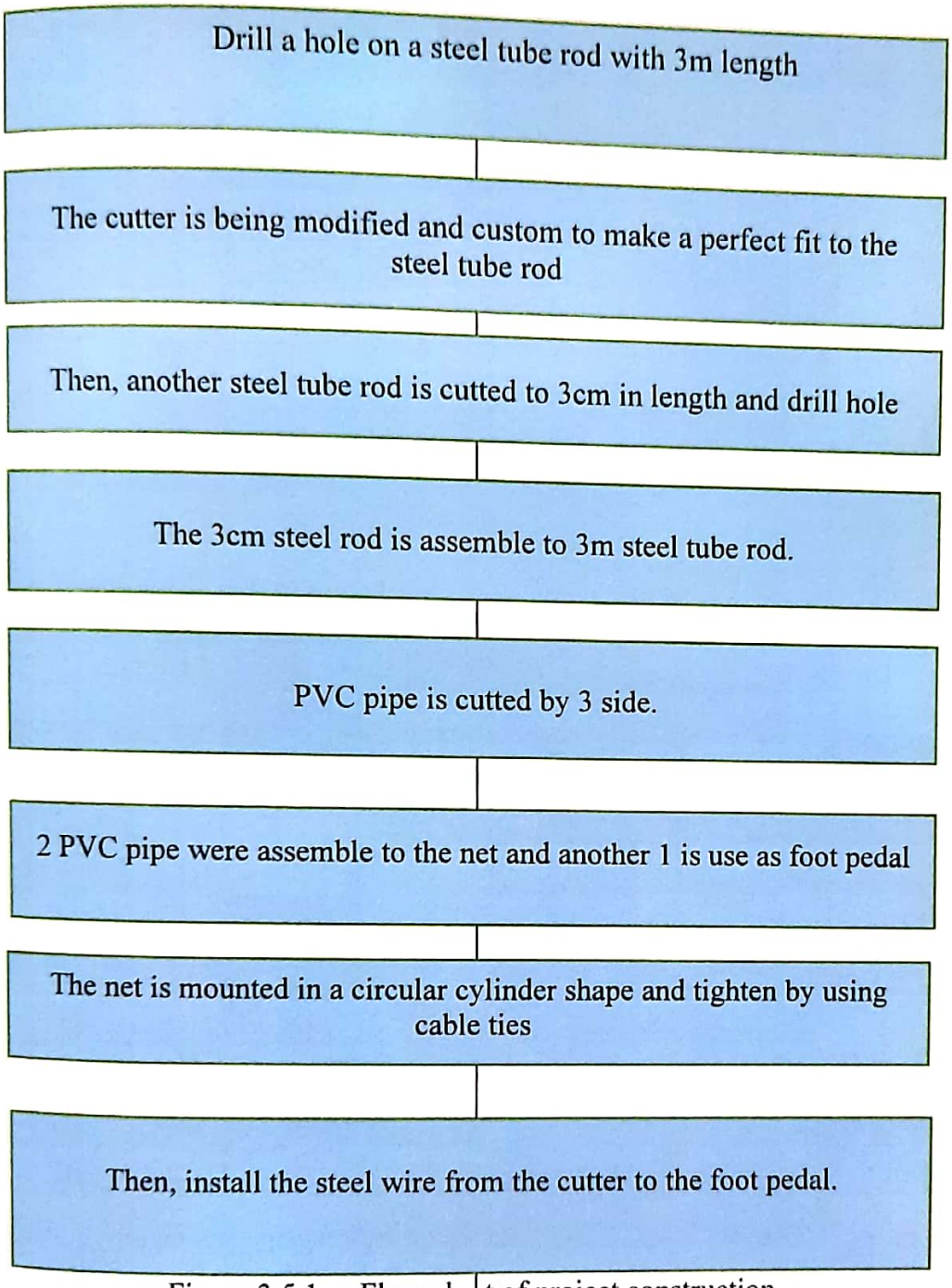


Figure 3.5.1: Flow chart of project construction

3.6 Cost of project

Component List	Price
Bolt and nuts 40mm	RM 4
Cable wire	RM 10
Mosquito Net	RM 10
PVC pipe	RM 10
Stainless Steel rod	RM 20
Cutter	RM 25
Rubber grip	RM18
Cable ties	RM4
Plate L steel	RM 3
PVC cap	RM 1.20
TOTAL	RM105.20

4.0 Data and Analysis

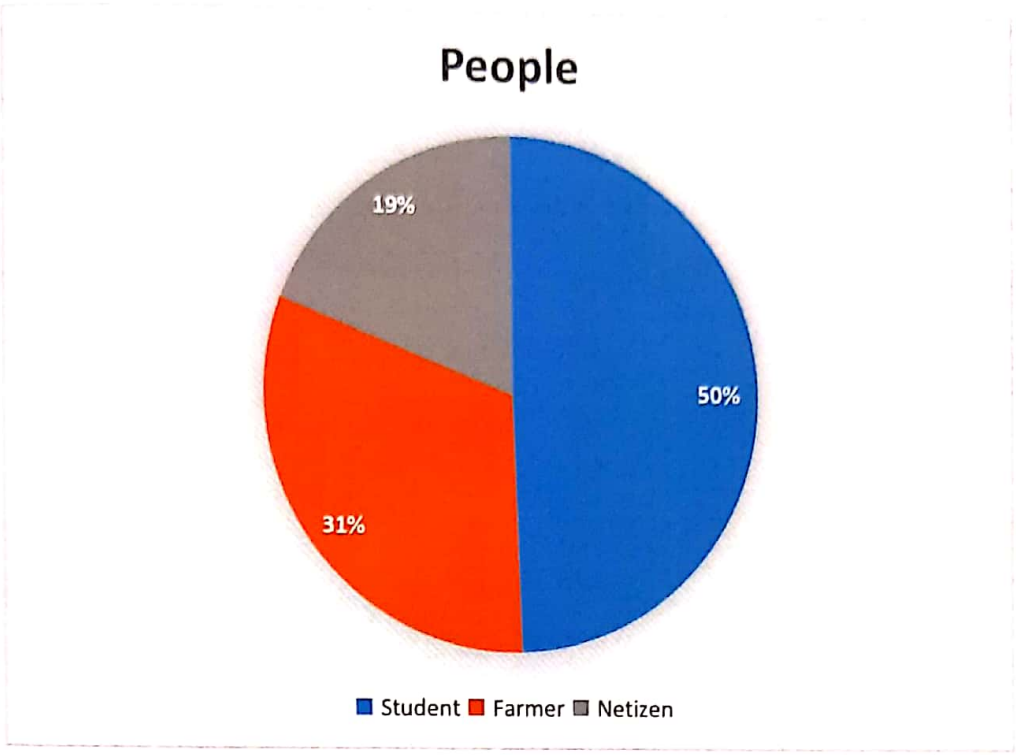
4.3 Introduction

Data analysis is a process of inspecting, cleansing, transforming and modeling data with the goal of discovering useful information, informing conclusion and supporting decision-making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, and is used in different business, science, and social science domains. In today's business world, data analysis plays a role in making decisions more scientific and helping businesses operate more effectively. The results obtained in this chapter are the results obtained from the questionnaire and experiments conducted in the study area. The results of the experiment in the study area are analyzed in more detail to draw conclusion based on the stated objectives of the study.

For the result collected shown 351 respondents from Politeknk Shah Alam student, farmers and citizen. We also finalised the conclusion and make it in campact way to be shown and there is several data that we focus on:-

1) Respondent demographics (people, and gender)
2) Servey question

4.2 i Respondent demographics



From the graph shown is the number of respondant is 357 people. From the graph above 50% respondant is from the student. 32% respondant is from farmer and 19% respondant is from netizen.

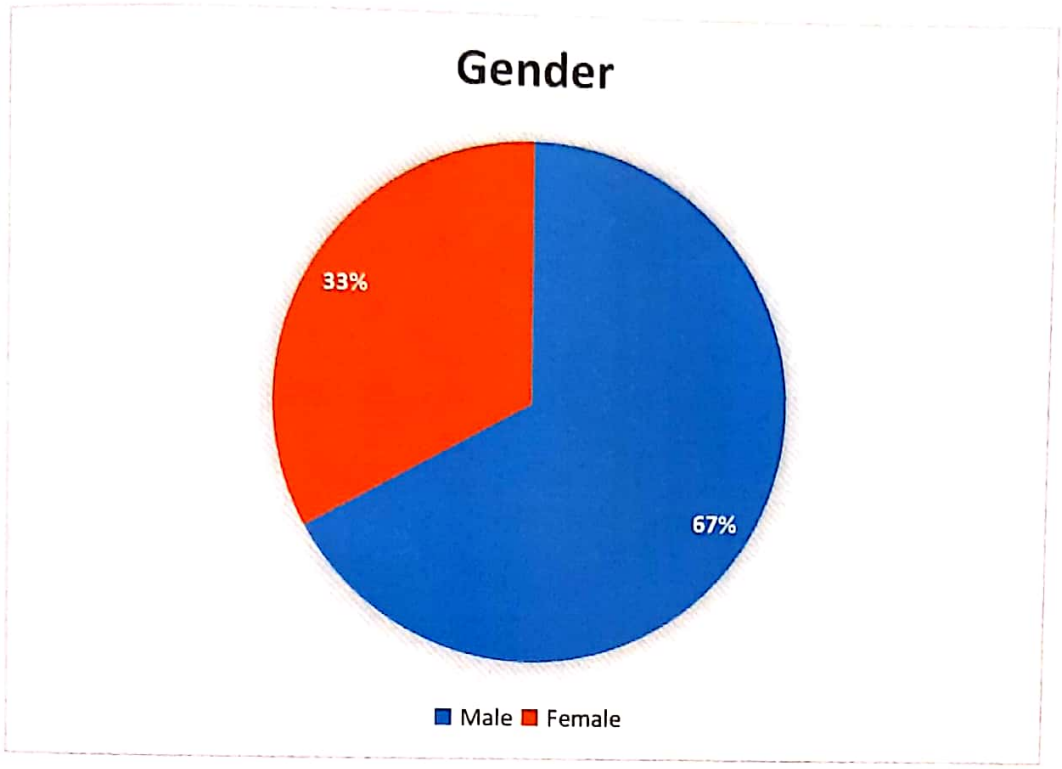


Figure 4.2 ii : Gender

From the graph above shown that the gender respondant. 67% respondant is from male and 33% respondant is from female.

4.3 Data from survey question

4.3 i Difficulty to knitting fruit

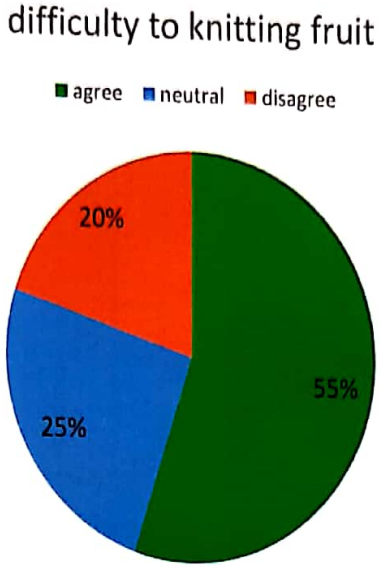


Figure 4.3 i : Difficulty to knitting fruit

The graph above show the difficulty to knitting fruit. From the graph 55% respondent agree, then, 25 % respondent are neutral and 20% respondent are disagree. The graph show that the respondent are disagree with the statement.

4.3 ii Does your body feel sick during or after knitting fruit

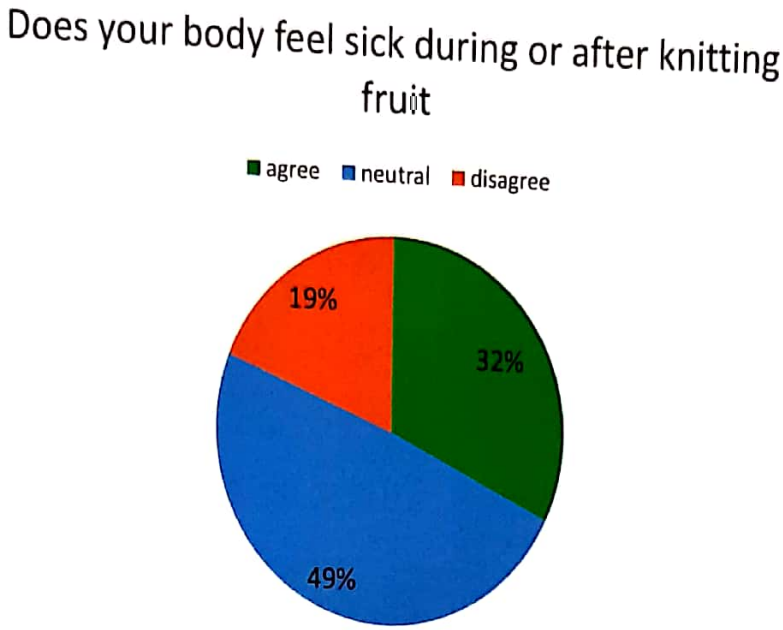


Figure 4.3 ii : Does your body feel sick during or after knitting fruit

The graph above show do the body feel sick during or after knitting fruit. From the graph 19% respondent are agree, 49% respondent are neutral and 32% are disagree. The graph show that respondent are neutral with the statement.

4.3 iii Will your fruit be damaged due to falling when kitting the fruit

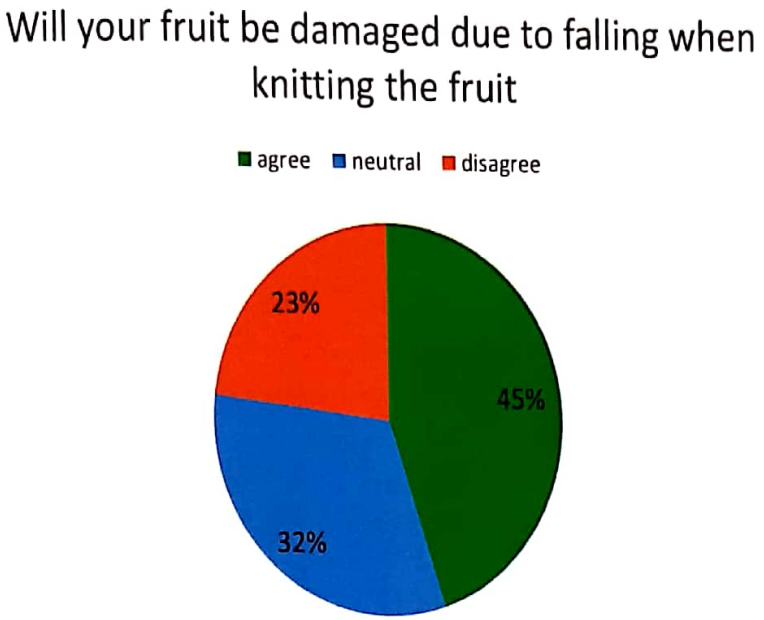


Figure 4.3 iii: Will your fruit be damaged due to falling when kitting the fruit

The graph shows the 'will your fruit be damaged due to falling when knitting the fruit' by using a fruit picker. From the data, 45% respondent agree with the statement. 32% respondent for natural with the statement. 23% respondent for disagree with the statement.

4.3 iv. Do you take a long time to knitting the fruit

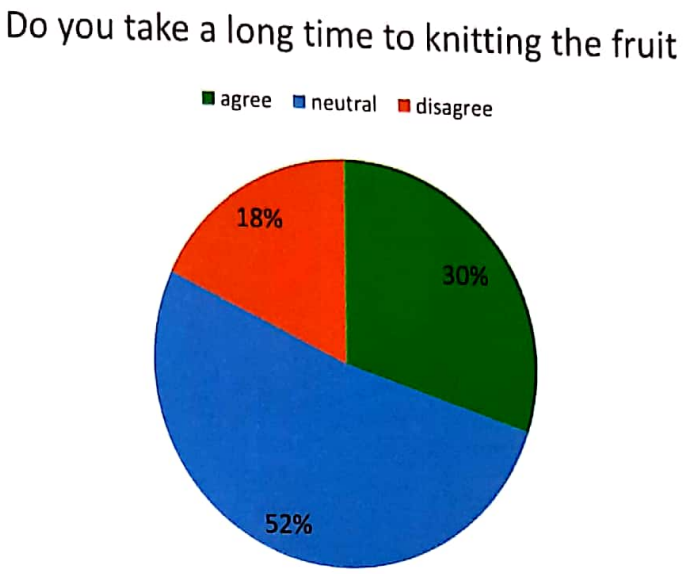


Figure 4.3 iv : Do you take a long time to knitting the fruit

Graph is shown the 'Do you take a long time to knitting the fruit' by using a fruit picker. From the analysis, 52% respondent neutral with the statement. 30% respondent for agree with the statement. 18% respondent for disagree with the statement.

4.3 v Are you comfortable using the existing fruit picker

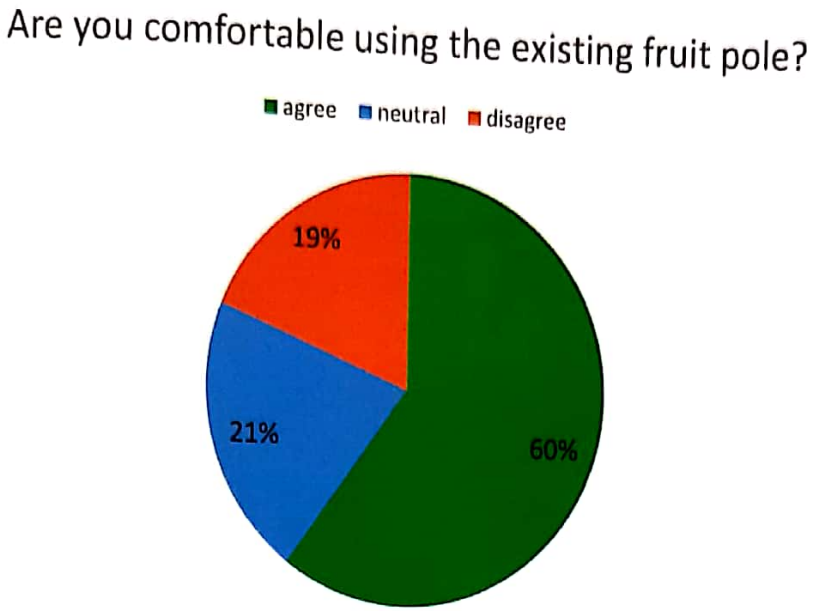


Figure 4.3 v: Are you comfortable using ordiniary fruit picker

The graph above is shown the 'Are you comfortable using existing fruit picker'. From the analysis, 60% respondent agree with the statement. 21% respondent for natural with the statement. 19% respondent for disagree with the statement. Mostly respondent are agree with the statement.

4.3 vi Is the ordinary fruit picker too heavy?

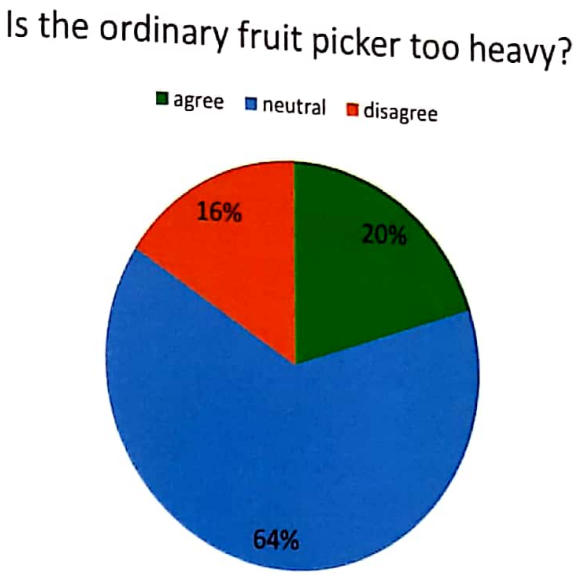


Figure 4.3 vi: Is the ordinary fruit picker too heavy?

From the graph shows 'the ordinary fruit picker is too heavy'. From the data, 64% respondent are neutral 20% respondent are agree and 16% respondent are disagree. Mostly respondent are neutral with the statement.

4.3 vii Is it easy to use the ordinary fruit picker

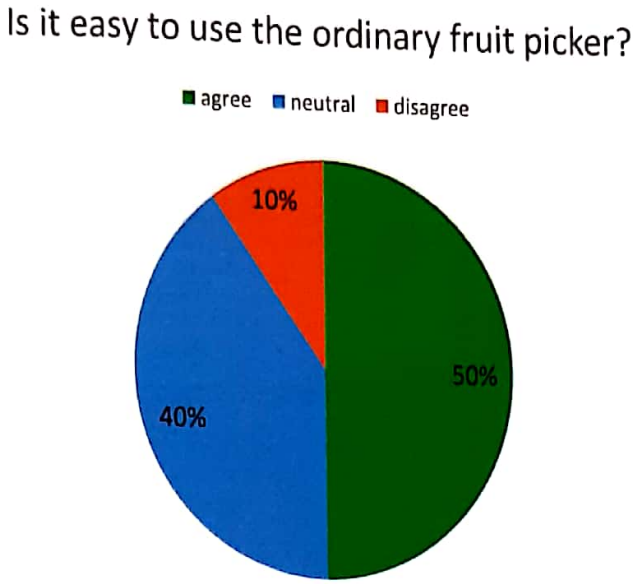


Figure 4.3 vii: Is it easy to use the ordinary fruit picker?

The graph is shown the data of 'it easy to using ordinary fruit picker'. From the analysis, 50% respondent agree with the statement. 40% respondent for natural with the statement. 10% respondent for disagree with the statement. The graph show most respondent are agree with the statement.

4.3 viii Do you use a ordinary fruit picker?

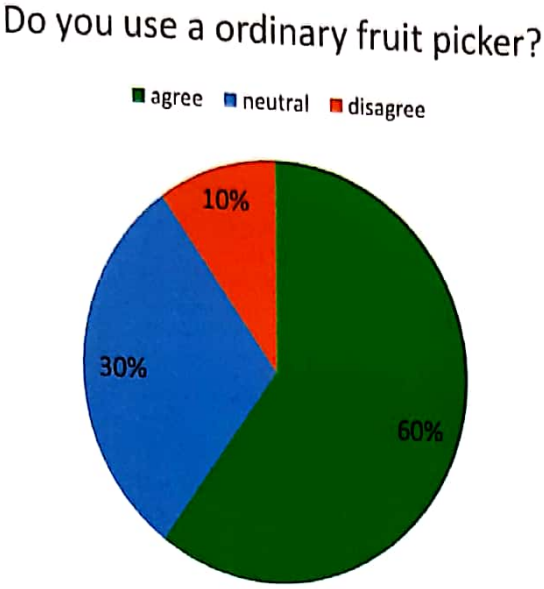


Figure 4.3 viii : Do you use a ordinary fruit picker?

From the graph beside is shown the analysis of the respondent still using a ordinary fruit picker. From the analysis, 60% respondent agree with the statement. 30% respondent for natural with the statement. 10% respondent for disagree with the statement.

4.3 ix Do you use a modern-day pole?

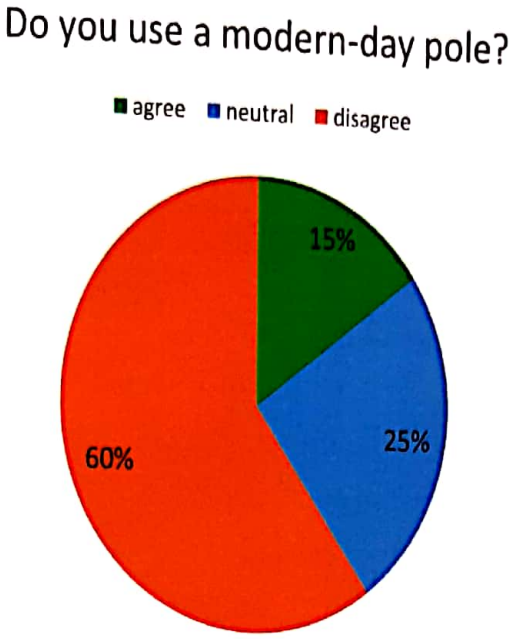


Figure 4.3 ix: Do you use a modern-day pole

Graph beside shown the data of the respondent 'use a modern fruit picker'. From the analysis, 60% respondent disagree with the statement. 25% respondent for natural with the statement. 15% respondent for agree with the statement. Most respondent is disagree with the statement.

4.3 x Have you ever heard of modern pole?

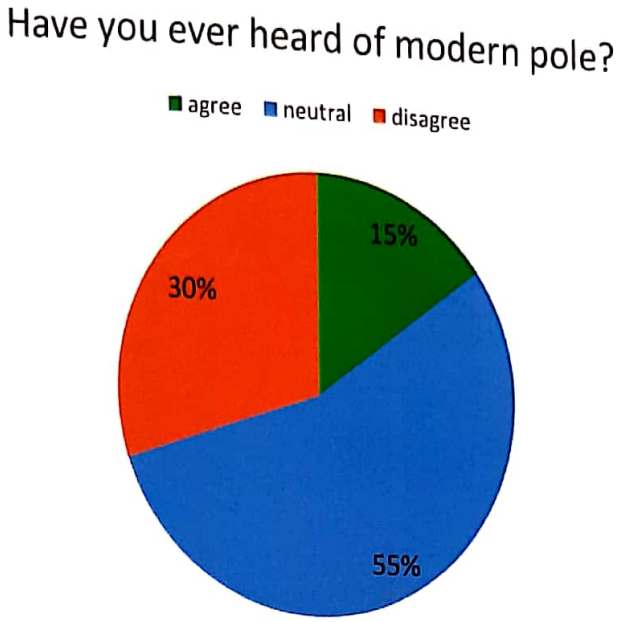


Figure 4.3 x: Have you ever heard of modern pole?

Graph above shown the data of the respondent 'have heard a modern fruit picker'. From the analysis, 55% respondent neutral with the statement. 30% respondent for disagree with the statement. 15% respondent for agree with the statement. The graph above show the respondent are mostly neutral with the statement.

4.3 xi Are modern pole too expensive?

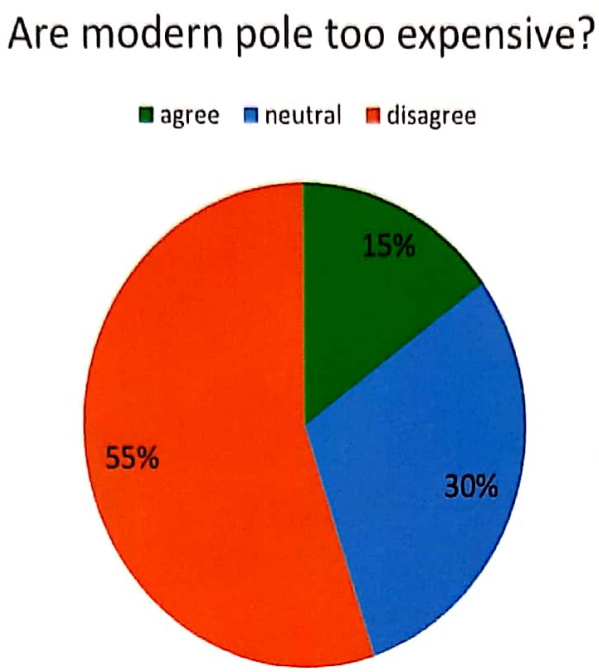


Figure 4.3 xi:Are modern pole too expensive?

Graph above shown the data of 'the modern pole too expensive'. For 55% respondent disagree with the statement. 30% respondent for natural with the difficulty using the ordinary fruit picker. 15% respondent for agree with the statement. Mostly respondent are disagree with the statement.

4.3 xii If we innovate the existing pole, will you support it?

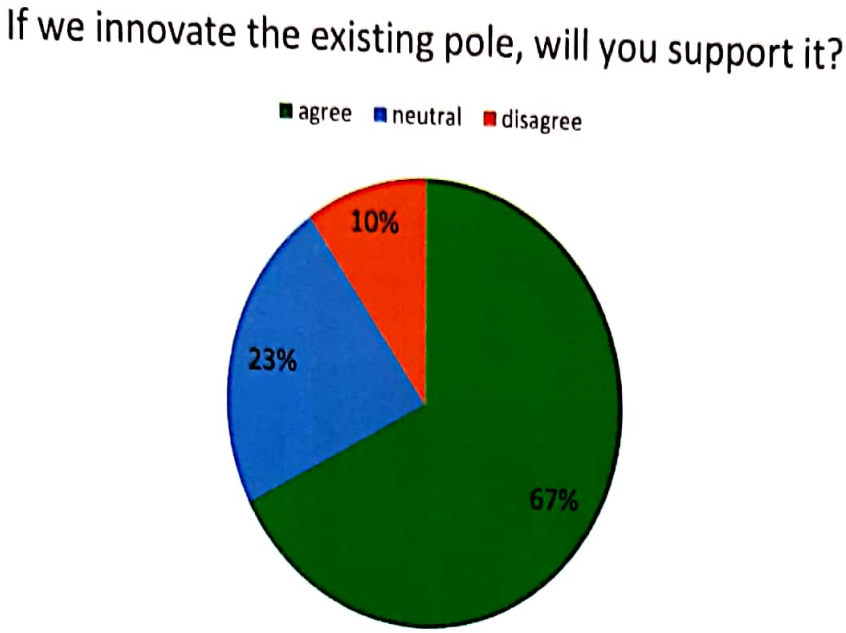
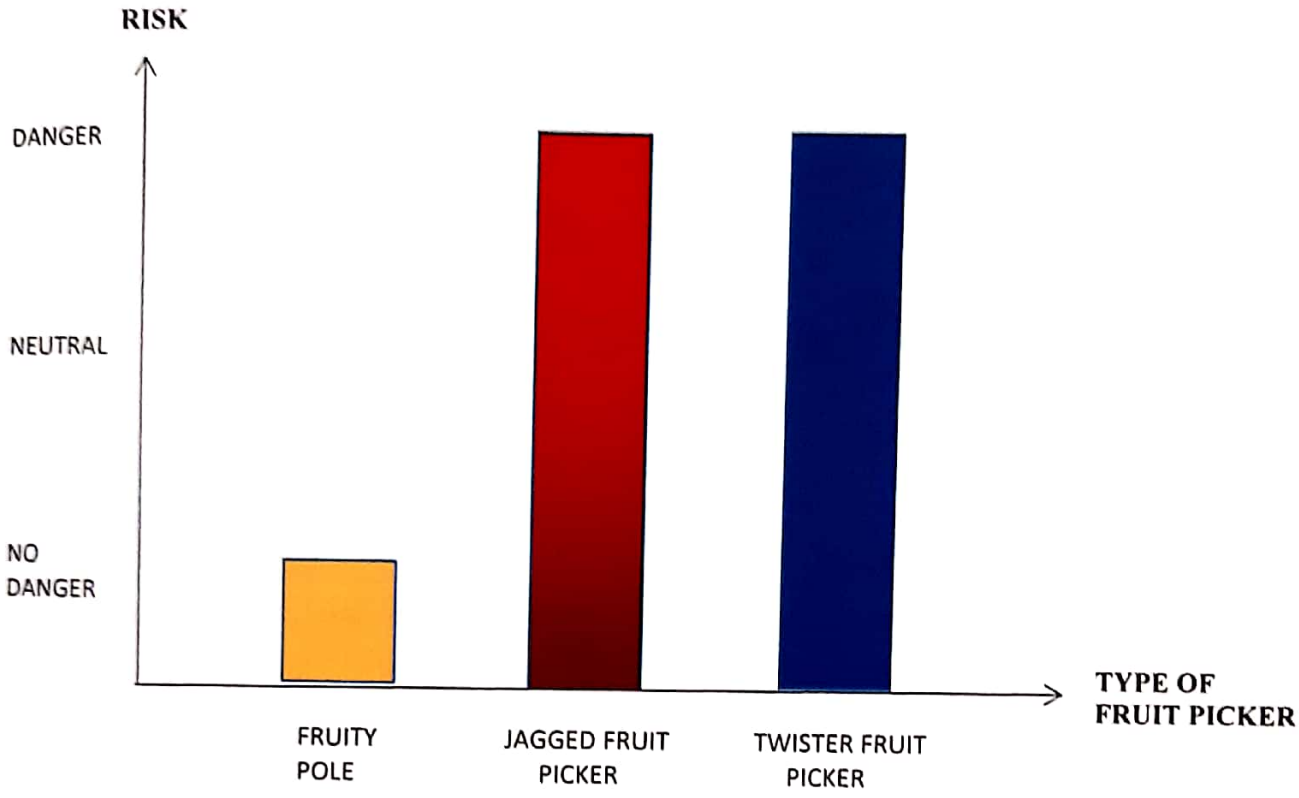


Figure 4.3 xii: If we innovate the existing pole, will you support it?

Graph above shown the data of the 'will their support the innovate of the ordinary fruit picker. From the analysis, 67% respondent agree with the statement. 23% respondent for natural with the statement. 10% respondent for disagree with the statement. The graph above show the respondent mostly agree with the statement.

4.4 Data objective

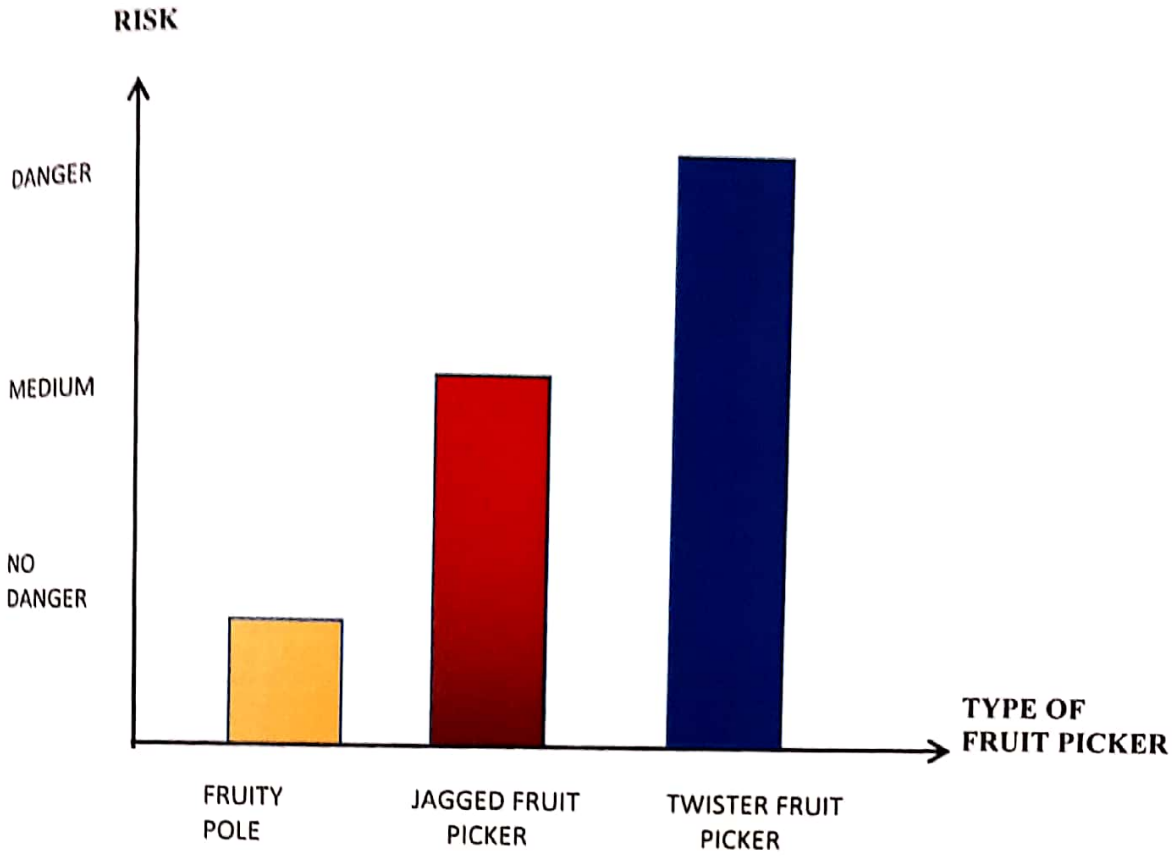
4.4.1 Length



Graph 4.4.1: Length

Graph above shown fruity pole has low risk compared to other fruit picker. Fruity pole is in low risk situation which can prevent danger to the farmer to get injuries like hand bleeding. Lightweight of fruity pole will less the danger risk to the farmer. For the jagged fruit picker the risk of farmer is high to get injuries because the net were set at the top and when the fruit fall inside the net, these will make the fruit picker become heavy and not stable to hold. For the twister fruit picker does not have the net/funnel for fruit and very danger for the farmer.

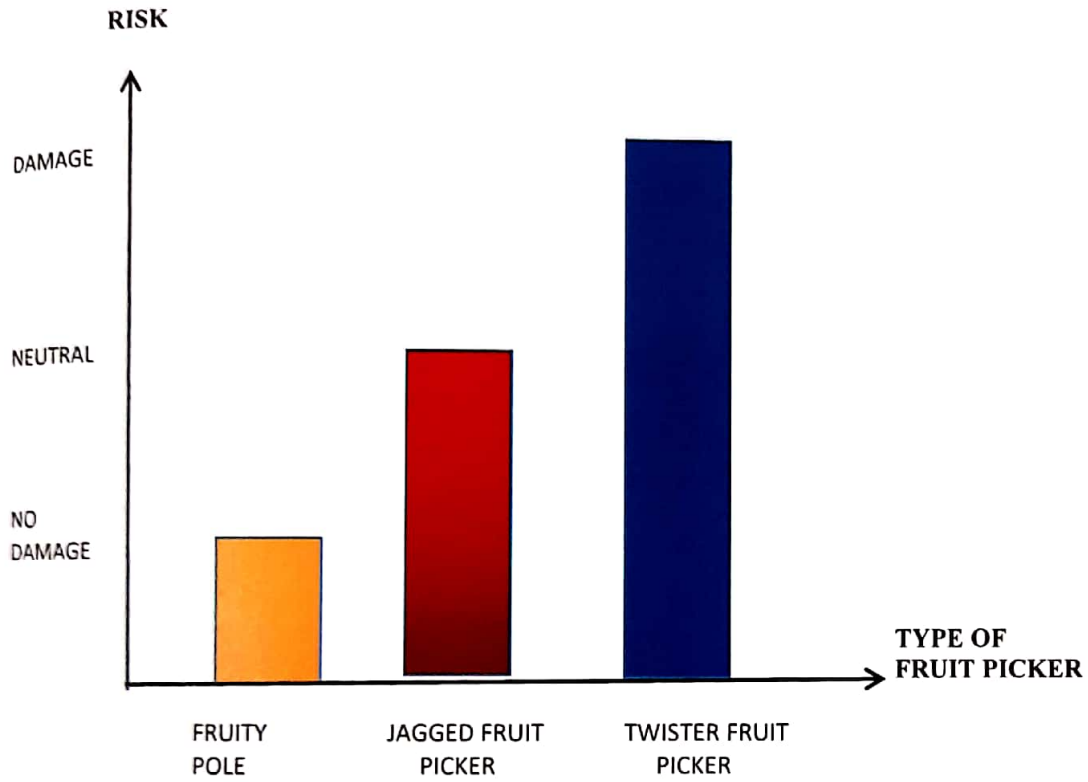
4.4.2 The holder



Graph 4.4.2: the holder

The graph above show the fruity pole has no risk,the jagged fruit picker has medium risk and the twister fruit picker has a danger risk. In this situation the fruity pole is mostly safe and less risk. The fruity pole has a custom rubber grip holder which can prevent slippery to hold. It is also very lightweight and easy to use as a daily fruit picker at home and very suitable for farmer. For the jagged fruit picker and twister fruit picker doesn't have a good holder so it is quite dangerous and not safe for the farmer.

4.4.3 The falling fruits



Graph 4.4.3: the falling fruits

The graph shown that the fruity pole has less risk of the fruit falling to ground. The jagged fruit picker is in medium and twister fruit picker has a danger risk. This two type of fruit picker is could not prevent fruit from fallen and will cause damge to the fruit. From the testing we already does, fruity pole has a funnel for fruit and has low chance of fruit to fallen ground.

4.4.4 Fruit Damage

	1ST FRUIT	2ND FRUIT	3RD FRUIT	4TH FRUIT	5TH FRUIT	6TH FRUIT	7TH FRUIT	8TH FRUIT	TOTAL
FRUITY POLE	0	0	0	0	0	0	0	0	0/8
ORDINARY FRUIT PICKER	1	0	0	1	1	1	0	0	4/8

TABLE 4.4.4

From the data above, fruity pole has no fruit damage. For the ordinary fruit picker it has 4 damage fruit cause by falling ground (scratch). This shown that fruity pole can protect fruit from damage during picking the fruits.

4.4.5 Time

	1ST FRUIT	2ND FRUIT	3RD FRUIT	4TH FRUIT	5TH FRUIT	6TH FRUIT	7TH FRUIT	8TH FRUIT
FRUITY POLE (MINUTE)	1	1.30	2.00	2.40	3.20	3.40	4.10	4.30
ORDINARY FRUIT PICKER (MINUTE)	1.10	1.50	2.25	2.58	3.40	3.56	4.50	5.39

TABLE 4.4.5

From data above, is to comparing time taken of fruit picked. Fruity pole has a less time taken compared to ordinary fruit picker. This shown that fruit picker is more efficient to be use and can pick a lot of fruit in less time taken.

5.0 CONCLUSION

In this modern era, people are moving toward times and everything made is to be more easy and efficient. Nowadays, the convenience of doing and solving a job is more of a priority uses. In this project we are innovating and improve more the quality of ordinary fruit picker has. For fruity pole we've already added some new thing and new innovation.

For example we've added funnel as fruit basket which prevent from fruit falling to ground and will cause damage to the fruit. The funnel created is to less fruit damage risk and injuries to farmer/human during knitting fruit. This fruit picker also has two ways of uses and knitting. This fruit picker is using foot as a pedal to move the cutter blade. The objective of the project is to minimized the damaged of the fruit. The research methodology is used and and guided by the flow chart in the process of planning, production, design and testing of project. The result by follong by correct steps and procedures of the project was succesfully implemented.

We are looking forward for this project 'fuity pole' in the future. We will improve more to make this project have a better function and more efficient.

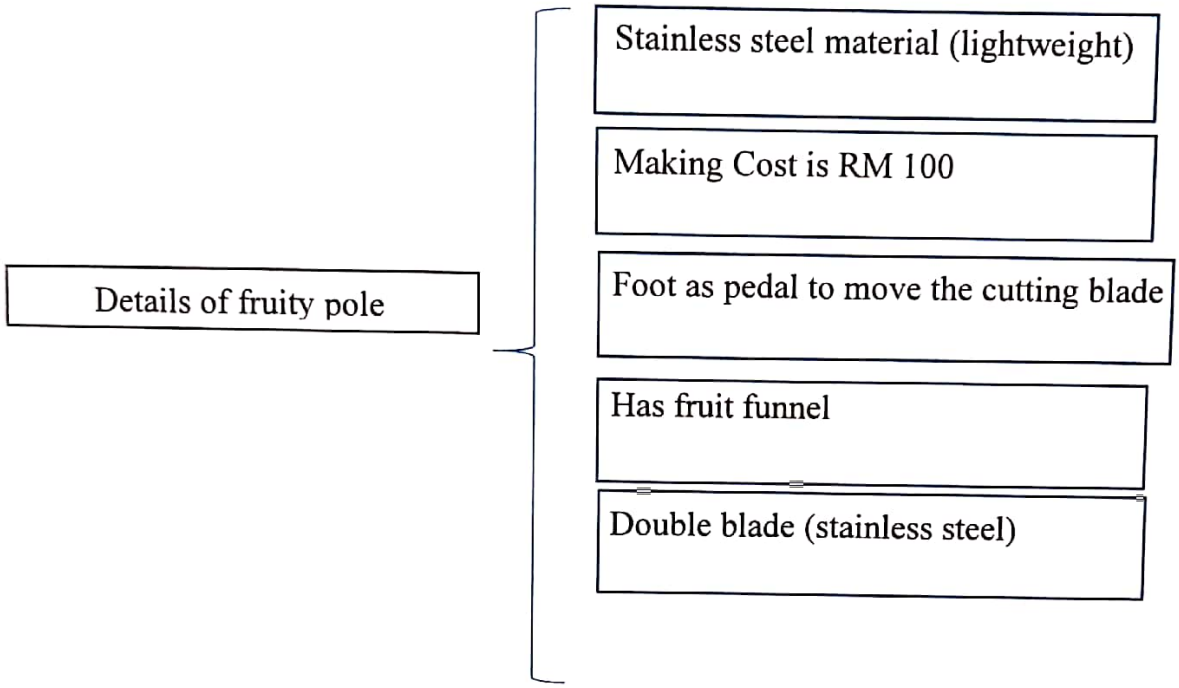
5.1 SUGGESTION

Fruity pole is a fruit picker that we already innovated. Fruity pole is easy and safe to be use which will not cause injuries to the farmer while knitting fruit. By using this kind of fruit picker, the time taken is less while picking fruit. There is some factors can be suggested to improve the fruity pole to make it become more efficient in future:-

The safety of the farmer is affected	A fruit knitted without protection will be at high risk for falls on the workers body.
Fruits fall and caused damage and rotten	When the farmers used a ordinary fruit picker, the fruit will continue to fall to the ground and break down due to the falling between the fruit and the ground.
Waste time, and manpower	Time wasting occurs when the fruit falling to the ground will cause the farmer to collect the fruit one by one and it will cause a waste of time.
Producing non-quality fruits	Fruits that fall to the ground will have severe side effects such as pores, bumps and scratches

5.2 Details of the proposed Fruity Pole

Fruity Pole has 3 meter of length. Fruity Pole have the ability to save the quality of fruit. It is already build with the funnel for fruit. furthermore, the time taken is less while picking fruit. And lastly, Fruity pole used a new innovation which use a foot as a pedal to move the cutter blade.



5.3 References

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