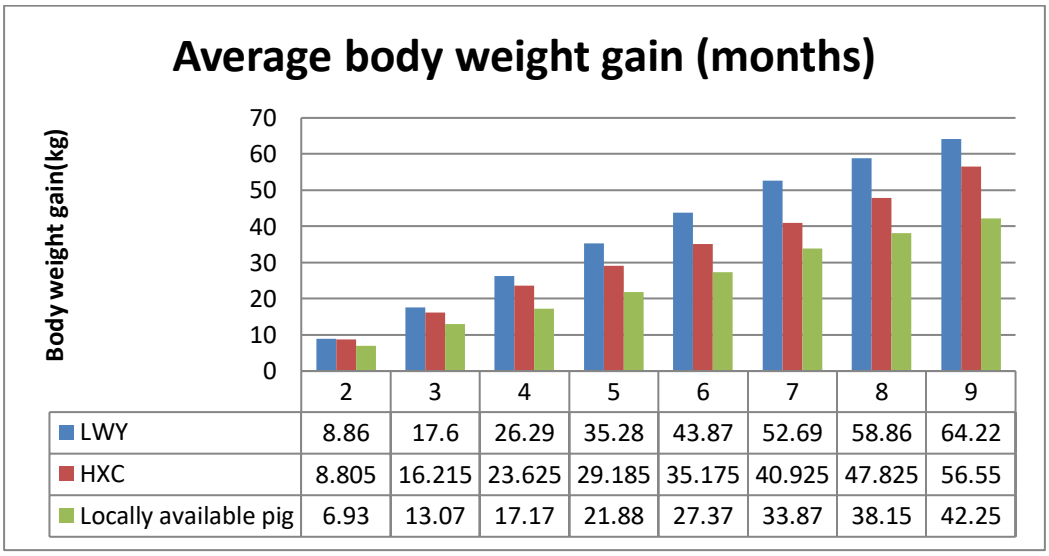
Significant outputs and outcome during last 3 years (2022-23 to 2024-25)

A. Achievements in Research

i. Significant research work done (not more than 2 pages during last 3 years including photographs and illustrations)

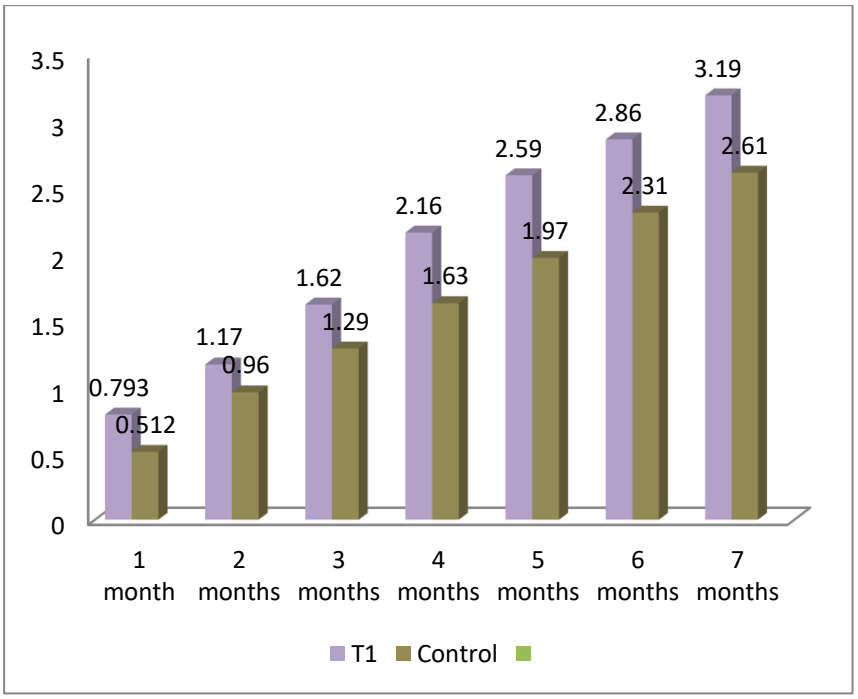
a)Performance of Large White Yorkshire pig- problem identified is Poor body weight gain of non-descript locally available breed (Severity-60-75 %)
There were three treatments T1 (Large White Yorkshire pig), T2 (Rani pig) and T3 (Local type)
Outcome-There was an increase in body weight gain by 52% in T1 and 33.84 % in T2 over T3 at 9 months of age and B:C Ratio were recorded- T1 (Large White Yorkshire pig)-1.37:1, T2 (Rani pig)-1.21:1, T3-0.90:1



b)Performance of Rainbow Rooster poultry bird- problemidentified is- High demand of improved variety of poultry bird for backyard rearing (Severity-65-75 %)
There were three treatments T1: Performance of Rainbow rooster poultry bird under semi intensive system of rearing (1.26:1), T2-Vanaraja poultry birds (1.06:1), T3- Local poultry bird (1.04:1)

Outcome- There was an increase in body weight gain in T1 by 177.02% and in T2 by 132.88% over the local bird. The average age at first egg lay recorded as 157 days in T1 and 155 days in T2 and B:C Ratio were recorded- T1: (1.26:1), T2: (1.06:1), T3- (1.04:1)

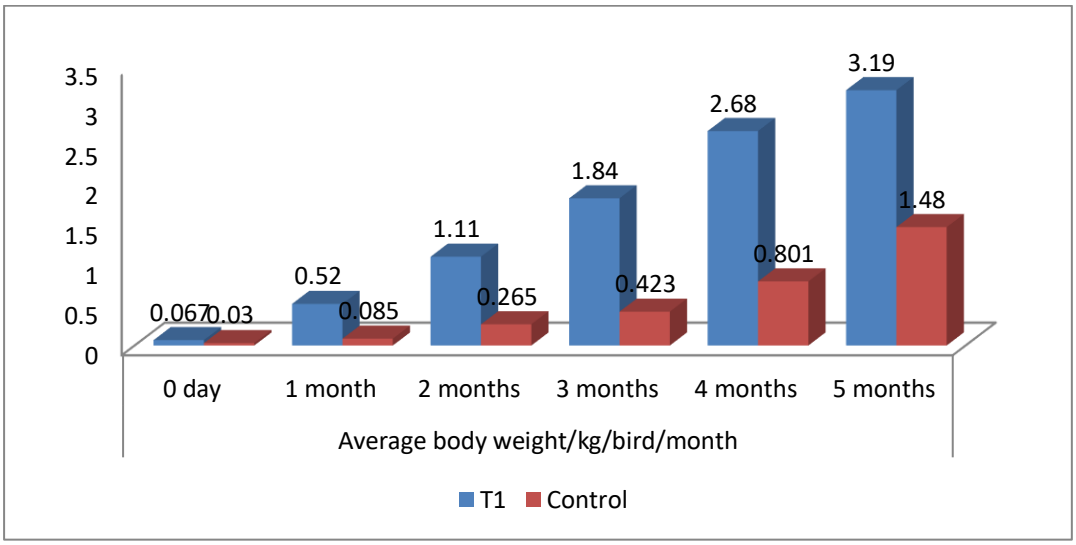
c)Performance of Magpie breed of duck under backyard system of rearing- problemidentified islack of good dual purpose duck breed
There were two treatmentsT1: Performance of Magpie breed of duck (2.05)
T2: Control (Locally available breed)(1.69)
Outcomes-There was an increase in body weight gain in T1 by 21.75% over the local duck. The average age at first egg lay recorded as 174 days in T1 and 183 days and B:C Ratio were recorded- T1(2.05), T2(1.69)



d)Performance of Rainbow Rooster poultry bird in semi- intensive system of rearing- problemidentified- Shortage of good dual purpose poultry bird

There were two treatments-T1: Performance of rainbow rooster poultry bird in semi intensive system of rearing, T2: Locally available poultry bird

Outcomes- There was an increase in body weight gain in T1 by 115.54% over the control. The average age at first egg lay recorded as 157 days in T1 and 304 days in control and B:C Ratio were recorded- T1 (1.35), T2 (1.32).



e)Performance Trial on high yielding varieties of crops under shifting cultivation

Problem identified- Low productivity & Non-availabilty of suitable HYV of crops for shifting cultivation

There were two treatments- T1-Rice (Var. Balum), Maize (Var. RCM-76), Ginger (Var. Nadia),TO2-Local Var. Of three crops

Outcomes- There were high yield recorded from T1 compared to T2 and B:C Ratio were recorded-T1 RICE (1.42), MAIZE (1.56), GINGER (1.78),T2 RICE (1.23), Maize (1.3), ginger (1.33)

f)Management Practices of citrus trunk borer in Orange Orchard- Problem identified- yield loss (Severity >70%)

There were two treatments- T1: Poked with a wire to kill larva + plug holes with some cotton soaked in petrol or diesel, T2: T01 +Quinalphose/ Imidacloprid + Lime + water (1:10:100) [Smearing of trunk up to 1 m height during April & June), T03: Farmers practice

Outcomes- Treatment 2 was found best compared to other treatments and B:C Ratio were recorded-T1 (3.95:1)T2 (4.2:1), T3**:**Farmers practice (2.2:1)

f)Performance of Creep Feeding in Piglets:

Problem Identified: Vulnerability of piglets in the first 4 weeks due to insufficient nutrients from sow milk, leading to higher mortality rates, poor weaning weights, increased length of weaning to next estrus in the sow.

Treatments: T0: Introduction of creep feeding starting from day 15 to 45, with iron injections on days 4 and 14; **T1**: Local practices (without creep feeding).

Key Outcomes/Results: Mortality rate before weaning in T1 (Creep Feeding) was 5% lower than T2 (10%). T2 (Local practices) have higher mortality since no creep feeding was involved. **Body weight gain at weaning**: Average body weight gain at 15 Days in T1 (Creep Feeding) was 0.18 ± 1.96 kg compared to T2 (Local practices) 0.13 ± 1.93 kg. this indicating that creep feeding boosts piglet growth earlier in life. **Incidence of disease**: creep feeding and iron injections may have helped improve immunity and overall health in piglets, potentially reducing disease incidence. **Benefit-Cost Ratio (B:C)**: **T1** (Creep Feeding) shows better returns due to healthier piglets, higher weaning weight, and potentially lower mortality. However in **T2 (Local Practices) l**ikely lower B:C ratio, as there's a greater risk of mortality and slower growth in piglets not receiving supplemental feed. **Creep Feed Composition**: Protein: 20%, Digestible Energy (DE): 3400 Kcal/kg. This specific nutrient profile indicates that creep feeding can provide a solid nutritional base to support piglet growth before they transition to full solid feeding after weaning.

Creep feeding is highly effective in reducing piglet mortality and boosting growth, as shown by the increase in body weight at 15 days (t1: 0.18 kg vs t2: 0.13 kg).

g) Performance of Magpie Breed of Duck Under Backyard Rearing System:

Problem Identified: Lack of good dual-purpose duck breeds that can be used for both egg production and meat.

Treatment: T1: Magpie breed of duck (likely a higher-performing breed) under backyard rearing system; Control: Local ducks under backyard rearing system.

Key Outcomes/Results: Body Weight Gain: T1 (Magpie Ducks): 21.75% increase in body weight gain over local ducks. This suggests that the Magpie breed is more efficient at growing under backyard conditions compared to local ducks. **Mortality Rate**:In T1 (Magpie Ducks): is 5% whereas in Control (Local Ducks) was 10%. The Magpie breed shows better survival rates under backyard rearing conditions, likely due to better genetics or higher resilience. **Age at First Egg Lay**: In T1 (Magpie Ducks) 174 days as compared control (Local Ducks) 183 days. The Magpie breed starts laying eggs earlier, making it more productive for farmers who rely on both eggs and meat. **Annual Egg Production**: T1 (Magpie Ducks) gives 192-197 eggs annually. This suggests that the Magpie breed lays a

high number of eggs in a year, contributing to higher overall production compared to local ducks. **Benefit-Cost Ratio (B:C)**: The Magpie breed (2.05) provides a better return on investment, as shown by the higher B:C ratio as compare to Control (Local Ducks): 1.69. This suggests that farmers can make more money from Magpie ducks due to both their superior growth rate and egg production.

Magpie Ducks are found superior to the local breed in terms of both meat production (body weight gain) and egg production. They also show lower mortality and earlier maturity (earlier egg laying), which are all positive attributes for backyard poultry farmers. The **B:C ratio of 2.05** for Magpie ducks indicates that they are not only more productive but also more profitable compared to local ducks.

ii. Impact of achievements in quantifiable terms to increase productivity/ profitability/ sustainability (Highlight in 1-2 pages)

The various studies demonstrate significant improvements in productivity, profitability, and sustainability across different animal and crop management systems. By analyzing these results, we can observe how innovations and improved management practices have led to measurable gains in key performance indicators such as body weight gain, survival rates, age at first production, and the benefit-cost ratio (B:C). These improvements are particularly significant in terms of both economic returns for farmers and sustainability in terms of resource use and resilience to climate challenges.

1. Piglet Performance with Creep Feeding:

Productivity & Profitability:

- **Increase in Body Weight Gain**: In piglets, introducing **creep feeding** starting from day 15 results in an increase in body weight gain by **38.46%** at 15 days compared to local practices. At weaning, this accelerated growth translates into better overall weaning weight and healthier piglets, which contribute to higher market value.
- **Reduced Mortality**: The introduction of creep feeding and iron supplementation results in a **5% lower mortality** rate in T1 compared to local practices (10% in T2). Reducing mortality directly leads to **increased productivity**, as more piglets survive and reach market weight.
- **Benefit-Cost Ratio (B:C)**: The creep feeding system, with a **better B:C ratio**, demonstrates its profitability, with healthier piglets gaining more weight. While not explicitly stated, it is evident that the return on investment is higher, as piglets grow faster, require less time to reach weaning weight, and suffer fewer diseases.

Sustainability:

- By boosting piglet growth rates and survival, creep feeding helps optimize resource use in pig farming. Moreover, healthier animals mean fewer veterinary costs, contributing to long-term **sustainability** for farmers.

2. Performance of Magpie Duck Under Backyard Rearing System:

Productivity & Profitability:

- **Body Weight Gain**: The **Magpie breed of ducks** shows a **21.75% increase** in body weight gain compared to local ducks. This higher growth rate translates to faster meat production, enabling farmers to generate income more quickly.
- **Early Maturity**: The **average age at first egg lay** in Magpie ducks is recorded as **174 days**, 9 days earlier than local ducks (183 days). This early egg-laying capability enhances **egg production** efficiency and provides additional income earlier in the duck's lifecycle.
- **Annual Egg Production**: Magpie ducks lay **192–197 eggs annually**, significantly improving egg yield compared to local ducks. This increase in egg production contributes to greater **diversification of income** for farmers, enabling them to capitalize on both meat and egg production.
- **Benefit-Cost Ratio (B:C)**: The **B:C ratio for Magpie ducks is 2.05**, compared to **1.69 for local ducks**, which clearly indicates that Magpie ducks provide better returns on investment. This translates to higher profitability, with farmers earning more from Magpie ducks due to both their superior growth rate and increased egg production.

Sustainability:

- The **Magpie breed** shows better survival rates (5% mortality rate compared to 10% for local ducks), which reduces the risk of loss and enhances the farm's sustainability. Fewer losses translate into more consistent production and reduced financial risk.
- The superior productivity of Magpie ducks also ensures that farmers can maximize the land and feed resources, making the system more **resource-efficient** and **sustainable** in the long run.

3. Performance of Rainbow Rooster Poultry Birds:

Productivity & Profitability:

- **Body Weight Gain**: Rainbow Rooster poultry under a **semi-intensive system** shows a **177.02% increase** in body weight gain, while Vanaraja poultry shows a **132.88% increase** compared to the local breed. This significant growth improvement means faster returns for poultry farmers, as the birds reach market weight more quickly.
- **Early Egg Production**: The **age at first egg lay** for Rainbow Roosters is **157 days**, and for Vanaraja, it is **155 days**. This is a marked improvement over the local poultry breed, where the age at first egg lay is substantially delayed. Early egg production ensures **higher returns on egg sales** within a shorter time frame.
- **Benefit-Cost Ratio (B:C)**: The **B:C ratio for Rainbow Rooster is 1.26**, slightly higher than **1.06 for Vanaraja** and **1.04 for local birds**. This shows that the Rainbow Rooster, despite being a more specialized breed, offers a **better return on investment** due to improved growth and egg production, which is crucial for small-scale poultry farmers.

Sustainability:

- The **improved body weight gain and early egg-laying** capacity of Rainbow Roosters support **sustainable poultry farming** by making efficient use of resources (such as feed and space). These traits help farmers achieve higher yields per bird, reducing the need for excessive breeding or reliance on non-sustainable farming practices.
- The relatively low B:C ratio for Vanaraja (1.06) also indicates a **more sustainable option** for farmers who are looking for a balance between productivity and profitability without over-relying on commercial breeds.

4. Performance of High-Yielding Crop Varieties in Shifting Cultivation:

Productivity & Profitability:

- **Higher Yields**: The introduction of high-yielding varieties (HYVs) such as **Balum rice**, **RCM-76 maize**, and **Nadia ginger** showed significantly higher yields compared to local varieties. This increase in crop yield directly translates to more produce per hectare, enabling farmers to earn more from the same area of land.
- **Benefit-Cost Ratios**: The B:C ratios for the high-yielding varieties are **Rice (1.42)**, **Maize (1.56)**, and **Ginger (1.78)**, which are higher than the local varieties (Rice 1.23, Maize 1.3, Ginger 1.33). This shows that adopting HYVs improves economic returns, which is crucial in **shifting cultivation**, where land productivity is a significant concern.

Sustainability:

- **Adopting high-yielding varieties** helps increase food production and farm income without expanding the land area used for cultivation. This is a more **sustainable approach**, as it allows farmers to produce more on limited land, addressing both food security and environmental concerns. Additionally, better yields mean more efficient use of natural resources like water and fertilizers.

5. Management of Citrus Trunk Borer in Orange Orchards:

Productivity & Profitability:

- **Reduced Losses**: Treatment 2 (using Quinalphose/Imidacloprid) effectively controls citrus trunk borer infestations, reducing yield losses significantly. This results in more **stable and reliable yields** for farmers.
- **Benefit-Cost Ratio (B:C)**: Treatment 2, with a B:C ratio of **4.2:1**, is the most cost-effective method for controlling trunk borers, yielding high returns relative to input costs. It ensures **higher profits** for farmers dealing with citrus pests.

Sustainability:

- **Sustainable Pest Management**: By using a combination of physical and chemical controls (poked holes and smearing), this method helps farmers manage pests without completely relying on pesticides. This **integrated pest management (IPM)** approach is more sustainable, as it reduces pesticide use and promotes long-term farm health.

Conclusion: The improvements across these studies showcase how adopting better breeds, improved management practices, and high-yielding crop varieties can **increase productivity, profitability, and sustainability** in farming. Whether it's through higher growth rates, reduced mortality, earlier production, or more efficient use of resources, the economic impact is clear: **Higher productivity** leads to increased income for farmers, **Better profit margins (B:C ratios)** ensure that farming remains a viable livelihood, **Sustainability** is enhanced through resource-efficient practices that minimize environmental impacts and ensure long-term farm resilience. By adopting these practices, farmers can see not only short-term gains but also long-term benefits in terms of both economic returns and environmental sustainability.

i. Quality seeds (qt) and planting materials (no.) produced and distributed (year-wise)

S. No.	**Crop**	**Variety**	**Quantity produced (No)**	**Value (Rs.)**	**Qty. distributed to farmers**
2022-23					
1.	Cabbage	Rare ball	1700	1700	800/10
2.	Knol-Khol	White Vienna	950	700	550/15
3.	Tomato	Rocky	570	1140	200/10
Total			3220	3540	1550/35

ii. Livestock/ poultry/ fish germplasm (no.) produced and distributed to farmers (year-wise)

2024-25		**No of Inputs**	**No of beneficiaries**
1.	Input Distribution under NEH programme (AINP on Jute & allied fibres) Pig	**110**	**55**
2.	Distribution of CRIJAF Nail weeder under NEH/ NER	300	300
3.	Pig Feed by ICAR NRC on Pig	50 Tons	950
4.	Research Extension Farmers Interface meeting and Input Distribution Program (Kilta, Hort Implements)	30	30
5.	Input distribution under ICAR-NRC Mithun	Gumboots -300 nos. Rain coat – 200 nos Steel bucket- 300 nos	250
6.	Piglets	(60 nos) Hampshire cross	24

7.	Poultry	(225 no) Rainbow Rooster	16
8.	Weeder	129 Nos	129
9.	Hand hoe	15 Nos	15
10.	Sickle	15 Nos	15
11.	Khurpi	15 nos	15
12.	Pig and Poultry feed	15 q	24
13.	Piglets	70 Nos	35
14.	chicks	1000 Nos	50
15.	Mushroom spawn	100 pkt	20
16.	Semi intensive unit for mithun	3 Units (Iron post 600, Dayna roof 221, fencing roll 150 bundle)	60
17.	T –Bar	600	120
18.	Water harvesting turpouline sheet	10 Nos	10
19.	Parsimon plant seeding under TSP Project	300	33
20.	Kiwi budded plants under TSP	500	50
21.	Khasi Manderin under TSP	200	10
22.	King Chill seedling	2000	34

iii. Patent/ GI/Farmer varieties obtained (No.)

S.No.	Farmers name	Crop	Patent/ GI/Farmer varieties
1.	Sh. Niamvau Phom Address: Village: Nyang, P.O. Longleng, Dist. Longleng, Nagaland	Ginger (Black), Var. HUNGNYAKIA	Registration under PPV & FR Act 2001

iv.SHCs distributed to farmers (Nos.)

Sl. No	No. Soil Sample	No. of SHCs Distributed	No. of Farmers' benefitted	Year
1	148	140 Nos.	140 Nos.	2022-23
2	200	180 Nos	180 Nos	2023-24
3	220	200 Nos	200 Nos	2024-25

v.List of new technologies promoted and extent of adoption (%) :

Sl. No.	Name of technologies	Adoption percentage
1	**Natural farming and organic farming**	**75**
1.	Feeding of grower pig fed with 50% replacement of maize with Tapioca root meal	80
2.	Popularization of French Bean	92
3.	Low cost scientific rain water harvesting structure (*Jalkund*)	98
4.	Feeding of grower pig fed with 50% replacement of maize with Tapioca root meal	74
5.	Popularization of Hampshire cross pig (Rani)	86
6.	Pea (Azad P4)	69
7.	Popularization of livestock based IFS for enhancing farm income	89
8.	Popularization of Rainbow rooster poultry bird	84
9.	Assessment of knowledge level of farmers on pig farming.	90
10.	Impact of trainings on promotion of backyard poultry farming.	87

vi.Entrepreneurship developed (No.): 4 Nos

S.No.	Name of farmer and address	Remarks
1.	Alem Phom; Pongching, Longleng	Farmers rearing Poultry birds 200 (Vanaraja) and obtained a B:C ratio 2.35
2.	P. Umto Phom; Auching, Longleng	Farmers getting a B:C 2.18 through poultry farming of 200 (Vanaraja)

vii.Creation of job opportunity/ self-employment (No. 14)

viii.Effective linkages established with stakeholders especially with development departments with documentary evidence of impact (Brief details of linkages).

S. No.	Name of organization	Nature of linkage
1.	Department of Agriculture, Longleng	Training, Technical Cooperation
2.	Department of Horticulture, Longleng	Training, Technical

		Cooperation
3.	Department of Veterinary Services and AH, Longleng	Training, Technical Cooperation
4.	Nagaland State Rural Livelihood Mission (NSRLM)	Training, Technical Cooperation
5.	Department of Sericulture/ATMA, Longleng	Training, Technical Cooperation
6.	Deputy commissioner office, Longleng	Logistic support in sending reports and communication
7.	National informatics centre (NIC), Longleng	Logistic support in sending reports and communication
8.	Department of Social Welfare (CDPO)	Training, Technical Cooperation
9.	Phom Baptist Church Association (PBCA), Lempong	Training, Technical Cooperation
10.	Department of Economics and Statistics, Longleng	Technical cooperation
11.	Department of fisheries and aquatic resources	Training, Technical Cooperation
12.	Department of Environment, Forest & Climate change	Training, Technical Cooperation

ix.Model villages developed/ established (Pig village/Poultry village/ Seed village etc.) (Name/No./location/ activities/ impact)

S.No.	Village name	Model village for Product
1.	Pongching	Orange
2.	Auching	Fish
3.	Bhumnyu	Soybean
4.	Tamlu	Arecanut
5.	Kangching	Pig
6.	Hukphang	Mithun
7.	Nyang	Vegetable