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Fostering Rural Entrepreneurship and Curbing Migration: The ARYA Project's Impact on Youth and Agriculture in Puri, Odisha

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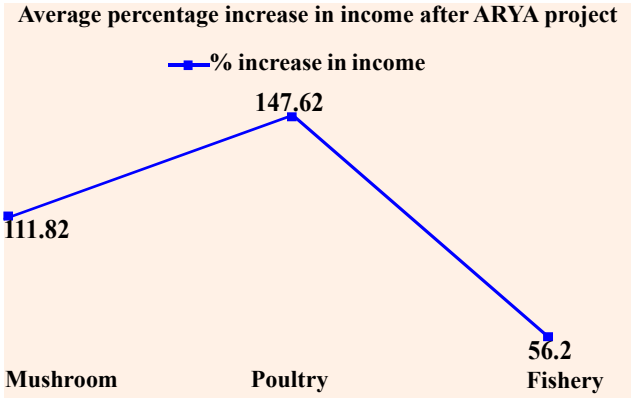
HIGHLIGHTS

- The initiative has established multiple entrepreneurial units to assist young entrepreneurs, marking significant accomplishments.
- Demonstrate how the program has improved financial results and local job prospects.
- It also addresses inequities and a range of preferences, especially in aspects related to gender and caste.

GRAPHICAL ABSTRACT



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ABSTRACT

Context: In the current situation, a significant issue revolves around the unemployment of rural youths, leading to their migration away from rural areas. Encouraging the development of agricultural enterprises not only has the potential to create job opportunities but also serves to bolster the livelihoods of farmers.

Objective: The study aims to tide migration and cultivate entrepreneurs engaged in various agricultural ventures. To improve household income and quality diet, backyard poultry production, apiary, mushroom production, its value addition, and fish production with fish seed were undertaken under the ARYA Project.

Method: This research conducted on the ARYA Project. The study focuses on integrating 130 youths into three collaborative enterprises - Mushroom, Fishery, and Poultry. The study offers insights into the ARYA Project's effectiveness in promoting youth entrepreneurship and its impact on economic sustainability within the agricultural sector.

Result & Discussion: The project's successful training and support for young entrepreneurs have led to the emergence of numerous entrepreneurial ventures, significantly bolstering profitability and sustainability in agriculture. Notably, after participating in the "ARYA" program, substantial increases in average net income were observed across poultry (147.62%), mushroom (111.82%), and fishery (56.2%). The correlation between adept operation and marketing skills and critical economic indicators such as gross turnover, daily income, and job creation underscores the effectiveness of these competencies. Moreover, the positive connections between financial and human resource management proficiencies and various performance metrics highlight the initiative's comprehensive impact. The recognition received by model units from organizations like FPOs, SHGs, and aspiring young entrepreneurs indicates a growing interest in similar entrepreneurial endeavors, thereby promoting inclusivity and balanced youth involvement in agricultural pursuits.

Agriculture stands as the backbone of global food security and economic development, underpinning livelihoods, and fostering sustainable growth as it is and was the backbone of India, but rapid urbanization and high population density have adversely impacted the agriculture (Kumari and Shirisha, 2021). The involvement of youth in agriculture is paramount, as they represent the future stewards of the land. Despite its pivotal role in food security and economic stability, agriculture fails to captivate the younger generation due to various factors such as perceived low profitability, manual labour-intensive practices, and limited access to modern technology and education. Farming is confronted by a host of challenges including low water availability, diminishing land holdings, soil nutrient depletion, constraints in crop/vegetable production (Noopur *et al.,* 2023a) and the allure of non-agricultural employment. Consequently, the agricultural workforce is dwindling, with rural communities increasingly migrating to urban areas. To address this, it's crucial to implement sustainable farming techniques, support small-scale farmers, promote organic farming practices (Panwar *et al.,* 2021), and invest in rural development initiatives.

Migration is a global phenomenon and has been both a boon and a bane to humans (Krishna, 2022). Migration is a part of active livelihood strategies but is also determined by social context, social norms and structures, household composition, gender ideologies, social contacts, and profit-making opportunities (Paraganiha, 2006). Rural-to-urban migration is a common phenomenon as far as social, economic, and demographic changes are concerned. There are various causes regarding massive rural-to-urban migration which create a subsequent impact on urban population imbalance and extreme urban decay in India (Chakraborty, *2021*).

India is the youngest nation in the world and has a massive youth force to offer to the agriculture sector but youth participation in agriculture is declining. The Indian Council of Agricultural Research (ICAR) along with agricultural departments are acknowledging young farmers for their innovative and diversified farming initiatives. Notably, ICAR's recent ARYA (Attracting and Retaining Youth in Agriculture) program focuses squarely on addressing the concerning trend of declining youth engagement in agriculture (Som *et al.,* 2018).

ARYA program strategized to support the existing rural enterprises as well as the potential entrepreneurs through capacity development and technological hand-holding (Gowda et al., 2023). ARYA project is providing vocational training in all areas of agriculture and allied sector (Sharma, 2021). Under this scheme, special efforts are being taken up to attract rural youth under the age of 35 years in agriculture to provide income-generating opportunities and engage them in agriculture. The youth groups may function as role models for other youths by demonstrating the potentiality of agri-based enterprises (Chauhan *et al.,* 2023) and also by imparting training to others (Singh *et al.,* 2019).

Youth entrepreneurship is widely recognized as a promising approach across the world to numerous economic difficulties, such as a lack of employment and a declining level of economic viability in rural and/or developing areas (Kimmitt *et al.* 2020). Since a large number of rural youths are migrating to cities in search of work, agriculture-based entrepreneurship development is an important approach to minimize outward migration (Sahoo *et a*l., 2023). As unemployment is a burning issue in India, Self-employment through agricultural enterprises is gaining attraction, especially in rural areas with technical and financial support (Purnima *et al.,* 2022). The introduction to the ARYA project in KVK Puri reveals a unique and promising opportunity. This initiative distinguishes itself as a potentially profitable venture, characterized by its remarkably low initial investment requirement, rendering it an attractive option for aspiring entrepreneurs. Additionally, the active involvement of Self-Help Groups (SHGs) and Farmers' Producer Organizations (FPOs) in income-generating activities introduces a significant socio-economic aspect to the project (Chauhan *et al.,* 2021; Chandegar *et al.,* 2023). The presence of government schemes designed to support such initiatives further solidifies its feasibility. Situated near the State Capital, Krishi Vigyan Kendra Puri not only benefits from logistical advantages but is also strategically positioned to meet the substantial market demand for the project's offerings, further enhancing its potential for success.

METHODOLOGY

The study was carried out in the Puri district of Odisha. In total, 130 youths were selected using a cluster approach across seven blocks: Satyabadi, Gop, Delanga, Pipili, Astaranga, Kanasa, and Nimapada.

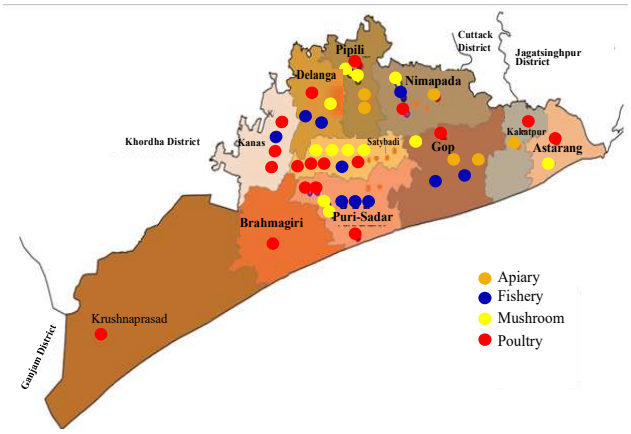


Figure 1: ARYA enterprises running in different Blocks of Puri District

The methodology for this research paper involved a systematic approach. It began with village identification through diagnostic field visits and engagement with key stakeholders, such as farmers, entrepreneurs, extension workers, and agricultural representatives.

This research commenced with a benchmark survey and market supply chain analysis to evaluate economic activities. This led to the identification of four enterprises: Mushroom, Fishery, Poultry, and Apiary. However, Apiary was excluded from the subsequent impact assessment due to its longer establishment timeline. Community engagement was ensured through a series of Focus Group Discussions (FGDs), specifically targeting rural youth interested in these enterprises within their respective villages. These discussions provided valuable insights into the aspirations and challenges of youth in these sectors. Further refinement of research participants was achieved through structured interviews, collecting essential data such as personal information, educational qualifications, age, and available resources.

The primary objectives of this research paper are twofold: first, to cultivate entrepreneurs who can effectively serve as brand ambassadors for the identified enterprises, Mushroom, Fishery, and Poultry, promoting it for further upscaling and development. Second, the research aims to pioneer easily adoptable models of agro-entrepreneurship that inspire unemployed youth to embrace new technologies and sustainable practices, offering them valuable livelihood opportunities in the agricultural sector. Measurable economic performance indicators (before adopting ARYA and after adopting ARYA) were used to evaluate the success of the ARYA enterprises, including (i) Avg. production (ii) Avg. annual Production (iii) Avg. Cost of production (Rs. /unit/year) (iv) Avg. Gross Return (Rs. /unit/year) (v) Avg. Net Return (Rs. /unit/year) (vi) B:C Ratio (vii) Avg. employment generation per annum. Subsequently, the coefficient of correlation between economic performance indicators and entrepreneurial competencies was determined, offering a comprehensive analysis aligned with the research objectives.

RESULTS

Youth participants underwent a thorough screening, assessing qualifications, personal attributes, age, and resources, ensuring their readiness for chosen enterprises. An inclusive and supportive environment was conducted through consultative workshops, sensitizing youth to project objectives and fostering collaboration. The project officially commenced with an inception workshop featuring successful entrepreneurs, fostering a culture of open expression and idea-sharing among participants. Discussions on enterprise scope, opportunities, challenges, and group exercises, enhanced project understanding and roles. This holistic approach guarantees methodical preparation, establishing a robust foundation for both project success and the overall development of the district.

The survey data illustrates in Table 1 diverse

Table 1. Demographic Profile of ICAR-ARYA Project Beneficiaries

Youths' description	Mushroom		Fishery		Poultry	
	(N-45)	%	(N-45)	%	(N-40)	%
Age (yrs.)						
20-25	9	20	4	8.88	7	17.5
25-30	11	24.44	12	26.66	18	45
30-35	13	28.88	8	17.77	11	27.5
35-40	17	37.77	21	46.66	4	10
Education						
Primary (up to 5th)	4	8.88	6	13.33	7	17.5
High school (up to 10th)	29	64.44	22	48.88	18	45
Intermediate (up to 12th)	8	17.77	14	31.11	8	20
Graduation	9	20	8	17.77	7	17.5
Sex						
Male	39	86.66	41	91.11	32	80
Female	6	13.33	4	8.88	8	20
Caste						
SC/ST	14	31.11	11	24.44	8	20
Others	36	80	39	86.66	32	80

youth participation in Mushroom, Fishery, and Poultry enterprises under the ICAR-ARYA initiative. Across age brackets, engagement levels vary with distinct preferences observed in each category. High school pass-outs play a substantial role in all three enterprises, forming major per centages. Notably, gender disparities are evident, highlighting the need for targeted initiatives to enhance female participation (Noopur *et al.,* 2021). Moreover, recognizing caste-based distinctions underscores the necessity for customized strategies to promote wider participation. The findings underscore the importance of nuanced interventions for fostering inclusivity and achieving balanced youth engagement in agricultural initiatives.

The project has achieved significant milestones in various enterprises over four fiscal years (2019-20 to 2022-23). As the data in Table 2 in mushroom production, 45 selected youths underwent need-based training, with 32 receiving start-up support, leading to 30 entrepreneurial units. In fish and fish seed production, 45 youths received training, 37 benefited from start-up support, establishing 30 entrepreneurial units. The backyard poultry enterprise saw 40 trained youths, with 28 receiving start-up support and the creation of 25 entrepreneurial units. In total, 130 youths were trained, and 97 received start-up support, resulting in 85 entrepreneurial units. The project's persistent efforts have successfully fostered entrepreneurship through tailored training and support.

Enterprise Mushroom : In the past four years, the ARYA project supported 30 youths in mushroom production, providing essential equipment such as a heating sealing machine, plastic tray, digital hygrometer, polythene, sprayer, digital weighing machine, chaff cutter withstands, plastic crate, mushroom spawn, paper bag, paddy straw cutter, and shed net. These resources empower youths for successful mushroom ventures. KVK interventions, including rack systems in shed net houses, increased production from 0.6 kg/bed to 0.9 kg/bed. Mechanized paddy straw cutting reduced cultivation costs by Rs. 35,000 per annum, and processing fresh mushrooms generated an extra benefit of Rs. 10 per kg. Initiating a vermicompost unit utilizing spent mushroom substrate promotes sustainable agriculture and enhances economic returns.

The increase in the average production of Paddy Straw Mushroom per bed by 50 per cent over the four years can be attributed to the positive impact of the ARYA initiative. The program likely facilitated enhanced cultivation practices, providing knowledge, resources, or support that contributed to improved efficiency and productivity in Paddy Straw Mushroom production. The economic impact assessment of the Mushroom enterprise over the four years of inclusion in the ARYA project reveals a noteworthy progression. The Benefit-Cost Ratio (B: C Ratio) has mirrored this positive trend, increasing from 1.25 initially to an impressive 2.58 in 2022-23. The average employment generation per annum in the Mushroom enterprise within the ARYA project has demonstrated consistent growth over the past five years. The substantial increase of 212.5 per cent in average employment generation per annum within the mushroom enterprise over the specified period highlights the positive impact of factors such as improved cultivation practices, business expansion, and training initiatives. Noopur *et al.* (2023b) stated that vegetable including mushroom are the sources of food and nutritional security.

Enterprise Fishery : As a result of KVK interventions, youths have embraced a holistic approach that includes IMC fry production in nursery ponds, the rearing of fry to fingerlings and then to yearlings, and round-the-year fish production by following the method of multiple stockings and multiple harvestings. This strategy guarantees consistent year-round production of table-size fish, live fish marketing, and pond management illustrating the successful implementation of KVK's initiatives in fostering sustainable aquaculture practices among the youths. Over the past four years, the ARYA Project has provided essential start-up

Table 2. Status of Youths under the ARYA Project

Name of Enterprise	2019-20			2020-21			2021-22			2022-23		
	T	S	E	T	S	E	T	S	E	T	S	E
Mushroom	30	5	5	40	-	10	40	12	27	30	05	30
Fish & Fish Seed Production	30	5	5	40	-	12	40	15	30	30	05	30
Backyard Poultry	30	5	5	40	10	15	40	10	25	30	03	25

T: No. of youths trained, S: No. of youths supplied Start-up, E: No. of Entrepreneurial Unit established

inputs to fish farmers, enabling them to engage in scientific fish cultivation. These inputs include Fry drag nets, plankton nets, water and soil test kits, fry conditioning hapas, live fish/fish seed transportation devices and common carp / Amur carp hapa breeding systems, fingerlings of Indian major carps, pump sets, 4-layered plastic water storage tanks, oxygen cylinders, feed grinding machines to produce mash feed, and gunny bag closure machines ensuring the farmers have the necessary tools and equipment for successful fish farming.

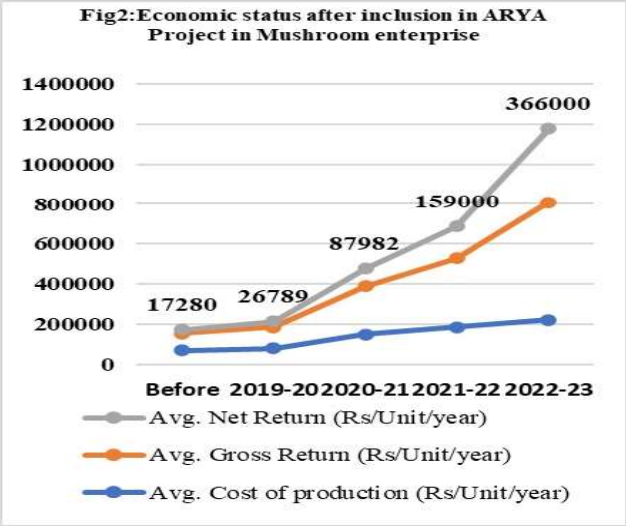
As per the data in Table 3, the average body weight of fish has increased by 59.62 per cent, indicating potential improvements in fish growth. Average fish production per hectare per year has seen a significant rise of 82.42 per cent, pointing to enhanced productivity. Over the four years from 2019-20 to 2022-23, the Fishery enterprise under the ARYA project has witnessed commendable economic growth. The Benefit-Cost (B:C) Ratio has demonstrated a consistent upward trend, escalating from 1.79 in 2018-19 to 2.31 in 2022-23. Moreover, the fishery enterprise has witnessed a substantial 26.80 per cent increase in average employment generation per annum.

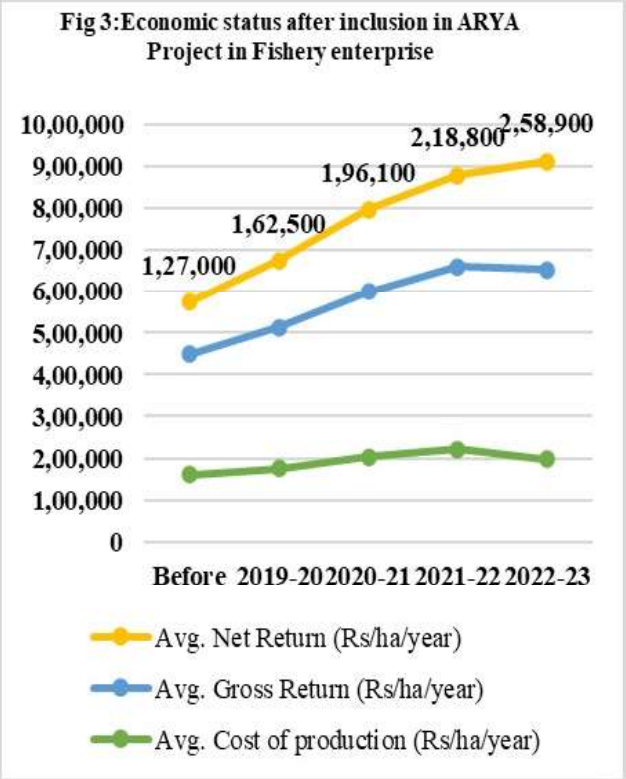
Backyard Poultry : As part of the ARYA project, 25 young individuals engaged in poultry rearing within a semi-intensive system have received essential startup resources, including chicks, feeders, drinkers, plastic stands, chick guards, feed, medicine, egg incubators, fertilized eggs and brooders, over four years. Furthermore, they have been provided with Azolla beds and Azolla to enhance their feed management capabilities.

Table 3 shows before integration into the ARYA Project, the poultry enterprise displayed modest figures, with an average net return of Rs 6800, a B: C Ratio of 1.45, and an annual generation of 14 jobs. However, over the four years of ARYA inclusion (2019-20 to 2022-23), noteworthy advancements have materialized. Mortality rates have seen a notable decrease of -83.33 per cent, suggesting enhanced flock health and management. The average net return has soared to Rs 144670 per annum, signalling a substantial uptick in financial performance. The consistent rise in the B: C Ratio, from 1.45 to 1.91, underscores improved profitability and wise investment choices. Additionally, there has been a substantial 435.71 per cent increase in average employment generation per

Table 3. Economic Impact on Mushroom, Fishery, and Poultry enterprise after 4 years of inclusion

Enterprises	Measurable indicators	Before 2018-19	2019-20 N=5	2020-21 N=10	2021-22 N=27	2022-23 N=30	% |Change
Mushroom	Avg. prod. paddy straw mushroom kg/bed	0.6	0.708	0.82	0.85	0.9	50.00
Fishery	Avg. body weight of fish (kg)	0.520	0.650	0.740	0.780	0.830	59.62
Poultry	Avg. body weight(kg/bird)	1.8	1.9	2.0	2.25	2.25	25.00
Mushroom	Avg. annual production (kg/unit/year)	864	1065.54	2131.6	3320	5100	490.28
Fishery	Avg. fish production (q/ha/year)	22.75	28.24	33.46	36.82	41.50	82.42
Poultry	Mortality (%)	24	12	10	4	4	-83.33
Mushroom		69120	79765	150710	185000	222000	221.18
Fishery	Avg. Cost of production (Rs./unit/year)	1,60,500	1,75,300	2,02,400	2,21,000	1,97,600	23.12
Poultry		14800	23400	54000	115050	158225	969.08
Mushroom		86400	106554	238692	344400	588000	580.55
Fishery	Avg. Gross Return (Rs./unit/year)	2,87,500	3,37,800	3,98,500	4,39,800	4,56,500	58.78
Poultry		21600	37150	90000	204790	302895	1302.29
Mushroom		17280	26789	87982	159000	366000	2018.05
Fishery	Avg. Net Return (Rs. /unit/year)	1,27,000	1,62,500	1,96,100	2,18,800	2,58,900	103.85
Poultry		6800	13750	36000	89740	144670	2027.5
Mushroom		1.25	1.33	1.58	1.86	2.58	106.4
Fishery	B: C Ratio	1.79	1.92	1.96	1.99	2.31	29.05
Poultry		1.45	1.58	1.66	1.78	1.91	31.72
Mushroom		96	100	164	192	300	212.5
Fishery	Avg. employment generation per annum	97	108	112	115	123	26.80
Poultry		14	25	45	75	75	435.71

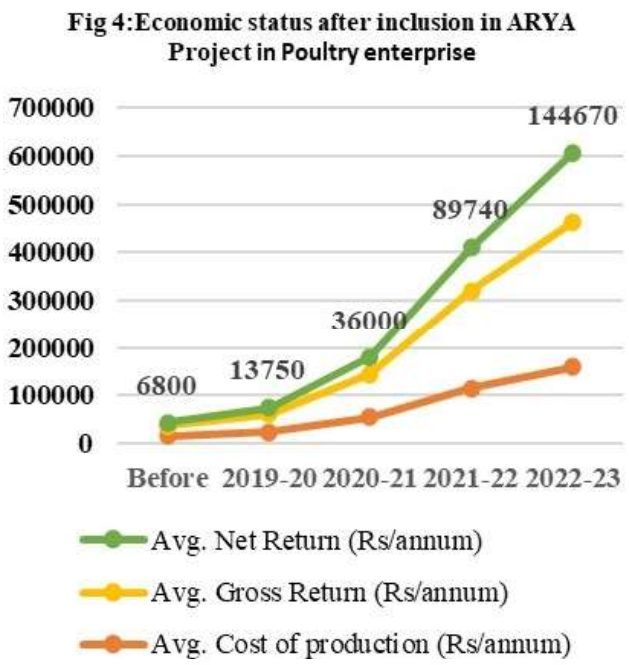




annum, emphasizing the poultry enterprise's positive impact on job creation.

It is evident (figure 2) that during initial year (2018-19), the average net return per unit per year stood at Rs. 17,280. Subsequent years witnessed substantial growth, reaching Rs. 26,789 in 2019-20, Rs. 87,982 in 2020-21, and a remarkable increase of Rs. 159,000 in 2021-22. The latest figures for 2022-23 reveal a significant increase, with an average net return soaring to Rs. 366,000/year.

The average net return per hectare per year has shown consistent growth, starting from Rs 1,27,000 in



2018-19 and reaching Rs 2,58,900 in 2022-23 (Fig 3). This positive trend indicates a significant improvement in the financial performance of the Fishery enterprise. The increasing average net return reflects enhanced profitability and economic sustainability, showcasing the project's effectiveness in fostering economic growth within the Fishery sector. These findings suggest sustained success and a positive economic influence on both the enterprise's financial performance and local employment opportunities over the four years.

The average net return per batch has shown a substantial increase, starting at Rs 6800 and reaching Rs 144670 in 2022-23, indicating a substantial improvement in financial performance (Fig. 4). These outcomes not only point to a flourishing and sustainable business model but also highlight the enterprise's positive impact on job creation and economic development within the broader community. The pivotal role of the ARYA Project in driving these positive changes emphasizes the ongoing need for support and strategic initiatives to ensure sustained success in the years ahead.

The above Table 4 shows ARYA project has significantly impacted the agricultural landscape, with 18 farmers in mushroom production, 12 in fishery, and 6 in poultry farming. This influence extends to 46 neighbouring villages for mushrooms, 36 for the fishery, and 28 for poultry. The project raised awareness through press releases, TV, and radio talks (12 for mushrooms, 18 for fishery, 10 for poultry) and

Table 4. Impact of the ARYA Project on Agricultural Enterprises in Local Communities

Impact after inclusion in ARYA	Mushroom	Fishery	Poultry
Farmers in the village started this Enterprise (No.)	18	12	6
No. of neighboring villages in which the enterprise has spread	46	36	28
No. of migrants benefitted	4	6	2
Products branded (No.)	1	0	0
Publications (No.)	3	4	2
Awareness created by the group i. e. Press release/TV or Radio talk, etc. (No.)	12	18	10
WhatsApp group created (No.)	1	1	1
Groups created	1	1	1
Technologies and success stories uploaded on YouTube	8	14	6

shared technologies on YouTube (8 for mushroom, 14 for fishery, 6 for poultry). Additionally, 4 migrants benefited in mushroom production, 6 in fishery, and 2 in poultry, improving their livelihoods. One WhatsApp group was created for communication and collaboration in the three sectors. These results highlight the project's broad impact and outreach.

The economic impact of individual enterprises after the inclusion of the ARYA project : From Figure 5 it is observed that the highest increase in average net income after training under "ARYA" in poultry is about 147.62 per cent followed by mushroom is about 111.82 per cent and fishery is about 56.2 per cent. Even so, the average income from fishing is not up to par because it requires a larger investment over the first two to three years. Since Puri is a coastal area, the

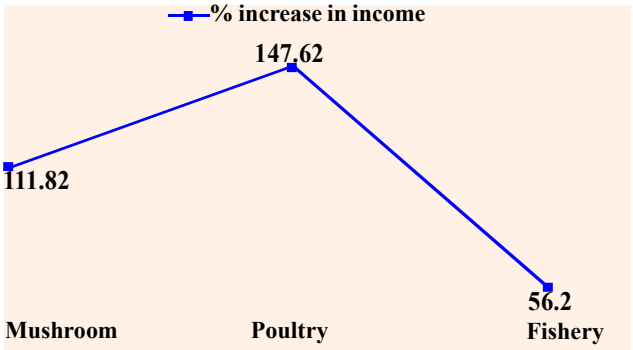


Fig 5. Average percentage increase in income after ARYA project

fisheries will undoubtedly produce strong results and benefit the farmers more, but it will take longer to turn a profit than the other two enterprises.

The correlation analysis conducted in this study, as illustrated in Table 5, reveals noteworthy relationships between economic performance indicators and entrepreneurial competencies. Notably, significant positive correlations were observed between gross turnover ($r = 0.695$, $p < 0.05$), per day income ($r = 0.712$, $p < 0.05$), net income ($r = 0.900$, $p < 0.01$), BC ratio ($r = 0.734$, $p < 0.05$), and employment generation ($r = 0.716$, $p < 0.05$) with specific entrepreneurial skills. These results indicate that ventures with higher economic performance, as reflected by metrics such as gross turnover, net income, and employment generation, tend to exhibit stronger competencies in areas such as financial management and human resource utilization (Kaur *et al.,* 2021). Conversely, operational duration displayed negative correlations with certain competencies, albeit not statistically significant ($r = -0.115$, $p > 0.05$), suggesting a potential trend where longer operational durations may be associated with lower levels of skill proficiency in

Table 5. Correlation (r) between economic performance and entrepreneurial competencies

Economic performance indicators	Entrepreneurial competencies			Total entrepreneurial competencies
	Operation and marketing competencies	Financial competencies	Human resource management competencies	
Operational duration	-0.115	0.959**	-0.301	0.729**
Gross value of inputs used	0.213	-0.331	0.965**	0.307
Gross turnover	0.695*	0.064	0.023	0.422
Per day income	0.712*	0.365	0.088	0.495
Net income	0.025	0.900**	-0.116	0.700**
BC ratio	-0.119	0.734*	0.741*	0.834**
Employment generation	0.716*	-0.274	0.818**	0.956**

*siginificant at 0.05% level of siginificance; *siginificant at 0.01% level of siginificance

certain aspects of entrepreneurship. These findings underscore the importance of cultivating and enhancing entrepreneurial competencies, particularly in operation and marketing, financial management, and human resource management, to drive economic success in entrepreneurial ventures.

DISCUSSION

The "Attracting and Retaining Youth in Agriculture" (ARYA) program, led by the Indian Council of Agricultural Research (ICAR), aims to reverse the trend of declining youth interest in farming by raising awareness, providing resources, and fostering collaboration among young farmers. . Through targeted initiatives and support mechanisms, ARYA strives to attract and retain the next generation of agricultural innovators, ensuring the sector's sustainability and growth. KVK was the responsible institute for this scheme. Thereby, each KVK was assigned to train about 200-300 youth (below the age of 35 years) in agriculture and its allied sector. KVK provides training on various supplementary activities like poultry farming, dairying, fisheries, goat rearing, mushroom production, and similar other activities that are related to agriculture and its allied activities. Meanwhile, it enables trained youths to establish network groups and deploy resources and capital-intensive activities like processing, value addition, and marketing (Sayana *et al.*, 2022). In previous studies it was mentioned that youth trained through the ARYA program can act as role models and master trainers for the youth in their rural area; which eventually inspires and motivates the other youth to initiate agri-based start-ups (Alok *et al.,*2021).

The average number of paddy straw mushrooms increased up to 800 beds/year (58.13%). Average annual production increased up to 83.16 per cent. So far as the employment generation is concerned, mushroom enterprise increased up to 26 per cent of the average employment generation/ year. The gross cost of paddy straw mushroom was Rs. 2,92,320 and the net return was Rs. 1,49,520 for eight months. For oyster mushrooms, the gross cost was Rs. 6,090 and the net return was Rs. 3,390 in two months. The benefit-cost ratio was 2.05, which proved to be very remunerative in rural areas (Sahoo *et al.,* 2023). The highest number of successfully running enterprises in Mushroom may be attributed to the good market linkage, skilled labourers, good quality spawn, funding by banking organizations, self-reliance, and sustainability. Our findings were in line with the findings of earlier researchers (Sohi *et al.* 2021; Pal *et al.,* 2022; Das *et al.* 2023).

Poultry rearing involves less investment and mostly women are involved in backyard poultry rearing with native chicken. Kadaknath is a popular native chicken in India (Jaishankar, 2020). Higher-income from poultry enterprise may be attributed to the high market value of the poultry breed (e.g., Sonali, Rhode Island Red, Kadaknath, and Vanaraja), good quality and quantity of produce, proper marketing channel, regular deworming, vaccination regular monitoring which is very similar to the previous findings (Pal *et al.* 2022).

Fish farming has the potential to generate employment for self as well as hired manpower in a commercial enterprise unit. The employment generation spreads across its supply chain, value chain, and management activities (Chandre Gowda, *2023*). The farmer gets a good return from his fish farming and making value addition of fish by making pickles and cutlets. Earlier, he was not satisfied with his income and was encouraged by the KVK team and inspired to adopt fish farming and implemented this idea passionately to increase his farm income and set a good example for a role model (Singh *et al.,* 2020).

Though the ARYA program has numerous advantages, there are some constraints to the adoption of ARYA interventions among rural youth. Some of the constraints identified through this study were lack of knowledge about equipment/machinery for enterprise, high costs of inputs, and difficulty in marketing the products. These were the major technical, input, and marketing problems encountered by the youth in the adoption of ARYA interventions (Sayana *et al,* 2022). So, to address this KVK Puri facilitates crucial connections for youth with government agencies and NGOs, fostering support for bankable projects, subsidies and acting as vocal for local (Sandhu and Chauhan 2020).

CONCLUSION

The impact study conducted under the ICAR-ARYA initiative reveals the dynamic engagement of youth in Mushroom, Fishery, and Poultry enterprises. The findings underscore the necessity for targeted interventions to address diverse preferences and disparities, particularly in gender and caste-based dimensions. Over the four fiscal years spanning

2019-20 to 2022-23, the project has achieved notable milestones by training and supporting young entrepreneurs, resulting in the establishment of numerous entrepreneurial units. The consistent increase in average net return reflects the project's success in enhancing profitability and economic sustainability in the agricultural sector. These results highlight the positive impact of the initiative on both financial performance and local employment opportunities, emphasizing the importance of tailored strategies for fostering inclusivity and ensuring balanced youth engagement in agricultural ventures viz; Market connectivity is promoted through exposure visits and the marketing of mushroom products under the ARYA Brand. The project's holistic approach to fish seed production and Biofloc systems addresses market demands, emphasizing sustainability. In the poultry sector, the project aims to engage more women from Self-Help Groups in Mother Units, while also establishing local poultry feed processing units for enhanced sustainability and resource utilization. This research offers valuable guidance for stakeholders seeking to promote entrepreneurship for long-term growth and development.

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Declaration of competing interest:

The authors declare the absence of competing interests.

Data availability:

Upon request, data will be made available.

Authors' contribution:

The study's conceptualization and operationalization were a collaborative effort between the first and second authors, encompassing the design, analysis, data collection, and paper writing. The third author contributed to the editing process, reviewed the results, and played a key role in finalizing the manuscript.

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