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Creating a Learning Process and Adapting Technology to Improve Highland Rice Production, Wiang Haeng District, Chiang Mai Province, Thailand

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Abstract

This study was conducted in the mountainous regions of Ban Huai Krai (Piang Luang sub-district), Ban Muang Pok (Saen Hai sub-district), and Ban Mae Haad (Mueang Haeng sub-district) in Wiang Haeng district, Chiang Mai province of Thailand. These areas are home to ethnic communities that primarily cultivate highland terrace rice and upland rice for domestic consumption. However, the increasing use of chemical herbicides, insecticides, and fertilizers has led to higher production costs and negative environmental impacts, affecting both the surrounding ecosystems and highland communities. The research aimed to enhance rice yields and ensure sufficient production to meet community needs by improving learning processes and introducing appropriate technologies for highland farmers. Thirteen farmers, including community leaders and proactive representatives with a strong interest in agricultural improvement, participated in the study. The following key steps were undertaken to equip participants with the knowledge, skills, and critical thinking required to lead and advance highland rice farming in their communities: 1) Conducting community gatherings in each sub-district, 2) Identifying challenges, proposing solutions, and defining development goals, 3) Sharing technical knowledge on rice cultivation from the Department of Rice, 4) Establishing demonstration plots to showcase and adapt highland rice production technologies, and 5) Assessing the adoption of these technologies by engaging farmers in hands-on activities and monitoring implementation progress. The research introduced both upland rice and highland terrace rice farming technologies, which included optimized seed rate usage, improved plot management, fertilizer application based on soil analysis, pest and disease control, and harvesting at the optimal time. Results showed significant improvements: upland rice yields increased by 5.4% while production costs decreased by 12.6%, and highland terrace rice yields increased by 10.0% with a 10.5% reduction in production costs across 13 demonstration plots. Throughout the process, representative farmers acted as technology disseminators, transferring knowledge to their communities and enabling farmers to collectively address production challenges. This collaborative approach enhanced understanding of rice cultivation practices, improved food security at both household and community levels, and contributed to the sustainable development of highland agriculture.

Keywords: Chiang Mai province, Ethnic groups, Highland rice, Soil analysis, Adapting technology



Prescribed Keeping, Burning, and Processing of Longan Branches for Income Generation of Longan Farmers in Mae Suai and Wiang Pa Pao Districts, Chiang Rai Province, Thailand

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Abstract

Longan farmers in Mae Suai and Wiang Pa Pao Districts, Chiang Rai Province of, traditionally disposed of pruning scraps by open burning, contributing to recurring PM 2.5 pollution. This research aimed to address the issue by promoting sustainable management of longan branches through the Burn Check application and enhancing their value by producing wood vinegar and charcoal that meet community product standards. A smokeless, low-pollution furnace was utilized, and community enterprises were established with the participation of 50 longan farmers and network partners. The process involved: 1) participatory problem analysis, 2) technology transfer for proper collection and controlled burning, facilitated by registering for permission through the Burn Check application, 3) creating and developing community innovators for income generation using smokeless furnaces, and 4) establishing community enterprise groups. As a result, longan branches were burned following scientific practices, reducing air pollution. Ten sub-districts, each with 10 communities, engaged in this initiative, and 70% of participants successfully adopted the Burn Check application. The project led to the formation of 10 community enterprises, generating income from the sale of wood vinegar (30 baht/liter) and charcoal (10 baht/kilogram), with a total revenue of 103,140 baht (around 3,025 USD). A Learning Innovation Platform was developed, encompassing five key stages: 1) preparation of agricultural waste, 2) kiln production, 3) wood vinegar and charcoal production, 4) quality inspection, and 5) packaging. This research significantly contributed to improving quality of life, fostering community resilience, and promoting environmental sustainability.

Keywords: Chiang Rai province, Prescribed keeping and burning, Burn Check Application, Smokeless-Low-pollution furnace, Community innovators



Development of Low-cost Layer Diets Using Local Resources for Promoting the Sustainable Self-reliance of Small-scale Farmers in the Tontan Sub-district, Suphan Buri Province, Thailand

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Abstract

Small-scale laying hen farmers in the Tontan Sub-district, Song Phi Nong District, Suphan Buri Province of Thailand, face challenges due to limited knowledge and skills in feed formulation. They rely on expensive commercial feeds and incur additional transportation costs, resulting in high production expenses. This study aimed to develop cost-effective and sustainable feed formulations using local resources, specifically water spinach and stinking passionflower, to promote self-sufficiency and reduce production costs. The research involved collaboration between local corporate networks, small-scale farmers, educational institutions, and government organizations to: 1) establish community partnerships, assess farmers' needs, and build community capacity, 2) evaluate the potential of local resources, 3) develop and test laying hen diets, and 4) provide education and business strategies to foster self-sufficiency. Forty Lohmann Brown hens (75 weeks old) were raised in individual cages under an open housing system and divided into four groups (10 hens each). They were fed conventional, reference, stinking passionflower, and water spinach diets for 21 days. Results indicated that stinking passionflower and water spinach diets could be effective feed alternatives, showing trends toward increased egg weight ($P = 0.087$) and egg mass ($P = 0.093$) without negatively affecting egg quality. The stinking passionflower and water spinach diets also reduced feed costs by 2.25 Baht/kg and 2.20 Baht/kg, respectively (around 0.07 USD/kg). This initiative enabled farmers and local networks to produce and distribute affordable, locally sourced feeds within their communities, fostering a community-based circular economy. By driving the principles of the sufficiency economy, this model strengthens self-sufficiency and supports the sustainable development of the community's foundational economy.

Keywords: Suphan Buri province, Laying hen diet, Cost reduction, Water spinach, Stinking passionflower



Enhancing Community Economy through a New Value Chain of Red Tilapia in Lum Nam Nan, Uttaradit Province, Thailand

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Abstract

Uttaradit province of Thailand produces and sells an average of 3,437.15 tons of red tilapia annually, which is insufficient to meet market demand. The existing value chain comprises only production and collection. Major challenges faced by producers include the high cost of fish feed, the inability of small-scale farmers to select quality fish breeds, and a lack of effective farm management knowledge. This research focuses on enhancing the red tilapia value chain through a collaborative network involving two hatcheries, six production businesses, the Uttaradit Aquaculture Cooperative, and one collection business. The interventions include: 1) participatory attitude adjustments to raise awareness about production record-keeping, 2) planning for production inputs and developing the farming process based on the “4 Good” production system-good breed, good feed, good farm management, and good marketing, and 3) business strategy development, including backward integration by expanding value chain links into input supply processes, and forward integration through joint marketing planning with collection businesses to boost sales and promote local consumption. Through knowledge exchange, capacity building, and practical experiments, the income of hatchery businesses increased by 27.93%, production businesses saw a 41.74% rise in revenue, with profits increasing by 5,000–10,000 THB (around 147-294 USD) per cage. Employment was created for 165 people, and new roles such as red tilapia hatchery operators, primary processors, processors, and sellers. Retail businesses achieved the highest value increase of 20%, collection businesses saw a 12.26% increase, and wholesale fresh fish businesses experienced a 10.53% increase. This distribution of income and benefits throughout the value chain positively impacted the community economically and socially.

Keywords: Uttaradit province, Value chain, Red Tilapia, Community economy, 4D production system



Development of Salted Four-Finger Threadfin Drying Process Using a Passive Solar Drying System for Salted Four-Finger Threadfin Processing Community Enterprise, Nong Chik District, Pattani Province, Thailand

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Abstract

The salted four-finger threadfin processing enterprise in Nong Chik district, Pattani province of Thailand, faces challenges in producing dried salted threadfin due to reliance on open-sun drying. Each drying cycle takes 2–5 weeks and is often disrupted by dust and insects. To address these issues, this research developed a passive solar dryer in collaboration with local enterprises, educational institutions, government agencies, and the general public. The study includes: 1) an analysis of drying challenges and the design and construction of the solar dryer, 2) experimental trials using the passive solar dryer, and 3) economic and quality assessments of the salted threadfin produced. The passive solar dryer (200 x 100 x 140 cm³) maintains temperatures between 38.2–68.7°C, with an average of 54.5 ± 3.2°C, and features a solar collector panel (200 x 250 x 20 cm³) with temperatures ranging from 32.6–83.1°C. Each drying cycle accommodates 152 threadfins and takes nine days, increasing production capacity by 33.3% compared to open-sun drying. This innovation results in a net income increase of 90,440 Baht (around 2,650 USD) per month for the enterprise, with a payback period of two months. The quality of threadfins, in terms of color, hardness, water activity, protein content, and *Staphylococcus aureus* levels, is comparable to traditional methods.

Keywords Pattani province, Four-finger threadfin, Passive solar dryer, Solar energy, Economic worthiness



Enhancing the Production Potential of Salted Dried Spanish Mackerel (*Scomberomorus commersoni*) and Threadfin (*Eleutheronema tetradactylum*) using Solar Drying Cabinets, Chai Talay Muang Ngam Processing Housewives Group, Songkhla Province, Thailand

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Abstract

The Chai Talay Muang Ngam Processing Housewives Group, located in Muang Ngam Subdistrict, Singhanakhon District, Songkhla Province of Thailand, encounters difficulties in producing salted dried Spanish mackerel and Threadfin which cannot be carried out during periods of low sunlight or rainy season, rendering year-round production unfeasible. There are also problems with microbial contamination, inappropriate packaging, and marketing. This research project therefore aims to enhance both the qualitative and quantitative aspects of the processing by using a solar drying cabinet to dry salted Spanish mackerel and Threadfin. The design of logos, labels, packaging, and marketing promotion involves the following processes: 1) gathering data from the community for research planning; 2) coordinating community and relevant stakeholders; 3) constructing and utilizing a solar drying cabinet for salted dried Spanish mackerel and Threadfin processing; 4) designing logos, labels, packaging, and marketing promotion; 5) establishing a learning and innovation platform (LIP); and 6) fostering community innovators. This process culminates in the construction of a solar drying cabinet for the processing of salted dried Spanish mackerel and Threadfin, which has the potential to boost production to 60 kilograms per month and minimize contamination from microorganisms, yeasts, and molds, thereby meeting the quality standards of salted fish products. The LIP has equipped members with the skills to process salted dried fish using solar drying cabinets, leading to the continuous expansion of benefits from the activities of the LIP and creating nine community innovators at level 2 and two at level 3 to support the learning of salted dried fish processing innovation with solar drying cabinets in the community. The Chai Talay Muang Ngam Processing Housewives Group has seen an increase in income from selling salted dried Spanish mackerel and threadfin, averaging 6,000 baht (around 176 USD) per month, or 45.85%.

Keywords Songkhla province, Appropriate technology, Solar drying cabinet, Learning and innovation platform, Community innovator