# Participatory Action Research and Development (PAR&D) on Para Rubber Production with Social Network for the Farmer Better Living in the Lower North of Thailand

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**Abstract**

The research objective is to conduct PAR&D activities with various stakeholders focusing on the problem-solving of northern Para rubber industry during 2004-2011. The research aim the empowerment and enforcement of the social network and the social business organization which is following The King's self sufficient economic philosophy for better living of the people among rubber growers, traders, industry and government sectors. The research has conducted by data survey, interview, questionnaire and focus group on various populations. They were 357 rubber growers, 19 traders and industry, and 45 government officials were purposively selected as a sample group. All collecting data were statistically analyzed and synthesized on the production and marketing problems among populations with policy, planning and marketing strategies techniques such as SWOT and TOWS. Many alternative strategies are applied to increase production capability and rubber marketing are prioritized and implemented with the network decision making. To increase the capability of production and marketing competitiveness generated strategies, targets, and effective projects; for instance, the central rubber market establishment, cluster enforcement, the knowledge transfer services, embedding people mindset towards environmental and local wisdoms concerns. Therefore, the strategy setting for increasing the competitiveness have to be conducted and followed the directions and purposes under the participatory network amongst government sector, business firms and farmers to achieve the objectives. However, there was a significant difference at $P \leq 0.05$ on urgently demand to establish the central rubber market in the northern region or Phitsanulok Province. In conclusion, the network reached the successful targets of R&D on central market and cooperative establishment, which is self-sufficient management with benefit productivities by the farmer and network support.

## Introduction and Objectives

There was no Para rubber cultivation in the north of Thailand due to the farmer believe that this crop is cultivated only in the south of the country. However, the new plantation area is expanding rapidly in the north east and the north of Thailand after the higher price and high demand of the world market. The succession rate is increasing in the other crops and reserve land. In fact these new plantations play the vital role to the economic development and cluster of industry, which create better income and changing agro ecological zone. Agriculture and Environmental Integration Research and Development Unit (AEI), Naresuan University (NU) urgently has conducted the special rubber R&D project since 2002. The objective are (1) To promote the academic service, coordinate and function as the center of network's activities among organizations and farmer promptly provide the solution to society, (2) To create database, academic service through R&D in agriculture, natural resource and environment. The missions focus on sustainable farming system with morality and

academic wisdom to develop and integrate agriculture, natural resource and environment conservation of the country. The farmer groups request AEI via NU to conduct the Participatory Action Research and Development (PAR&D) on Para Rubber Production with Social Network for the Farmer Better Living in the Lower North of Thailand.

The research objectives are to conduct PAR&D activities side by side with the farmers**,** government and private sectors targeting on the problem and solution. To empowerment and to enforcement on the social network through the social business organization which is following self sufficient economic for better living of the people.

**Methods**

The research and development questions are analyzed by appreciation influence control (AIC), SWOT, TOWS, social impact assessment (SIA), initial environmental examination (IEE) and Fishbone analysis. Data survey, interview, questionnaire and focus group are used as data colleting from various stakeholders and focus on the problem and solution of Para rubber industry. They were 357 rubber growers, 19 traders and industry, and 45 government officials were purposively selected as a sample group. The strategic planning and implementation are PAR&D with social network and social business model under self sufficient economic concept. Five forces model, Potter's diamond model, logistic & cluster analysis, supply & demand side and value chain management are employed. Technology transfer on production, marketing, organization management and supports are participating and conducting under the social network system. This PAR&D has conducted since 2004 to 2011. The summarization of real time research is reported. The full report of each activity is also available.

**Results**

According to the previous study and survey on community problem and requirement in the lower north of Thailand before the beginning of the government policy and implementation on rubber expansion project namely *"Para rubber plantation for raising farm income and farmer security in northern region of Thailand 2004-2006*". Most of farmers cultivate the rubber due to the prosperous long term income about 25-30 years with less management and better than the previous horticultural and field crops. On the other hand, the farmers are facing the lack of good cultivar, necessary knowledge on rubber cultivation, land management, and poor income for 6 years before latex tapping. Most of new farmers need to be trained on tapping technique, labor and soil management, and good agriculture production (GAP).

NU promptly collaborated to Chiang Mai University (CMU) and Maejo University (MJU) launch the first project on "Markets for agroforestry tree products: Para rubber products of small scale farmers in northern Thailand" that supported by Southeast Asian Network for Agroforestry Education (SEANAFE) and SIDA in 2006. Such research found that the lower north is geographically logistic cross-junction of mainland Indochina. Many plantations in highland and reserve land are ready to harvest with low yield. Large number of plantation is located in unsuitable land with poor conditions, and in the paddy field. Most of small scale farmer (0.65-21.04 ha) change their farm without understanding and skill on Para rubber production. The exiting Para rubber production system intends to produce field latex at farm level. 80% of them process field latex to smoked sheet before selling to the market. The remaining 17% of them sell field latex to the market and sell their rubber residues or cup lump. While, the production of ribbed smoked sheet, rubber block, and concentrated latex were done the primary processing plants located mostly in the southern and eastern region. As a new

growing area, farmers grew rubber mostly in the upland areas (orchard land and degraded forest) under rain-fed condition and have just recently cultivated the crop and haven't tapped the latex. In addition, new planting farmer of intend to do cup lump system. The weakest point for these farmers is the poor marketing system and depends upon the middle-man system without understanding and bargaining power. The local markets are established in certain villages within the concentrated plantation areas. The traders were the hawkers who travel regionally across villages collecting rubber products from the growers. The lack of primary processing factory and central market system in the region pressure on the rubber products which were transported to other region such as Rayong province for processing to ribbed smoked sheet, block rubber, and concentrated latex. World market price of rubber is determined by supply and demand. The quotations are readily available from international markets. However, national rubber committee is established by the Ministry of Agriculture and Cooperatives with Thai Rubber Association, which announce official rubber prices daily to support the reference price in each region. The rubber transactions in each central rubber markets referenced to the Hai Yai and FOB Bangkok prices. In contrast, the benefit of farmer in the north is taken with bad marketing system and received the lowest price. Only the word of mouth system of information dissemination among small rubber growers functioned well in the rural areas. Value chain of Para rubber in the north was focused on unsmoked sheet. However, the study also found the selling of field latex and rubber residues at farm level. This study analyzed the value chain of ribbed smoked sheet, blocks rubber, and concentrated latex. Three levels of the value chain i.e. farmer, primary processor and exporter was considered. The results found that the three participants in each chain would receive almost the same level of profit per kg. (0.68-0.95 US$/kg.). The rubber growers get the highest benefit (0.95 US$/kg. for unsmoked sheet) in the value chain followed by the exporters (0.87 US$/kg. for processing ribbed smoked sheet) and primary processors (0.78 US$/kg. for exporting ribbed smoked sheet).

In 2007, AEI run the survey on technology transfer and was requested from the rubber group, which has more than 600 members, in Phitsanulok and other provinces. They would like to learn on rubber cultivation, primary processing, value added and other income. Therefore, AEI created the network of rubber experts to help the farmers such as Department of Agriculture, Office of the Rubber Replanting Aid Fund, and Artificial Flower Club. The project was launched during 9-10 July 2007 at NU named "Community empowerment with Para rubber production". This project focused on knowledge transfer of rubber clone, cultivation, treatment and management, tapping, producing, and other incomes in the rubber field such as intercropping, livestock, and artificial flower from rubber leaves. The participatory research action with several techniques such as brainstorm, AIC, SWOT, policy and planning found that the encouragement of strength is rubber central market establishment in the north. The weakness solution is the reformation of land rights for effective production. Threat aspect is the lack of rubber processing plant in the north. The logistic opportunity is Phitsanulok province, which were located geographically in the Indo-china intersection for product distribution. The problem on human resources is the high cost of tapping labor and lack of skill labor. The problem on management is the high cost of production factors due to the shortage of loan with low interest. The problem on technology is the shortage of tapping skill workers and unsmoked sheet technology implementation. The problem on environment is the water shortage and soil unfertility as well as no land rights. In conclusion, the major requirement of farmers was the rights of land entitle to access the capital credit. They would like to develop and promote Phitsanulok province as the center of rubber industry.

In 2007, AEI was strongly supported by Thailand Research Fund (TRF) to conduct the research project on "The potential of rubber production, marketing and collaborative competency of Para rubber in Vietnam and Thailand". This study focused on the potential of production, marketing, economic policy, business and investment base on collaborative competency between Vietnam and Thailand. The production, industry and marketing comparison was surveyed-study in the major region of Thailand and Vietnam. The research found that Vietnam can operate and manage the rubber estate effectively while the rubber clone in Vietnam can be tapped in the $4^{th}$-$5^{th}$ year of cultivation earlier than in Thailand. The labor management was highly effective due to a labor manage the rubber field more than 10 rais in Tay Ninh, Dong Nai, Ba Ria-Vung Tau, Binh Duong, Binh Phuoc, and Ho Chi Minh City. The rubber tree was treated well to produce the sufficient latex using twin cups tapping system. Non-productive rubber trees are cut and processed to the high price furniture exporting to the oversea. The potential on production expansion within the country will be impossible. Vietnam has limited suitable land due to reserve area and zoning for national food and energy security. The cluster of Vietnam rubber implement with strategy to expand the plantation in the neighboring countries with natural resources. This research concluded the collaborative competency strategic which is named "Asian Loop". The advantages of major world production country such as Thailand, Indonesia and Malaysia were pooled with Vietnam and rubber utilization countries, which created the rubber material supply management, encouraged the utilization demand from oversea, and stimulated the value added process within Thailand. This concept is function on the Asian value and wealth within the Asian region and demand side of the other region.

Asian Loop for sustainable rubber production market consists of 3 loops. **The first loop** is the demand and supply chains within Thailand. According to the previous action research and survey, it indicates that Para rubber is the economic crop of the country because Thailand is the number one rubber exporter of the world. However, the national rubber consumption is only 10%. Thailand should develop to be the rubber industrial producer and world exporter of the value added products. Thailand should accelerate the investment of processing and new value added product within the country, as well as increasing the national consumption and promote downstream industry. **The second loop is** the South East Asian loop. Thailand should immediately increase her competency with the production countries. Thailand, Malaysia and Indonesia as the major world supply country should seriously perform the price and supply with their bargaining power through International Rubber Consortium Limited (IRCO) that control more than 70% of the world production and supply. Thailand and IRCO should invite Vietnam to join the next member because Vietnam has the effective logistic and marketing potential on the world distribution. Moreover, Thailand should coordinate closely with Malaysia and other hi-tech producer countries to invest in Thailand at the lowest logistic cost. **The third loop** is the connecting new opportunity or the high demand industrial countries for Thailand such as China, India, Japan, Taiwan, Korea and Russia. This knowledge and concern was transfer to public initiate the farmer in the north established the rubber institution named "Para rubber group of Indo China Intersection" with the strong support by the Agricultural Rehabilitation and Development. This is the beginning of rubber farmer empowerment to the national market. AEI R&D unit and the rubber group coordinated and invited the 15 related organizations into the network and declare the MOU on rubber production and market development in March 2009. After the 6 months of establishment, Para rubber group of Indo China Intersection was officially open in September 2007 and carried fund raising in April 2008. The ceremony was opened and announced by the Privy Councilor, His Excellency Mr.Ampol Senanarong.

AEI received the research fund from the Lower Northern Research Administration Network to conduct "The potential of International Market, Logistics and Supply Chain of Para rubber in Phitsanulok Province" with the strong intention and encouragement from rubber networks in 2009. The research found that Phitsanulok province has the potential to be the rubber central market according industry attractiveness evaluation with 7.83 point and industry strength with 7.71 point. The suitable strategy should be the forward vertical integration that is the government, private sector or farmer institution should own or control the raw material in the process or any marketing channel without the middle man or broker. If the full rubber central market system establish in Phitsanulok, the Gross Provincial Product (GPP) will increase 8.56% per year and GPP of agriculture will increase 129.15% per year.

**Table 1 TOWS matrix for internal and external strategies**

| IFAS | Strength (S) | Weakness (W) |
|---|---|---|
| GEFAS | (S1) Phitsanulok is highly competitiveness on geographical transport location<br>(S2) Best infrastructure, logistic and convenient communication<br>(S3) High quality of product | (W1) Limited of suitable land<br>(W2) The farmers lack of knowledge on cultivation & harvest<br>(W3) No central market in the area<br>(W4) Lack of group establishment with strong bargaining to traders and suppliers |
| Opportunities (O) | SO | WO |
| (O1) Demand of natural rubber in the world market: China, Japan, India, USSR<br>(O2) Market situation within partner countries<br>(O3) Production and market situations<br>(O4) Production capacity of rubber industry<br>(O5) Government policy: IRCO<br>(O6) Appropriate environment for production<br>(O7) Entrance of new farmers<br>(O8) Competitive market of other group | (S3, O1) Research and development and rubber quality control to maintain the existing market and expand market to new partners<br>(S1, S2, O9) World supply and price positioning | (W2, O5) Continuously training and rubber information from government sector<br>(W3, O1, O5) The government sector set up the rubber central market in the north region or in Phitsanulok province<br>(W4, O8) Establish the rubber farmer group to create the advantages on cost reduction and effective production |

**Table 1 TOWS matrix for internal and external strategies (continue)**

| Threat (T) | ST | WT |
|---|---|---|
| (T1) The expansion of rubber cultivation area and rubber export of the foreign competitors<br><br>(T2) The advantage on factors of production of the competitors<br><br>(T3) Investment in rubber business<br><br>(T4) Property of agricultural product<br><br>(T5) Entrance of synthetic rubber as a substitute product<br><br>(T6) Bargaining power on rubber supply to rubber traders<br><br>(T7) Bargaining power on raw material buying in rubber cultivation | (S3, T1) Focus on good quality of rubber production and research on rubber new product diversity, differentiation, and value adding<br><br>(S1, T4) Research on rubber clone development for good quality and reduce the lost after harvest | (W4, T6) Establish the farmer group and central market in the province for stronger bargaining power to rubber traders and suppliers |

The results from Table 1 establish the strategic competency as follow;

(1.) SO: more-more, use the strength to create the advantage from opportunity. Government sector, private sector, education institutes and related organizations should conduct further research, develop, and maintain the rubber production quality in order to keep the old partners and expand more markets to new partners under IRCO policy and activities.

(2.) WO: less-more, create the advantage to overcome the weakness. Government sector launch the training program and provide necessary information related to rubber to the farmers continuously. Government sector set up the central market in the north region especially in Phitsanulok province. Setting up of the rubber corporative group in Phitsanulok will create the advantage on cost reduction and effective factors of production.

(3.) ST: more-less, use the strength to overcome or avoid the threat, focus on quality of rubber production, research on new rubber product for product differentiation and value adding, and research on rubber clone development for area suitability, high quality and standard, and reduce lost after harvest

(4.) WT: less-less, improvement from the weakness and threat, create the strength and opportunity, and encourage the rubber group to set up in the province to empower the bargaining.

The results from strategic analysis, general environment analysis, industrial competitiveness analysis, and internal environment analysis could be create the strategic results to increase the potential of rubber production and market in Phitsanulok as follow

(1.) The government sector should set up the rubber central market in the north region and within Phitsanulok province on logistic and advantage.

(2.) The government sector, private sector, educational institution, and related organization should conducted research, develop and produce good quality for keeping the old partner and expand more markets to the new partner**.**

(3.) The government sector should launch the training on advance technology and should provide necessary information on rubber knowledge to the farmers**.**

(4.) Establish the grower groups create higher competitiveness in term of cost reduction and possible factors of production.

(5.) Focus on produce good quality product and research on new rubber product for varying, product differentiation and value added.

(6.) Research the new rubber clone development suit for the new area, high quality and standard, and reduce lost during harvest

(7.) Promote the rubber group and market structuring in the province which empower bargaining of the rubber traders and suppliers under IRCO network**.**

In conclusion, there was a significant difference at $P \leq 0.05$ on urgently demand to establish the central rubber market in the northern region or Phitsanulok Province. In addition, the networks achieve the successful targets of R&D on central market and cooperative establishment, which is self-sufficient management with benefit productivities by the farmer and network support. This research result was supported and published by the Phitsanulok Federation of Thai Industries magazine to transfer this main concept to the farmer group and rubber industry. In July 2010, NU launched the MOU with the rubber organization networks to establish the rubber central market and named "Para Rubber Central Market of Indo China Intersection" as the new rubber market in the north of Thailand. The development on rubber community empowerment was fast forward by the rubber network and AEI. All rubber groups agreed to raise the status of rubber producer group to rubber trader and marketer. Para rubber group of Indo China Intersection was open new channel as "Phitsanulok Para Rubber Cooperatives" under Phitsanulok Provincial Cooperatives Office in June 2010. National supporting come from the rubber networks such as Rubber Estate Organization, Rubber Replanting Aid Fund, Rubber industry, local government and NU. The Para Rubber Central Market of Indo China Intersection was open officially in August 2010 at Ban Yang sub District, Wat Bot District, Phitsanulok that opened by Mr.Supachai Phosu, Deputy Minister of Agriculture and Cooperatives. Then all members call for government support to this social organization and announced Phitsanulok province as the rubber center in the northern region of Thailand.

**Table 2 of milestone on rubber project participation and collaboration**

| Year | Activity | Host/organizer | Output |
|---|---|---|---|
| February 2006 | "Markets for agroforestry tree products: Para rubber products of small scale farmers in Northern Thailand" | Southeast Asian Network for Agroforestry Education (SEANAFE) and Swedish International Development Coorporation Agency (SIDA) | Teaching Material on rubber farming system for applying to teaching agroforestry education with NU-CMU-MJU-KU network |
| July 2007 | "Community empowerment with Para rubber production" | NU-Farmer group-Indochina Development institute-Northern Research Funding agencies | Knowledge on intercropping in rubber plantation, minor job from rubber production, and brainstorming idea for rubber development |
| May 2007 | "The potential of rubber production, marketing and collaborative competency of Para rubber in Vietnam and Thailand" | Thailand Research Fund (TRF) | Policy and strategy on rubber collaborative with Vietnam |
| March 2007 | Official opening of Para rubber group of Indo China Intersection | Para rubber group of Indo China Intersection, NU and 15 organizations | Establishment of Para rubber group of Indo China Intersection |
| September 2008 | Fund raising for Para rubber group of Indo China Intersection | Para rubber group of Indo China Intersection, NU and the rubber network | Funding for rubber group development and planning of activities |

**Table 2 of milestone on rubber project participation and collaboration (continue)**

| | | | |
|---|---|---|---|
| February 2009 | "The potential of International Market, Logistics and Supply Chain of Para rubber in Phitsanulok Province" | Lower Northern Research Administration Network, NU and the rubber network | Policy Recommendations on international rubber development of Phitsanulok province |
| March 2009 | MOU on Rubber market development | The 15 organizations of rubber network and NU | Rubber market collaboration and networking |
| April 2009 | Seminar on rubber grower networking in the north of Thailand | Rubber Estate Organization and NU | Leader of rubber group network in the north of Thailand |
| September 2009 | Meeting with Phitsanulok governor on Rubber Market Development in Phitsanulok | Para rubber group of Indo China Intersection and NU | Report and consult on rubber market development and finding support from government sector |
| | Seminar on rubber market development | Para rubber group of Indo China Intersection and NU | Knowledge transfer on rubber market watch and development |
| December 2009 | Meeting on rubber market funding from Agricultural Rehabilitation and Development | Para rubber group of Indo China Intersection and NU | Funding consultation and channel |
| January 2010 | Meeting on rubber group expansion and development | Para rubber group of Indo China Intersection and NU | Conclusion on rubber group expansion and activities |
| | Seminar on Government Policy for support rubber farmer to value adding and raise income | Rubber Estate Organization and NU | Knowledge Transfer on rubber farmer institution establishment and rubber market participation |
| March 2010 | Meeting for rubber market funding with Agricultural Rehabilitation and Development | Para rubber group of Indo China Intersection and NU | Funding consultation and channel,<br>Organization and activities |
| April 2010 | Cooperatives establishment, Fund raising and management | Para rubber group of Indo China Intersection and NU | Cooperatives policy and planning, |
| June 2010 | Establishment of Phitsanulok Para Rubber Cooperatives | Phitsanulok Para Rubber Cooperatives, NU & networks | Farmer institution and empowerment |
| July 2010 | MOU on Para Rubber Central Market of Indo China Intersection establishment | The network and NU | Collaboration on supporting Para Rubber Central Market of Indo China Intersection establishment |
| August 2010 | Official opening Para Rubber Central Market of Indo China Intersection | Phitsanulok Para Rubber Cooperatives, NU and networks | Para Rubber Central Market for rubber farmer institution empowerment |
| February 2011 | Meeting on rubber business development with Marketing Organization for Farmers | Phitsanulok Para Rubber Cooperatives and NU | Business, marketing and financial channels for rubber group development |
| March 2011 | Meeting on rubber business development with Marketing Organization for Farmers | Phitsanulok Para Rubber Cooperatives and NU | Problem solving and development activities |
| September 2011 | Meeting for development the northern rubber tapping center | Phitsanulok Para Rubber Cooperatives, NU, PSRU, and networks | Northern rubber tapping center, school of professional tapping worker and system |

Recently, Phitsanulok Para Rubber Cooperatives has supported by the grower and industry networks, which connect to every region of Thailand. The farmer network practice follow the self-sufficient economic in three categories; self sufficient, reasonable and self control. All members set up their organization culture and seriously select their leader and representative base on two criteria; ethic and wisdom. The group buys the rubber and collects the raw material to process in the eastern, southern, and northern networks with the initial capital of 1.4 million Baht. The group has the sale and order of unsmoked sheet about 60 tons/month costly about 1,145,000 Bath. Moreover, the cooperative also provide the services on input and output management. The reduction cost of production and marketing is using volume demand-supply technique and network bargaining power. The efficiency of the network management process is increased by technical support and technology transfer, which is coordinated and run under the mission and MOU. The successful story of this Para rubber over the problem and barrier is significantly depending upon participatory action research on the well frame social network.

**Conclusion**

PAR&D on Para Rubber Production with social network for the farmer better living in the Lower North of Thailand show a clear picture of academic and networking power on the farming and industrial development. All parties are integrating their works on their commitments with unity mission and well understand of the same vision. Problem and solution prioritization with the real demand of poor farmer clearly indicate the people participation on critical thinking and decision making with AIC and strategic techniques. The targets, implementation plan and activities are selected with PAR as a snow ball effect. The most important is the social movement and activities run the by various social functions and networks. This social movement has improved the weakness and threat transfer to strengths and opportunities. It is noticed that our resources and other agencies are not able to do everything completely, but our understanding and sincerely participation from involved stakeholders could create the great momentum of farmer organization development.

**Keywords:** Para rubber, Cultivation, R&D, Participatory Research Action, Social Network

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