Research article

Sectoral Plans on Natural Resources and Environment: A Study on Pak Phli District, Thailand

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Abstract Since district has an intermediate position to multilevel planning system in almost all developing countries, there is a need to develop and prepare plan at district level incorporating the needs of the people, problems, potentials and developmental issues of the sub-districts to ensure sustainable rural development. With this view, the Regional and Rural Development Planning Programme of the Asian Institute of Technology (AIT) has intensified the planning workshop course to prepare sectoral plans within the district plans for strengthening decentralized planning exercise. This paper focuses sectoral plans on natural resources and environment, Pak Phli district, Nakhon Nayok Province, Thailand. The objective of this study is to clearly focus on need assessment, policy analysis, problems and potentials analysis and finally, identification of development programmes and projects to fulfill sectoral, spatial and clientele requirements. The methodology is developed on participatory planning approach, concept of learning while working, group discussion/interviews, discussion with governmental officials through meetings, brain storming, group exercise and presentation. However, study shows that although Pak Phli is blessed with the attraction of natural resources and renowned with abundant agricultural products, orchard gardens, beautiful water reservoirs and waterfalls but soil backward situation (gravel soil, hard soil, salty soil or acidic soil), severe soil erosion, high soil degradation and improper waste management are the most significant problems while lack of land title, low soil fertility, flooding, non-functioning of community forestry project and water pollution are prioritized as problems in this district. In accordance with several recommendations, this study proposes three projects for developing of natural resources and environment sector: (1) Acid soil management by applying liming and organic farming practices; (2) Strengthening community forestry project by enhancing capacity building of existing community forestry groups; and (3) Improving municipal solid waste management system by involving private sector and community people to carry out community solid waste management.

Keywords sectoral plan, development programme, participatory planning, organic farming, community forestry, solid waste management

INTRODUCTION

Pak Phli district, a district in the eastern part of Nakhon Nayok Province, eastern Thailand is blessed with the attraction of natural resources and also, called as provincial heritage site since it is renowned with abundant agricultural products, orchard gardens; beautiful tourist spots and waterfalls; and graceful with green nature and local culture. However, study shows although natural resources are available but soil backward situation (gravel soil, hard soil, salty soil or acidic soil), severe soil erosion, high soil degradation and improper waste management are the most significant problems while lack of land title, low soil fertility, flooding, non-functioning of community forestry project and water pollution are prioritized as problems in this area.

Since district has an intermediate position into multilevel planning system for ensuring sustainable rural development incorporating the needs of the sub-districts, this paper makes an attention to develop Pak Phli district plan focusing its natural resources and environment sector.

This study does clearly analysis the need, existing national policies and strategic plans, problems and potentials and finally, identifies development programmes and projects to fulfill spatial and clientele requirements of natural resources and environment sector at local level.

METHODOLOGY

The study is conducted by a workshop course offered for five months in every August session by the Department of Regional and Rural Development Planning, Asian Institute of Technology (AIT), Thailand. A preliminary reconnaissance survey is conducted by workshop coordinator in order to select the study area. The computerized village level data base, for example, National Rural Development data base (NRD-2C), 2009 and Basic Minimum Need (BMN), 2009 maintained by a central agency in Thailand (Thammasat University Data Processing Centre, Bangkok) are used to know the development status of study area. Apart from these sources of secondary data and information, a primary sample survey is usually conducted by the faculties, staffs and students through a structured questionnaire to provide additional information on particular sectoral analysis. However, equal emphasis is also given to collect first hand information by using participatory rapid rural appraisal and field research methods (rapid district appraisal). This gives the scope to interact directly with people, different groups, local leaders, government officials at provincial, district and sub-district level and thus facilitates participatory planning procedures (Routray, 1998).

Qualitative research approach is applied for this study because qualitative inquiry is inductive-focusing on practice, perception and interpretation rather than deductive and experimental. For doing this, this study frequently uses some selected techniques such as: secondary data analysis, content analysis, SWOT analysis, problem and proposal matrix analysis and in-depth case study analysis.

RESULTS AND DISCUSSION

Sectoral analysis on natural resources and environment: Pak Phli district

Physical setting, land form and topography

Pak Phli district is subdivided into one (1) municipality (Kho Wai municipality) and seven (7) sub-districts (Ko Wai, Ko Pho, Pak Phli, Khok Kruat, The Ruea, Nong Seang and Na Hin Lad) in Fig. 1, further subdivided into fifty one (51) villages. The total area of this district is 590.46sq.km or 1/6 of provincial area. The land form of Ko Wai, ko Pho, Pak Phli, and Tha Ruea is flood plain whereas the land form of Khok Kruat and Nong Seang is foot hill. The land form of Na Hil Nat is mountain type and height of the land is found within the range of (400m – 1300m) whereas the height of other sub-districts' high land is below 400m.

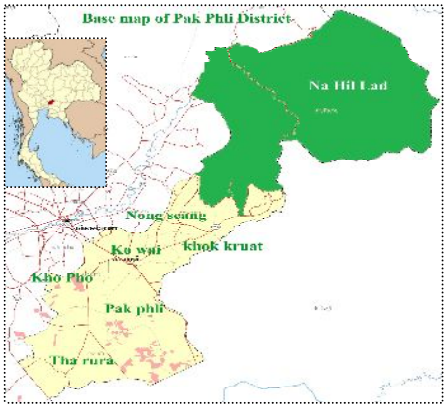

Fig. 1 Base map of Pak Phli District

Land, soil situation, water resource and forest

Pak Phli district is mainly forest area (52%) and agriculture (39%) is the major livelihood occupation comparing others occupations like animal husbandry (1%) and fruit orchard practice (1%) within the district. Water resources have lowest share of total area, only 1% (Land development department, 2009).

BMN, 2009 shows the existence of lack of land title for many people and landless in this area. Na Hin Lad has the highest percentage (93%) of household that has own land whereas Ko Pho has the lowest percentage (31%) of household. It also shows that most of the land is rented by farmers for paddy due to the need for the economy of scale. It is found that Tha Ruea has the highest percentage of household with land greater than 50 rai. Other sub-districts composed of 30% of household with 11-20 rai of land Khok Kruat has the highest percentage of household with less than 5 rai (13.45%). However, Ko Wai and Ko Pho have less than 50% household with rent land.

Pak Phli District has forest of 55% in its whole area while another 45% is covered by several soil series situations. Depending on soil series, the dominant soil types of Pak Phli District are Clay soil, Sandy soil and Loamy soil. Clay soil covers 92,928 Rai whereas Sandy soil and Loamy soil cover 35,901 Rai of total area. Less than 1% of area (313 Rai) in Na Hil Nad is steep mountains (Land Development Department, 2009), Table 1.

Table 1 Soil series situation in Pak Phli District

Soil Series	Location	Area	%	Texture	Filtration	pH	Nutrient	Usage
6	Nong Saeng, Khok Kruat	5,937	2.16	Clay	Low	4.5-5.5	Fe, Mg	Paddy, vegetables
10	Pak Phli, Tha Ruea	3,242	1.18	Clay	Low	4.5	n/a	Paddy, vegetables
11	Ko Wai, Ko Pho, Pak Phli, Tha Ruea	65,958	24.02	Clay	Low	4.5-5.0	Al	Paddy, vegetables
16	Na Hin Lat, Nong Saeng, Ko Wai, Ko Pho, Pak Phli	34,418	12.54	Salty clay	Medium	5.0-6.0	Fe, Mg	Paddy
35	Na Hin Lat, Khok Kruat	3,702	1.35	Sand	High	4.5-5.5	n/a	Upland crops
46	Nong Saeng	2,527	0.92	Clay loam	Medium	5.0-6.0	n/a	Upland crops
56	Na Hin Lat, Khok Kruat	3,733	1.36	Sandy silt	High	4.5-5.5	n/a	Upland crops
62	Na Hin Lat	313	0.12	Rocks	n/a	n/a	n/a	Not suitable for cultivation
Forest	Na Hil Nat	147,157	53.60	n/a	n/a	n/a	n/a	Forestry tress

NRD-2C, 2009 and field survey, 2010 shows that the soil situation of the villages of Ko Wai, khok kruat, Na Hil Nad and Nong Seang are fertile and farmers are using less amount Chemical fertilizer (30%), excess amount of organic fertilizer (chicken /fish) (70%) and organic pesticide. Agriculture learning centers and awareness growing campaign by them on using organic fertilizers, environmental protection, solid waste management, road maintenance and afforestation are available. However, Pak Phli, The Ruea and Kho Pho face high soil degradation due to using excess amount of chemical fertilizer (80%) and pesticide. Severe soil erosion is found in Nong Seang because of it physical soil profile of slop and valley complex.

BMN, 2009 shows that there are 40 Canels/rivers, 75 ponds/swamps and 7 dams are found as natural water resources throughout all sub-districts in Pak Phli district. For ensuring drinking water sources and reserving water for dry season, Khok Kruat has the highest no. of ponds (328) and bowels (21); Na Hil Nad and Ko Wai have 3 and 1 manmade reservoir accordingly. In case of water for agriculture, NDR-2C, 2009 shows that out of data availability of 51 villages, 3 villages (6%) are backward having no water sufficiently for agricultural cultivation, 38 villages (75%) are

moderate having water sufficiently during rainy season, and 10 villages (20%) are progress having water sufficiently for cultivation during all year.

The total forest area of Pak Phli district is 399,381 rai. 397,361 rai of total forest area is reserved and protected with the forest laws regulated by the Royal Forest Department located at Na Hil Lad sub-district, table 2. Presently, government promotes eco-agro tourism activities in this area.

Table 2 Area of forest and plantation (rai)

Sr.	Category	Naung Seng	Ko Pho	Pak Phli	Ko Wai	Khok Kruat	Tha Reau	Na Hin Lat	Total
1	Dense Evergreen Forest	-	-	-	-	-	-	397,292	397,292
2	Disturbed Evergreen Forest	-	-	-	-	-	-	69	69
	Sub-total								397,361
3	Plantation	105	183	38	58	45	646	445	1,520
4	Community forestry	200	100	-	-	200	-	-	500
	Total								399,381

Field Survey, 2010 shows the lake of comprehensive management plan in implementing Community forestry activities. People usually perceive their role as recipients of top-town decision making and therefore only put assignments projects into practice. Consequently, one community forest in Khok Kruat sub-district is about to change into play ground. Also, local governments have planned to cut down the forest and convert it into the sport field following the public demand.

Environmental management, policy and program analysis

NRD-2C shows that Khok Kruat and Na Hil Nad have progressive level of environmental management facing no solid waste management (SWM) problem. Case study of Kho Wai municipality shows that it is responsible to collect waste from household of every sub districts using two vehicles (cab van) (storage capacity 15 Lb.m) per day. These vehicles go to collect waste one time per day. Every day the total of 39.40 liters fuel is used for garbage collection. To get this facility, every household pays 100 baths per month. Kho Wai has own landfill to disposal the waste collected from every household. Every day 3.5 tons waste is disposable in this landfill (Lopa et al, 2010).

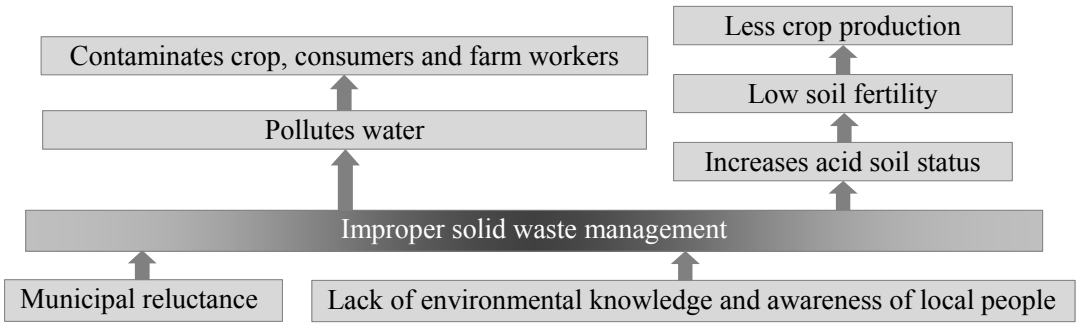

Fig 2 Problem tree analysis of SWM

However, the waste collected from Pak Phli district is also stored in Kho Wai landfill. Every day 500 kg waste from Pak Phli is disposable into Kho Wai landfill. However, field Survey' 2010 shows municipality does not collect waste from all sub-districts. It collects waste but irregular from

those areas which are near about to municipality. This condition is considered a serious and visible environmental problem and public health risk, Fig. 2 (Lopa, 2010).

There is still lack of adequate programmes in line with the national policies and strategies. Farm burning as illegal in national policies but it is widely prevalent in all sub-districts. It has adequately addressed the awareness on environmental pollution and solid waste management system but programs to address the issues are not conducted in the local area. Forest national policies have addressed well but since the forest encroachment and clearance are high, campaigns for awareness raising, and trainings for capacity building, forest reforestation programmes are needed to be intensified as the scope of these activities are found to be very limited.

Problems and prospect analysis

Table 3 Problem matrix

Problems	1	2	3	4	5	6	7	8	9	Score	Rank
Low soil fertility										0	0
Acidic soil status	x									1	2
Severe soil erosion	x									1	2
High soil degradation	x	x							x	3	1
Lack of land title										0	0
Flooding during rainy season										0	0
Improper waste management	x	x		x						3	1
Non-functioning of community forestry										0	0
Severe water pollution										0	0

Table 4 Proposal matrix

Identified Problems	Development Potential	Policy Situation	Project Proposals
1. Low Soil fertility in Ko Wai, Ko Pho, Pak Phli, The Ruea and Na Hil Nad 2. Acidic soil status in Ko Wai, Ko Pho, Pak Phli, The Ruea 3. Severe soil erosion in Nong Seang 4. Lack of land title 5. High Soil Degradation in Pak Phli, The Ruea and Kho Pho 6. Flooding during rainy season in Kho Pho, Kho Wai, Pak Phli, The Ruea, Khok Kruat and Nong Seang 7. Irregular Municipal Waste Management in Kho Wai, Nona Saeng and Pak Phli and illegal waste dumping practice by household in other sub-districts 8. Non-functioning of community forestry in nong Seang, Kho Pho and Khok Kruat 9. Severe water pollution in Pak Phli and Kho Pho	1. Availability of water resources and irrigation & water accessibility project in the district 2. Availability of forest resources (69% of total area) 3. Availability of organized land suitability and land classification data 4. Due consideration for Natural Resource and Environment Issues by Land Development Department 5. Prospect for eco-agro tourism development	1. Promotion local participation on environment management 2. Natural resources and environmental rehabilitation such as community forestry program promotion 3. Political and administrative development such as people's participation, politic and administration promotion	1. Acid soil management by applying liming and organic farming practices 2. Strengthening community forestry project by enhancing capacity building of existing community forestry groups 3. Improving municipal solid waste management system by involving private sector and community people to carry out community solid waste management.

Provincial and district level strategies have adequately addressed the drinking water issue but not for the agricultural purposes. However, presently, they have planned to introduce a large scale

water supply and irrigation project in which Kho wai, Khok Kruat Pak Phli and Na Hil Nad sub-districts cover 27,809 rai for irrigation project and Tha Ruea, Pak Phli & Kho Pho cover 102,776 rai for ensuring water accessibility during the dry season. National and district level strategies have adequately addressed the issue of land reform ongoing only in three sub-districts but the problem is lack of land title in these areas need to address.

From the problem matrix analysis, Table 3, it is found that high soil degradation and improper solid waste management are the most important problems of this area whereas acid soil status and low soil erosion are equally important while non functioning community forestry, lack of land title, flooding, low soil fertility and severe water pollution are least important among these nine core problems. Apart from these problems, prospects for water and irrigation projects, available forest resources and prospect for eco-agro tourism projects, due consideration for natural resource and environmental management are main potentials observed, Table 4.

CONCLUSION

Rapid population growth and increasing agricultural intensity have driven interrelationship between local people and environment which become complex putting high pressure on natural resources ranging from poor soil quality, soil acid, soil erosion, forest encroachment, lack of land title and landlessness. Likewise increasing agricultural and household activities have brought about environmental pollution; like air pollution from burning harvesting, solid waste, and impacts of extensive chemical uses to human and environment. Apart from these problems, availability of community forestry and successful implementation and probability of its promotion in other sub-districts, topographical advantages which can lead to storage of high water and solve the problem of water shortage and promote agricultural productivity and existence of favorable national, provincial and district level policies are some of the potentials of the sector. But these potentials are not fully harnessed.

There exist favorable policies and plans at national, provincial, district and sub-district levels to address the local problems but there is gap in design and implementation of programmes as per the need of local problems. Programs utilizing the potentials and solving the problems of the area should be designed and implemented which need effective coordination among the provincial, district and local level governments of the area.

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