CHAPTER 3

RESEARCH METHODOLOGY

3.1 Conceptual Framework

The conceptual framework of this study is shown in Figure 3.1 and Figure 3.2..

3.2 Study Design

The study, on the economic aspects of Leprosy Control, is focused on the analysis of the cost for routine case detection and leprosy elimination campaign activities and how to measure the outcome of routine case detection strategy and LEC strategy. It is a retrospective analytic study and the type of data come from secondary data from the leprosy elimination program of Myanmar (1998) and some hypothetical data are used to present the general features of the program.

The cost components and effectiveness in term of total number of newly cases detected of the two alternative strategies are compared in two townships. For comparison purpose, the two townships will be selected by two stages stratified sampling techniques. To control the other factors, which can affect the effectiveness of the two case detection strategies, endemicity of the disease, geographical area, population stability, and health infra-structure should be the same in two selected townships.

The cost components and effectiveness in term of total number of newly cases detected of the two strategies in the same townships in different years: (routing case detection in 1997 and leprosy elimination campaigns in 1998) are compared also. In this study the costs of the two strategies should be changed into 1998 constant price.

To study the factors influencing effectiveness of the case detection program, descriptive study will also be done. Thailand had success story for leprosy control program, the study will also describe the factors influencing Thailand leprosy control program.

Figure 3.1   **Conceptual framework of cost- effectiveness analysis of (routine case detection & leprosy elimination campaign) for new case detection of leprosy elimination program in Myanmar.**
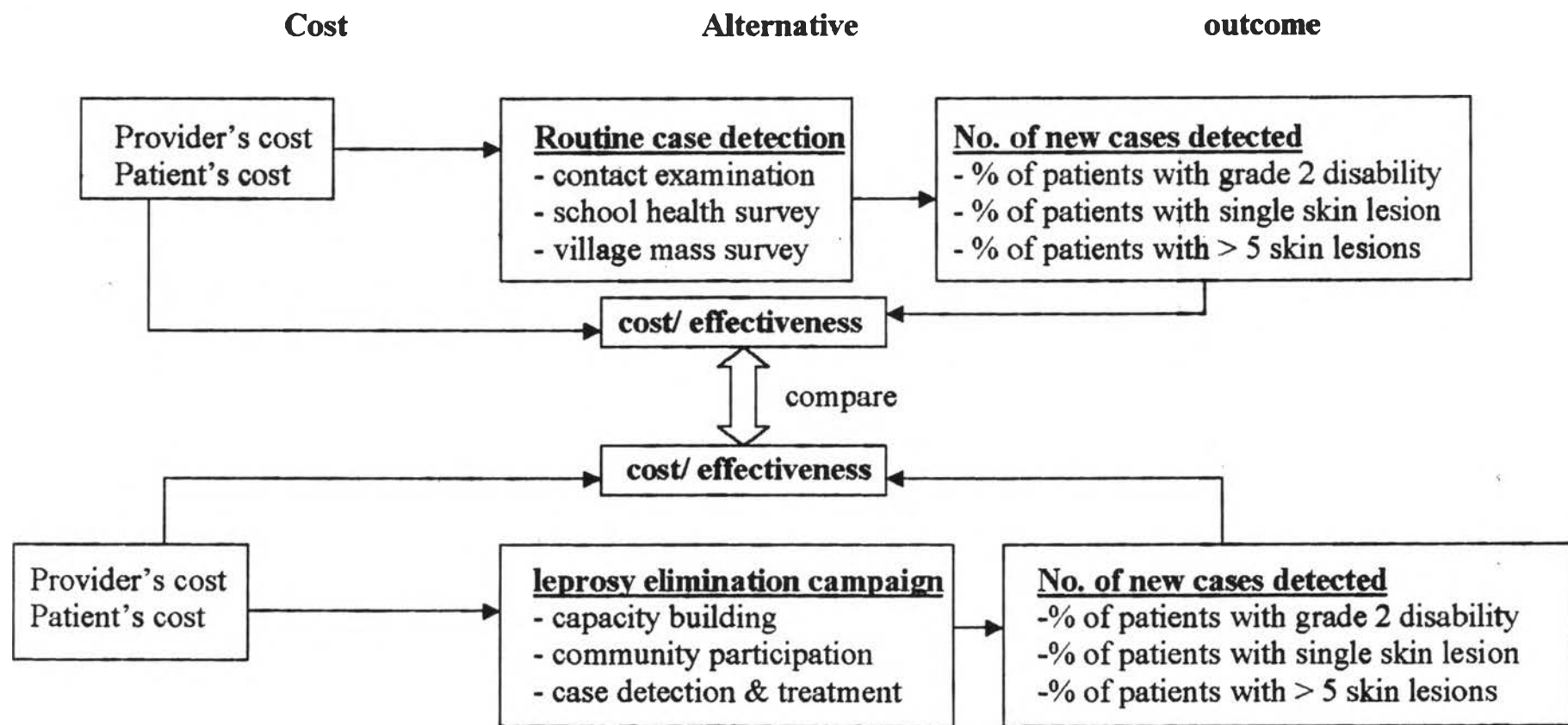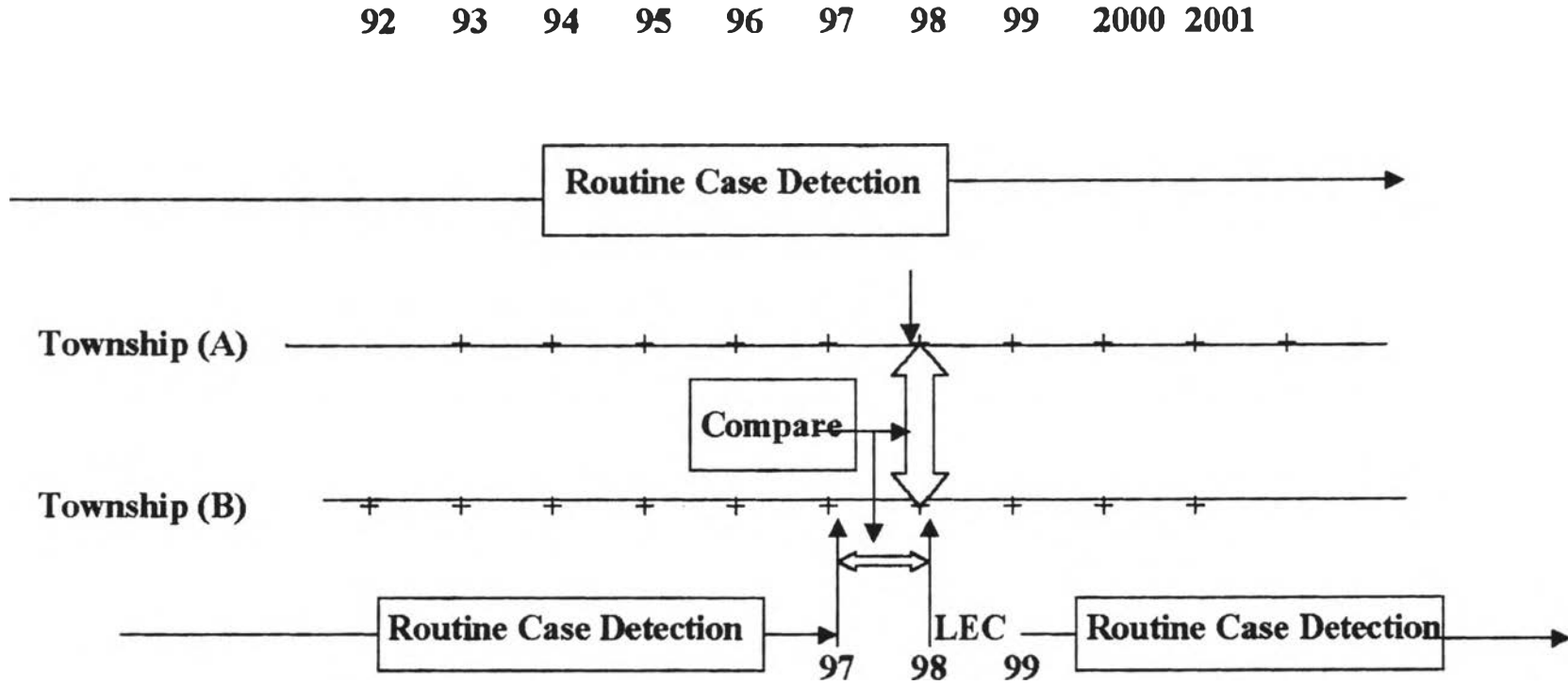

Cost   Alternative   outcome

| Provider's cost Patient's cost | **Routine case detection** - contact examination - school health survey - village mass survey | **No. of new cases detected** - % of patients with grade 2 disability - % of patients with single skin lesion - % of patients with > 5 skin lesions |

cost/ effectiveness

compare

cost/ effectiveness

| Provider's cost Patient's cost | **leprosy elimination campaign** - capacity building - community participation - case detection & treatment | **No. of new cases detected** -% of patients with grade 2 disability -% of patients with single skin lesion -% of patients with > 5 skin lesions |

Figure 3.2 Conceptual Framework of Cost-Effectiveness Analysis of (Routine Case Detection & LEC)

3.3. Study Area

There are 14 States and Divisions in Myanmar and they are divided into three groups according to the registered prevalence rate. In this study one township from routine case detection area and one township from LEC area will be selected from each endemic area. There are 271 townships in Routine case detection area and 55 townships in LEC area in 1998. To compare the cost- effectiveness of two new case detection strategies I will choose the two townships, those are the same geographical location, the same sociodemographical situation, and the same health infrastructure.

3.4 Study Population

Inclusion criteria: Newly detected leprosy patients who registered during Routine case detection and LEC activities in 1998.

**Exclusion criteria:** A patient who had past history of leprosy will not included in this study.

All the health personnel including basic health staff and leprosy control personnel in the selected area are acting as the study population from provider's perspective.

Sampling Technique

Although this is an analytical study, an empirical study will be carried out when feasible and this will call for sampling. Following sampling technique will do selection of patient and health personnel.

1. First stage stratified sampling of the whole country according to the level of endemicity

2. Second stage stratified sampling of hyper-endemic, moderate-endemic and low-endemic townships according to the case detection strategy: (routine case detection or leprosy elimination campaign

Figure 3.1 Diagram of Stratified Sampling Technique.
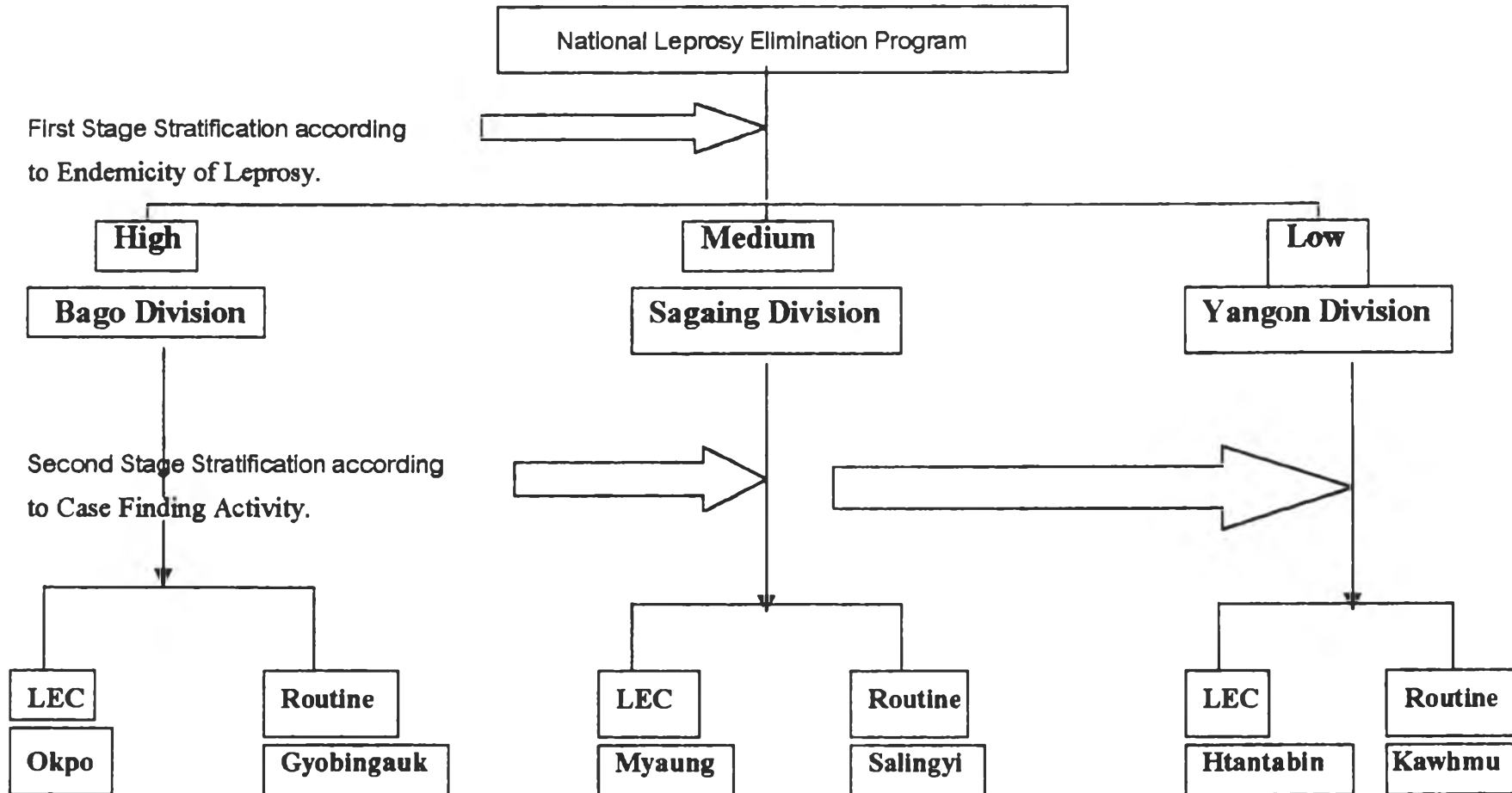
Operational Definitions.

Leprosy case: The WHO definition for a case of leprosy is the following.
- A person having one or more of the following features and who has yet to complete a full course of treatment.
- Hypopigmented or reddish skin lesion(s) with definite loss of sensation.
- Involvement of peripheral nerves, as demonstrated by definite thickening with loss of sensation.
- Skin smear positive for leprosy.

New case: It is a case of leprosy detected in a given time period, who has not been diagnosed and treated as having leprosy before.

Early case detection: Detecting a case of leprosy before disability sets in the hands, feet, eyes and face. This means zero disability at the time of detection.

Late case: A case with grade two disability or visible deformity and cause social stigma.

Paucibacillary leprosy : Patients with clinical manifestation of indeterminate leprosy, Tuberculoid leprosy (TT), Borderline Tuberculoid leprosy (BT) and patients have bacteriological index of 2 or greater at any sites.

Multibacillary leprosy: Patients with clinical manifestation of Mild borderline leprosy (BB), Borderline-lepromatous leprosy (BL), Lepromatous leprosy (LL) and patients have bacteriological index of 2 or greater at any sites.

Cost: Cost is defined as the value of resource used to produce something including specific health services.

Producer's cost: Cost incurred by the National Leprosy Elimination Programme for routine case detection and LECs.

Patient's costs: Cost incurred by the patient for seeking diagnosis of leprosy.

3.4 Detail costing for proposed LEC activities in one LEC team.
Initial Phase C_{IP}

In initial phase, National Program Manager, Team Leader and Leprosy Inspector discussed with local health personals about the objective of LEC, method of selecting for LEC area, work-plan for operation of LEC by phase. The costs of initial phase will be calculated with formula (I) to (ii).

1. Perdiem of National Program Manager and 2 persons in preliminary discussion of LEC and collection of data.

$$C_{IP1} = 3 \text{ Persons} * 3 \text{ Days} * 250 \text{ Kyats.} \text{ -------------- (I)}$$

2. Perdiem of RLO + 4 persons (1 TL+ 3 LI)in preliminary discussion of LEC and collection of data.

$$C_{IP2} = 5 \text{ Persons} * 3 \text{ Days} * 250 \text{ Kyats.} \text{ --------------(ii)}$$

$$\text{Where 5 persons} = 1RLO + 1 TL + 3 LI$$

$$C_{IP} = C_{IP1} + C_{IP2}.$$

Preparatory phase $C_P = C_{PDC} + C_{AM} + C_{HEM} + C_{SED}$

In preparatory phase, one activity is preliminary data collection. In this activity, Project Manager, Leprosy Inspector, Assistant Leprosy Inspector and Junior Leprosy Workers are trained how to collect the data. The costs for this activities are calculated with formula (iii) to (v).

Preliminary data collection. C_{PDC}

1. Perdiem of PM

$$C_{PDC1} = 1PM * 7 \text{ Days} * 250 \text{ Kyats.} \text{ -------------- (iii)}$$

2. Perdiem of LI and JLWs

$$C_{PDC2} = \text{No. of LI \& JLW} * 7 \text{ Days} * 250 \text{Kyats.} \text{------(iv)}$$

3. Perdiem of LCP staff for LEC orientation training.

$$C_{PDC3} = \text{No. of LI, ALI \& JLW} * 7 \text{ Days} * 250 \text{ Kyats ----(v)}$$

$$C_{PDC} = C_{PDC1} + C_{PDC2} + C_{PDC3}.$$

In preparatory phase, another activity is advocacy meeting. There are two levels in advocacy meeting, one is in District level, and another is in Township level. The main objectives are to send out messages about MDT, signs of Leprosy, and opportunities for diagnosis and treatment, encourage individuals with suspicious lesions to come forward for examination.

B. Advocacy meeting. C_{AM}

    1. District level (meeting expense)-

$$C_{am1} = 1 \text{ District} * 15,000 \text{ Kyats.} \text{------------------(vi)}$$

    2. Township level

$$C_{AM2} = 1 \text{ Township} * 10,000 \text{ Kyats.} \text{------------------(vii)}$$

$$C_{AM} = C_{AM1} + C_{AM2}.$$

Another activity is production of Posters, Slogans, Pamphlets, and Banners in consultation with National Consultant, National Program Manager, and Program Supervisor. These health education materials are distributed and costs are calculated according to the formula (vii) to (xv).

C. Health education material C_{HEM}

    1. Posters

$$C_{HEM1} = \text{No. of Villages} * 3 \text{ Sets} * 3 \text{ Posters} * 5 \text{ Kyats.} \text{-------(viii)}$$

    2. Pamphlets

$$C_{HEM2} = \text{No. of Villages} * 30 \text{ Sets} * 5 \text{ Kyats.} \text{----------------(ix)}$$

    3. Chase cards

$$C_{HEM3} = 1.5 * \text{No. of Villages} * 18 \text{ Kyats.} \text{----------------(x)}$$

    4. Patient charts

$$C_{HEM4} = 200 * 1 \text{ Township} * 10 \text{ Kyats.} \text{------------------(xi)}$$

    5. Slogan

$$C_{HEM5} = \text{No. of Villages} * 2 \text{ Sets} * 5 \text{ Slogens} * 5 \text{ Kyats.} \text{----(xii)}$$

6. Banners

$$C_{HEM6} = 1 \text{ Banner} * \text{No. of LEC teams} * 1000 \text{ Kyats.} \text{------(xiii)}$$

7. Audio-visual aids – video tapes

$$C_{HEM7V} = \text{No. of LEC teams} * 1000 \text{ Kyats.} \text{----------------(xiv)}$$

- cassette tape

$$C_{HEM7C} = \text{No. of LEC teams} * 200 \text{ Kyats.} \text{----------------(xv)}$$

$$C_{HEM} = C_{HEM1} + C_{HEM2} + C_{HEM3} + C_{HEM4} + C_{HEM5}$$
$$+ C_{HEM6} + C_{HEM7V} + C_{HEM7C}.$$

D. Stationary, equipment & drugs C_{SED}

1. Stationary

$$C_{SED1} = 1 \text{ Township} * 4{,}000 \text{ Kyats.} \text{--------------------(xvi)}$$

2. Torch lights

$$C_{SED2} = \text{No. of LEC teams} * 300 \text{ Kyats.} \text{------------------(xvii)}$$

3. Supplementary drugs

$$C_{SED3} = 1 \text{ Township} * 5{,}000 \text{ Kyats.} \text{----------------------(xviii)}$$

$$C_{SED} = C_{SED1} + C_{SED2} + C_{SED3}.$$

Implementation phase

In implementation phase, one activity is meetings and workshops to the local health personals and Health Volunteers, selected from the villages. The costs are calculated according to the formula (xix) to (xxv).

A. Meeting & workshops C_M

1. Meeting (briefing at head quarters)

$$C_{M1} = \text{No. of SH\textbackslash RHC} * 1{,}000 \text{ Kyats.} \text{------------------(xix)}$$

2. workshops for health staff

- Perdiem of trainers

$$C_{M2.1} = 3 \text{ Person} * \text{No. of SH\RHC} * 2 \text{ Days} * 250 \text{ Kyats.} \text{---(xx)}$$

- Perdiem of trainee

$$C_{M2.2} = 8 \text{ BHS} * \text{No. of SH\RHC} * 2 \text{ Days} * 250 \text{Kyats.} \text{----(xxi)}$$

3. workshop of volunteers

- Perdiem of trainers

$$C_{M3.1} = 3 \text{ Person} * \text{No. of SH\RHC} * 1 \text{ Day} * 250 \text{ Kyats.} \text{--(xxii)}$$

- Perdiem of trainees

$$C_{M3.2} = 1.5 \text{ Person} * \text{No. of Villages} * 250 \text{ Kyats.} \text{----(xxiii)}$$

- Travel cost for volunteers

$$C_{M3.3} = 1.5 \text{ Person} * \text{No. of Villages} * 250 \text{ Kyats.} \text{-----(xxiv)}$$

4. Information meeting at visiting villages

$$C_{M3.4} = \text{No. of Visiting Villages} * 500 \text{ Kyats.} \text{------(xxv)}$$

B. Perdiem of Teams C_{PT}

- Team Leader

$$C_{PT} = 3 \text{ Person} * \text{No. of Visiting Villages} * 250 \text{ Kyats} \text{---(xxvi)}$$

Where 3 person = 1 TL + 2 Members.

In implementation phase, one activity is supervision of LEC. The supervisors are Director (Disease Control), National Program Manager, and Division or State Health Director. The costs for supervisors perdiem and transportation costs are calculated according to the formula (xxvii) to (xxxv).

C. Perdiem of Supervisors C_{PS}

$$C_{PS1} = 4 \text{ Person} * 4 \text{ Days} * 250 \text{ Kyats.} \text{--------------- (xxvii)}$$

Where 4 person = Director + NPM + DHD\SHD + CO.

$$C_{PS2} = 1 \text{ RLO} * 7 \text{ Days} * 250 \text{ Kyats.} \text{----------------(xxviii)}$$

$$C_{PS3} = 1 \text{ TMO} * 7 \text{ Days} * 250 \text{ Kyats.} \text{--------------(xxix)}$$

$$C_{PS4} = 3 \text{ Person} * 3 \text{ Days} * 250 \text{ Kyats.} \text{-------------(xxx)}$$

Where 3 person = LEC committee members, exclude: TMO, LI, ALI, JLW.

$$C_{PS} = C_{PS1} + C_{PS2} + C_{PS3} + C_{PS4}.$$

D. Transportation for Supervisors C_{TS}

$$C_{TS1} = 5 \text{ Person} * 10 \text{ gallons} * 300 \text{ Kyats. } \text{------------(xxxi)}$$

Where 5 person = Director + NPM + DHD\SHD +TMO +CO.

$$C_{TS2} = RLO * 20 \text{ gallons} * 300 \text{ Kyats.}\text{----------------(xxxii)}$$

$$C_{TS3} = PM * 40 \text{ gallons} * 300 \text{ Kyats.}\text{------------------(xxxiii)}$$

- Transportation of IEC materials

$$C_{TS4} = 1 \text{ Township} * 1000 \text{ Kyats.}\text{-------------------(xxxiv)}$$

$$C_{TS} = C_{TS1} + C_{TS2} + C_{TS3} + C_{TS4}.$$

E. Mobilization of Teams from village to village C_{MVV}

$$C_{MVV} = \text{No. of Visiting Villages} * 100 \text{ Kyats.}\text{----------(xxxv)}$$

F. Compilation of report C_{CR}

$$C_{CR} = 3 \text{ Person} * 3 \text{ days} * 250 \text{ Kyats.}$$

G. Miscellaneous C_{MIS}

$$C_{MIS} = 1 \text{ Township} * 5,000 \text{ Kyats.}\text{------------------(xxxvi)}$$

Total budget required for LEC Team

$$TC_{PROVIDER} = C_{IP} + C_{PDC} + C_{AM} + C_{HEM} + C_{SED} + C_M + C_{PERT} + C_{TS} + C_{MVV} + C_{CR} + C_{MR}$$

3.5 Patient's cost for seeking diagnosis and treatment of leprosy.

Total cost of patient $TC_{PATIENT}$

1.	Patient travelling cost	=	C_{PTT}
2.	cost for registration	=	C_R
3.	cost for absence from his work	=	C_W
4.	cost for another person accompanying	=	C_{AP}
5.	cost for absence from accompanied P. work	=	C_{APW}

$$TC_{PT} = C_{PTT} + C_R + C_W + C_{AP} + C_{APW}$$

3.6 Detail provider's cost for routine case detection activity.

(1) Capital cost

- building's cost

- vehicle's cost

- equipment's cost

- long-term training's cost

2) Recurrent cost

- staff's salary

- material and supply's cost

- maintenance cost

- drugs cost

- short-term training's cost

- social mobilization's cost

To calculate the total personnel cost for each method of case finding activity, by multiplying the total annual income of individual health personnel by the proportion of time spent by each method of case finding activities.

Total personnel costs for doing ACD.

$$TC_{P.ACD} = \Sigma^n_{I=1} \left[\Sigma^q_{p=1} * S_{IP} \right] \text{------------------------------ (1)}$$

Where S = Total annual income of health personnel.

I = Health personnel; I=1 ....n

P= proportion of time spent on doing ACD. P= 1...........................q.

Total personnel costs for doing PCD.

$$TC_{P.PCD} = \Sigma^n_{I=1} \left[\Sigma^v_{u=1} * S_{iu} \right] \text{-------------------------- (2)}$$

Where S = Total annual income of health personnel

I = Health personnel ; I =1...........................,n

U =proportion of time spent for doing PCD ; u =1..........................,v.

(2) Calculation for Total Material Costs (TC$_M$).

Material costs can be calculated by multiplying unit cost for each material into number of material used for each method of case finding activity within one year. Calculation for this cost item is shown in Table 3. .

Total Material Costs for doing ACD.

$$TC_{M.ACD} = \Sigma^n_{i=1} \left[M * N_A \right] \text{------------------------- (3)}$$

Where M = Unit cost for material

N_A = No. of material used for doing ACD.

I = Items of materials; I = 1........................., n

Total Material Costs for doing PCD.

$TC_{M.PCD} = \Sigma^n_{I=1} [M * N_P]$ ————————————(4)

Where M = Unit cost for material

N_p = No. of material used for doing PCD.

I = Items of Material ; I= 1........................., n.

4. Calculation for Short-term Training. (TC_{STT})

The costs for short-term Training can be calculated by summation of following items.

> (1) Perdiem * No. of days for training.
>
> (2) Costs for training materials
>
> (3) Traveling Allowance for participents.

The equation for calculation of short term training is as follows:

$TC_{STT} = \Sigma^n_{I-1} [C_p + C_{TM} + C_{TA}]$ ———————— (5)

Where C_P = Costs for perdiem

C_{TM} = Costs for training materials

C_{TA} = Costs for traveling Allowance

I =No. of short-term Training within one year ; I= 1................., n

5. Calculation of costs for Social Mobilization (TC_{SM}).

It is calculated by summation of operation costs for social mobilization activities within one year. In this term, operation costs for social mobilization contained costs for transporting educational materials (pamphlets and posters) cost for providing health education by leprosy elimination programme.

$TC_{SM} = \Sigma^n_{I-1} [C_{SM}]$ ———————— (6)

Where C_{SM} = Costs for Social Mobilization

I =No. of health centers in selected Township ; I = 1 ...., n.

6. Total Provider's costs for Routine Case Detection activity.

$$TC_{pr.RCD} = TC_{P.ACD} + TC_{P.PCD} + TC_M + TC_{STT} + TC_{SM} \text{------------}(7)$$

Where $TC_{pr.RCD}$ = Total provider's cost for doing Routine Case Detection

$TC_{P.ACD}$ = Total personnel costs for doing ACD

$TC_{P.PCD}$ = Total personnel costs for doing PCD

TC_M = Total costs for material

TC_{STT} = Total costs for short-term Training

TC_{SM} = Total costs for social mobilization

Total cost for patient's perspective

The costs for patient's perspective are as follow. In this study direct cost means cost incurred by patient for diagnosis of leprosy and indirect cost means cost incurred by relatives accompanying the patient for diagnosis of leprosy.

Direct cost

(a) Estimation of travelling cost of patients.

In this study, traveling cost of patient will be estimated. But in empirical study, this data will be a primary data. This cost item is considered only in PCD because the patient does not need to go to health center in ACD.

$$TC_{tr.pt} = \sum_{I=1}^{n} (C_{tr.pt}) \text{------------------}(8)$$

Where $TC_{tr.pt}$ = Total traveling cost for patient

$C_{tr.pt}$ = traveling cost for patient

I = number of patients ; I =1.................... n

(b) Time cost for patient (absence from work)

This cost item will be estimated from average wage of the patients. But empirical study, this cost item will be collected as primary data.

$$TC_{ti.pt} = \Sigma^n_{I=1} (C_{ti.pt}) \text{---------------------}(9)$$

Where $TC_{ti.pt}$ = Total time cost for patient

$C_{ti.pt}$ = Time cost for patient

i= number of patient ; i=1 ....n

Indirect costs.

(a) Estimation of Traveling cost of relatives.

In this study we assume that only one relative accompanied for each patient and this cost is same with each patient. But in the empirical study this cost item will also be primary data.

$$TC_{tr.re} = \Sigma^n_{I=1} (C_{tr.re}) \text{-----------------} (10)$$

Where $TC_{tr.re}$ = Total traveling cost for relative

$C_{tr.re}$ = traveling cost for relative

I=number of patient ; I =1...................... N

(b) Time cost for relative, accompanying patient (absence from work)

In this study we assume that only one patient accompanied each patient and the cost is same with each patient. But in the empirical study, this cost item will also be primary data.

$$TC_{ti.re} = \Sigma^n_{I=n} \left(C_{ti.re} \right) \text{----------------------} (11)$$

$TC_{ti.re}$ = Total Time cost for relative

$C_{ti.re}$ = Time cost for relative

I= number of patient : I = 1 .... n

Total patient's cost for Routine Case Detection.

$$TC_{PT.RCD} = TC_{ti.pt.ACD} + TC_{ti.pt\,PCD} + TC_{tr.pt} + TC_{ti.re} + TC_{tr.re} \text{---------------} (12)$$

Where $TC_{PT.RCD}$ = Total patient's cost for Routine Case Detection

$TC_{ti.pt.ACD}$ = Total patient's time cost for doing ACD

$TC_{ti.pt.PCD}$ = Total patient's time cost for doing PCD

$TC_{tr.pt}$ = Total patient's traveling cost

$TC_{tr.re}$ = Total relative's traveling cost

$TC_{ti.re}$ = Total relative's time cost

The formula for total patient's cost for doing LEC is the same with equation No. 12.

3.7 Cost-Effectiveness Analysis.

In this study cost-effectiveness analysis is calculated by dividing the total cost of each case finding activities with total number of newly detected cases from each case finding activities.