

CHAPTER IV

DATA ANALYSIS

The results of this study will be presented in three parts : 1. Statistical technique to test the impact of the programme 2. Analyzing the costs to provider of programme establishment and operation and its impacts 3. Sensitivity analysis to analyze the impact of input factors on the outcome of programme.

4.1 Statistical Technique to Test the Impact of the Programme

Using the statistical technique to test the impacts of the programme means to test the differences of the DMFT index between two groups of school children , one implementing the programme and the other not implementing the programme. t - test was used for testing but the way for testing depends on the difference or equality of variances, F distribution - test was done to test the variances.

This study based on the secondary data. Because of the lack of available data, the sample size is a little smaller than the designed sample size and it is presented in Table 4 1

Table 4.1: Population of Two Groups of School Children, One Implementing the Programme and the other not Implementing the Programme.

		1991	1992	1993	1994
Group 1	Urban area	548	545	543	541
	Rural area	407	406	406	404
	Both U & R	955	951	949	945
Group 2	Urban area	552	550	547	543
	Rural area	405	404	404	403
	Both U & R	957	954	951	946

4.1.1 Statistical Technique to Test the Difference of Variance of the Two Groups of School Children

Before conducting the programme, all students involved in this study were examined and variance of DMFT index was tested. The results show that the variances of DMFT index of the two groups of school children were the same. Based on data collected at these schools, F statistic for testing of variances from 1991 to 1994 will be presented as follows

Null hypothesis $H_0 : \sigma_1^2 = \sigma_2^2$

Positive hypothesis $H_a : \sigma_1^2 \neq \sigma_2^2$

a) Statistical Technique to Test the Difference of Variance of the Two Groups of School Children in the Urban Area

The data required for testing variances of two groups of school children since 1991 - 1994 are presented in the Table 4.2

Table 4.2: The Data Required for Testing Variances of Two Group of School Children: One Group Implementing the Programme and the Other not Implementing the Programme in Urban Area.

		1991	1992	1993	1994
GROUP 1	\bar{X}_1	3.1	3.2	3.36	3.55
	S_1^2	5.37	3.45	2.67	1.92
	n_1	548	545	543	541
GROUP 2	\bar{X}_2	3.50	4.32	4.6	5.5
	S_2^2	6.75	10.1	15.5	18.73
	n_2	552	550	547	543

Comparing the F ratio calculated from the data required with the F ratio percentage point located in the F table, with $\alpha = 0.05$, $v_1 = n_1 - 1$, $v_2 = n_2 - 1$, the table showed that $F_{0.025, \infty, \infty} = 1.01$. If the F ratio is less than 1.00, H_0 will be accepted, that means two groups have the same variances. If F ratio is excess 4.03, H_0 will be rejected in favor of H_a , the two groups have different variances.

The results of the F test are expressed in the Table 4.3 showed that: the variances of number of decayed missing and filled teeth of the two groups of school children in the DongDa school during 1990-1994 were different.

Table 4.3: The Result of F Distribution Test

	1991	1992	1993	1994
F ratio	1.26 Reject Ho	2.92 Reject Ho	6.9 Reject Ho	9.76 Reject Ho

b) Statistical Technique to Test the Difference of Variance of the Two Groups of School Children in the Rural Area

The data required for testing variances of two groups of school children since 1991 - 1994 are presented in the Table 4.4

Table 4.4: The Data Required For Testing Variances of Two Groups of School Children in Rural Area

		1991	1992	1993	1994
GROUP 1	\bar{X}_1	0.82	0.80	0.78	0.75
	S_1^2	0.69	0.68	0.63	0.58
	n_1	407	406	406	404
GROUP 2	\bar{X}_2	1	1.40	1.70	2.20
	S_2^2	0.97	1.35	1.48	1.93
	n_2	405	404	404	403

Comparing the F ratio calculated from the data required with the F ratio percentage point located in the F table, with $\alpha = 0.05$, $v_1 = n_1 - 1$, $v_2 = n_2 - 1$, the table showed that $F_{0.025, \infty, \infty} = 1.00$. If the F ratio is less than 1.00, H_0 will be accepted, that means two groups have the same variances. If F ratio is excess 1.00, H_0 will be rejected in favor of H_a , the two groups have different variances.

The results of the F test in Table 4.5 showed that: the variances of number of decayed missing and filled teeth were different significantly.

Table 4.5: The Result of F Distribution Test

	1991	1992	1993	1994
F ratio	1.41	1.98	2.35	3.32
Result	Reject Ho	Reject Ho	Reject Ho	Reject Ho

c) Statistical Technique to Test the Difference of Variance of the Two Groups of School Children in the Urban and Rural Areas

The data required for testing variances of two groups of school children in the to areas since 1991 - 1994 are presented in the Table 4.6

Table 4.6: The Data Required for Testing Variances of Two Groups of School Children in Both Urban and Rural Areas.

		1991	1992	1993	1994
GROUP 1	\bar{X}_1	2.13	2.18	2.26	2.35
	S_1^2	4.70	3.64	2.76	1.97
	n_1	955	951	949	945
GROUP 2	\bar{X}_2	2.44	3.08	3.38	4.09
	S_2^2	5.38	9.56	14.2	16.63
	n_2	957	954	951	946

Comparing the F ratio calculated from the data required with the F ratio percentage point located in the F table, with $\alpha = 0.05$, $v_1 = n_1 - 1$, $v_2 = n_2 - 1$, the table showed that $F_{0.025, \infty, \infty} = 1.00$. If the F ratio is less than 1.00, Ho will be accepted, that means two groups have the same variances. If F ratio is excess 1.00, Ho will be rejected in favor of Ha, the two groups have different variances.

The results of the F test are expressed in the Table 4.7 showed that The variance of number of decayed missing and filled teeth of the two groups of school children were different.

Table 4.7: The Result of F Distribution Test

	1991	1992	1993	1994
F ratio	1.24 Reject Ho	2.35 Reject Ho	5.14 Reject Ho	8.44 Reject Ho

4.1.2 Statistical Technique to Test the Difference of DMFT Index of the Two Groups of School Children

The t-test used for testing the difference of DMFT index of two groups of school children during 1990-1994.

a) Statistical Technique to Test the Difference of DMFT Index of the Two Groups of School Children in the Urban Area

With $\sigma_1^2 \neq \sigma_2^2$

Null hypothesis : $H_0 \mu^1 \geq \mu^2$

Positive hypothesis: $H_a \mu^1 < \mu^2$

The data required for testing the difference of DMFT index between two groups of school children in the DongDa school during 1990-1994 are presented in the Table 4.8.

Table 4.8: The Data Required for Testing the Difference of the DMFT Index of Two Groups of School Children in the DongDa School During period 1990-1994.

		1990-1991	1991-1992	1992-1993	1993-1994
Group 1	\bar{X}_1	3.1	3.2	3.36	3.55
	n_1	5.37	3.45	2.67	1.92
	S_1^1	548	545	543	541
Group 2	\bar{X}_2	3.50	4.32	4.6	5.5
	n_2	6.75	10.1	15.5	18.73
	S_2^2	552	550	547	543

Comparing the t value calculated from the data required with the t value located in the t table, with $\alpha = 0.05$, t value has v degrees of freedom, $t_a = -1.645$. If the calculated t is less than -1.643, H_0 was rejected meaning the DMFT index of the two groups of school children are significantly different. If the calculated t was greater than -1.643, H_0 was accepted meaning DMFT indexes of two groups of school children are not significantly different.

The results of these tests presented in Table 4.9 show that the differences of DMFT index between two groups of school children in the urban area during 1990-1994 are significant.

Table 4.9: The Result of t-test of the Difference of DMFT Index Between Two Groups of School Children in the Urban Area

	1990-1991	1991-1992	1992-1993	1993-1994
$\bar{X}_1 - \bar{X}_2$	-0.40	-1.12	-1.24	-1.95
$S_{\bar{X}_1 - \bar{X}_2}$	0.148	0.281	0.182	0.195
t	-2.7	-3.99	-6.81	-10.00
Result	Reject H_0	Reject H_0	Reject H_0	Reject H_0

b) Statistical Technique to Test the Difference of DMFT Index of the Two Groups of School Children in Rural Area

With $\sigma_1^2 \neq \sigma_2^2$

Null hypothesis $H_0 : \mu^1 \geq \mu^2$

Positive hypothesis : $\mu^1 < \mu^2$

Where: μ^1 is the mean of DMFT per person of group with intervention

μ^2 is the mean of DMFT per person of group without intervention

The data required for testing the difference between the DMFT of two groups school children in 1991 are presented in Table 4.10.

Table 4.10: The Data Required for Testing the Difference of DMFT Index Between Two Groups of School Children in Rural Area During 1990-1994

		1990-1991	1991-1992	1992-1993	1993-1994
Group I	\bar{X}_1	0.82	0.80	0.78	0.75
	n_1	407	406	406	404
	S_1^2	0.69	0.68	0.63	0.58
Group II	\bar{X}_2	1.00	1.40	1.70	2.20
	n_2	405	404	404	403
	S_2^2	0.97	1.35	1.48	1.93

Comparing the t value calculated from the data required with the t value located in the t table, with $\alpha = 0.05$, t value has $n_1 + n_2 - 2$ degrees of freedom. The table shows that $t_{0.05} = -1.645$. If the result is less than -1.645 , H_0 was rejected, that means DMFT index of the group of school children implementing the programme is less than the DMFT index of the group of school children not implementing the programme significantly. If the result greater than -1.645 , H_0 was accepted meaning DMFT index of two groups of school children are not significantly different.

The result of the t-test in Table 4.11 shows that the DMFT indices of the two groups of school children in the rural area are significantly different.

Table 4.11: The Result of the Testing of Difference DMFT Index Between Two Groups of School Children in the Rural Area during 1990-1994

	1990-1991	1991-1992	1992-1993	1993-1994
$\bar{X}_1 - \bar{X}_2$	-0.18	-0.60	-0.92	-1.45
$S_{\bar{X}_1 - \bar{X}_2}$	0.06	0.07	0.072	0.069
t	-3.00	-8.57	12.77	21.01
Result	Reject H_0	Reject H_0	Reject H_0	Reject H_0

c) **Statistical Technique to Test the Difference of DMFT Index of the Two Groups of School Children in Both Urban and Rural Area**

With $\sigma_1^2 \neq \sigma_2^2$

Null hypothesis : $H_0 \mu^1 \geq \mu^2$

Positive hypothesis: $H_a \mu^1 < \mu^2$

The data required for testing the difference of DMFT index between two groups of school children in both urban and rural areas are presented in Table 4.12.

Table 4.12: The Data Required for Testing the Difference of the DMFT Index of Two Groups of School Children During Period 1990-1994.

		1990-1991	1991-1992	1992-1993	1993-1994
Group 1	\bar{X}_1	2.13	2.18	2.26	2.35
	n_1	955	951	949	945
	S_1^2	4.70	3.64	2.76	1.97
Group 2	\bar{X}_2	2.44	3.08	3.38	4.09
	n_2	957	954	951	946
	S_2^2	5.38	9.56	14.20	16.63

Comparing the t value calculated from the data required with the t value located in the t table, with $\alpha = 0.05$, t value has v degrees of freedom, $t_\alpha = -1.645$. If the calculated t is less than -1.643, H_0 was rejected meaning the DMFT index of the two groups of school children are significantly different. If the calculated t was greater than -1.643, H_0 was accepted meaning DMFT indexes of two groups of school children are insignificantly different.

The results of these tests presented in Table 4.13 show that the differences of DMFT index between two groups of school children in the urban area during 1990-1994 are significant.

Table 4.13: The Result of t-test of the Difference of DMFT Index Between Two Groups of School Children in Both Schools.

	1990-1991	1991-1992	1992-1993	1993-1994
$X_1 - X_2$	-0.31	-0.9	-1.12	-1.74
$S_{x_1-x_2}$	0.105	0.113	0.133	0.140
t	-2.952	-7.96	-8.42	-12.43
Result	Reject Ho	Rejct Ho	Reject Ho	Reject Ho

4.2 Analyzing the Costs to Provider of the School-based Oral Health Programme Establishment and Operation

Costs of the School-based Oral Health Programme establishment and operation of the urban, rural areas and both urban and rural areas are analyzed.

To analyze the costs to provider of programme establishment and operation includes many steps:

4.2.1 General Consideration When Costing the Input Costs

1. Level of dental status : the size of children at school with programme, the size of children in the study group, the annual dental caries incidence of this group.

2. Level of cost: The costs for establishing and operating this programme are not only the costs for performing the school based oral health programme at the school but also the costs for administration and supervision.

3. Activities of introducing a school-based oral health programme in order to consider the costs composed of costs for establishing (equipment costs, trained person cost.) and costs for running this programme (personnel cost, maintenance cost, consumable cost, supervision cost).

4. Type of cost: To analyze the structure of costs, the costs will be classified into some types such as capital costs and recurrent costs.

5. Present value of running costs: Capital cost is invested once at the beginning of application of programme but running cost must be allocated every year, the present value of cost will be concerned. It depends on annual interest rate and present cost.

6. Components of costs: Cost system can be also classified into activities including: Training costs (training the teachers who give dental health education and help the children in mouth rinsing), Equipment costs (costs of equipment for establishing and running the programme).

7. Allocating shared costs across activities: In order to calculate the cost of each activity at the school, it will be necessary to share the cost of different resource between the activities for which they are used. The cost allocation based on dimension determining the cost of input: for staff it will be concerned with the amount of time spent on each activity. For supply the volume of different items which is used for each activity is considered

4.2.2 Costing of Input Activity

All the costs for establishing and running the school-based oral health programme in this study were calculated in Vietnamese Dong. Capital costs were calculated for each year following annual cost formula. Recurrent costs were calculated by two schemes: one based on current price and the other based on a constant price in a given year. By using current price, it expressed the current value of running the programme. Using constant price (1990 price) for the calculation, the results show the change of running costs of the Programme. In this calculation, following assumptions are made:

- The price of all consumables are unchanged
- Inflation rates are excluded
- Salaries of dental nurses are remained
- Only the quality of consumables and some other items are changed

Cost systems are illustrated in Table 4.14

Table 4.14: Cost System for Establishing and Running the Programme

Establishing the service point for running the programme	Running the programme
Training teachers	Annual re-training teachers
Equipment for implementing programme	Annual supplying of consumable
Administration for establishing the programme	Salary of dental nurse
	Supervision
	Annual repairance and maintenance equipment

Information required for costing

1. Costing training of teachers include:

- Number of teachers to be trained
- Number of required training days for each teacher
- Perdiem per teacher
- Travel cost per teacher
- Number of times for training
- Perdiem for 1 training hour
- Administration cost (renting the conference room, printing, material, logistic.)

2. Costing of equipment

- Required types of equipment
- Required number of each type of equipment
- The time that was used of each type of equipment for this programme
- The useful life of each type of equipment
- The price of each type of equipment at every year during 1990-1994 period
- The price of each type of equipment at a given year
- The interest rate
- The annualization factor

3. Costing of salary

- Number of dental nurse
- Monthly salary of dental nurse at every year during 1990-1994 period
- Monthly salary of dental nurse at a given year
- Time spent for dental service at this school
- The proportion of time spend for group of school children for this study

4. Costing of annual consumable

- Types of drug to be used
- Amount of each type of drug to be used amount of burr
- Amount of fluoride agents
- The price of each unit of fluoride agent at every year and a given year
- The price of each unit of drug at every year and a given year
- The price of small dental equipment at every year and a given year
- Amount of chart for examination

- The cost of charts for examination
- Amount of other consumables for dental services such as cotton, bandage, alcohol
- Cost for these items

5. Costing of annual supervision

- Supervision time
- Supervision days per time
- Perdiem of supervisor
- Transport cost per time per supervision

6 Costing of equipment maintenance

- Annual maintenance equipment cost

7 Costing of annual retraining of teacher

- Annual retraining cost of the teacher

Assumption for costing

The number of teachers in the study are unchanged.

The students withdraw from the study are very few and so do not have an effect on the cost.

Calculation of costs

1 Costing of training teacher (TCO)

$$TCO = CTT + ADC$$

$$CTT = CTS + CTR$$

$$CTS = NTS * TD * PDJ + NTS * TPJ$$

$$CTR = NTR * TDP$$

$$ADC = ADM * CTT$$

$$ADM = 5\% \text{ of } CTT$$

$$\text{TCO} = \text{NTS} * \text{TD} * \text{PDJ} + \text{NTS} * \text{TPJ} \\ + \text{NTR} * \text{TDP} + \text{ADM} * \text{CTT}$$

Where:

ADC is administration costs

CTS is the costs for teachers

CTR is the costs for trainers

CTT is the costs for teachers and trainers

NTS is the number of teachers to be trained

NTR is the number of time for training

NTU is the number of teachers in the 1st group

NTE is the number of teachers in the 2nd group

PDJ is per diem junior for teacher

PDP is per diem for 1 training hour

TD is training days per teacher

TCO is the costs for training the teachers

Costs of training teacher was served for establishing and operating the school-based oral health programme, the knowledge of dental health education that these teachers received lasts for 10 years or more. So these costs were considered as capital costs and were calculated for every year.

2. Costing of equipment for group of school children implementing the programme in this study

Costing of equipment was calculated as an annual cost using the following formula:

$$\text{Annual cost} = \frac{\text{Current value of the item}}{\text{Annualization factor}}$$

Where: Current value is the amount of money to be paid to buy each equipment such as educational mouth rinsing equipment, dental equipment.

Useful life of each equipment: From the criteria of Hanoi Institute of Odontology- Maxillo Facial Surgery

Discount rate: Equal the difference between the interest rate and inflation rate

Annualization factors: Consult a standard table to find the correct annualization factor.

Because the equipment were used not only for group of school children in this study but also for other group of school children so the costs of these equipment will be shared to other activities. The costs of these equipment will be calculated for every year

Equipment of the programme establishment and operation are the same for both DongDa and NghiaHung schools.

$$ECO = EEC + MRC + DEC + OEC$$

$$EEC = (DMC + TBC + BC + PC) * POT$$

$$MRC = GC + CC$$

$$DEC = (DCC + DMC + EC + TC) * POT$$

$$OEC = (IBC + ESC + CSC + OIC) * POT$$

Where:

BC is the cost of booklet

CC is the cost of callus

CSC is the costs of cotton sterilization box

DCC is the cost of dental chair

DEC is the costs of dental equipment

DDC is the costs of dental model

DMC is the cost of dental machine

EC is the costs of equipment for examination

ECO is the costs of equipment

EEC is the costs of educational tools

ESC is the costs of electric stove

GC is the cost of glasses

IBC is the costs of instrument boiler

MRC is the cost of mouth rinsing equipment

OEC is the costs of other equipment

OIC is the costs of other items

PC is the cost of poster

POT is the proportion of time using the equipment

TBC is the costs of tooth brush

TC is the costs of equipment for treatment

3. Costing of the consumables (COC)

As mentioned above, costing of consumables was based on two schemes: one based on current price and the other based on a constant price. A constant price that was used in this study is the price in the year 1990. This price will be applied for cost calculation in the years during the Programme.

The costs of all consumable items depend on their price, amount of each item and the new incidences.

Total cost of consumables are the sum of total cost of each item.

The costs of consumables were calculated as in Table 4.15.

Table 4.15: The Way for Calculating the Costs of Consumable

Items	No unit	Price of 1 unit	Total cost
1. Flouride	-----	-----	-----
2. Drug	-----	-----	-----
3. Material	-----	-----	-----
4. Drill	-----	-----	-----
5. OC	-----	-----	-----
6. Chart	-----	-----	-----

4. Costing of administration for establishing the programme

From the data collection, it was found that the administration cost for establishing and operating the Programme is 5% of equipment cost and training cost.

$$ADC = .05 (MC + TC)$$

Where: ADC is the cost of administration for establishing the programme

MC is the material costs

TC is the training costs

5. Costing of salary for dental nurse

$$CSN = MSN * 10.5 \text{ months} * POT * POS$$

Where:

CSN is cost of salary for dental nurse

MSN is the monthly salary of dental nurse

1 year dental nurse serve at school 10.5 months

POS is the proportion of time that dental nurse spends for dental services at this school: One week a dental nurse works at school only 4days, two other days she works at the Institute

POT is the proportion of time that dental nurse spend for serving this study group

6 Costing of annual retraining of teachers

$$RTCO = CTT + ADC$$

$$CTT = CTS + CTR$$

$$CTS = NTS * TD * PDJ + NTS * TPJ$$

$$CTR = NTR * TDP$$

$$ADC = ADM * CTT$$

$$ADM = 5\% \text{ of } CTT$$

$$RTCO = NTS * TD * PDJ + NTS * TPJ + NTR * TDP + ADM * CTT$$

Where:

ADC is administration costs

CTS is the costs for teachers

CTT is the costs for teachers and trainers

CTR is the costs for trainers

NTS is the number of teachers to be trained

NTR is the number of time for training

PDJ is per diem junior for teacher

PDP is per diem for 1 training hour

RTCO is the costs for retraining the teachers

TD is training days per teacher

TPJ is travel cost per teacher

Every year, these teachers are retrained to accumulate their knowledge. The costs for retraining these teachers were shared for the following years

7. Costing of equipment maintenance

$$ACM = ECO * 10\%$$

Where: ACM is annual equipment maintenance cost

ACM equal 10% of ECO

8. Costing of annual supervision

$$CAS = (SPC + STC) * SD$$

Where: CAS is the cost of annual supervision

SPC is per diem for supervisor

STC is travel cost for supervisor

SD is the number of day for supervise

Capital costs

Capital cost for establishing the programme are the same for four years and it was calculated for every year

$$CP = AEC + ACD + AOC + ATC$$

Where: AEC is annual education costs

ACD is annual dental equipment costs

AOE is annual other costs

ATC is annual training costs

Recurrent costs:

Recurrent costs were calculated for every year

$$RC = COC + CAR + ACM + CAS$$

Total cost

$$\begin{aligned} TC &= CP + RC \\ &= AEC + ACD + AOC + ATC + COC + CAR + ACM + CAS \end{aligned}$$

Average cost

$$AC = \frac{TC}{PP}$$

Marginal cost

$$MC = \frac{\Delta TC}{\Delta DMFT}$$

Input data for the calculation of the cost of programme establishment and operation:

1. The data of the population of group of school children implementing programme in this are presented in the Table 4.16:

Table 4.16: The Population of Two Groups of School Children in Two Areas

	Age	1991	1992	1993	1994
Group 1	6	295	293	293	292
	7	257	257	256	254
	8	201	201	201	200
	9	202	200	199	199
	Total	955	951	949	945
Group 2	6	298	297	297	297
	7	255	254	254	252
	8	202	201	201	199
	9	202	202	199	198
	Total	957	954	951	946

Students aged from 6-9 years were selected in this study to avoid their withdrawing. Each classroom that was selected had 45 to 55 students and had one teacher. These teachers have followed their students. All new students were excluded in this study.

2. Number of teachers of the group of school children implementing the school based oral health programme in this study

NTS = 20 teachers

NTU = 12 teachers

NTR = 8 teachers

Where NTU is the number of teachers of the groups of school children implementing the programme in the DongDa school

NTR is the number of teachers of the groups of school children implementing the programme in the NghiaHung school

3. Number of teachers that were trained in one course

TNT = 30 teachers

4. Amount of time for training

NTR = 102 hours

5. Perdiem for 1 training hour

TDP = 5,000 Dong

6. Perdiem for junior teacher

PDJ = 15,000 Dong

7. Required training days

TD = 10 days

8. Administration cost rate of training for teacher

ADM = 5%

9. Equipment costs (Capital cost)

Costs of all equipment were calculated at the price in 1990. This equipment was used not only for group of school children in this study but also for other school children in the school.

The proportion of time for using this equipment for this group of school children is 34.5% of all time using the equipment.

9. 1. Educational tools

EEC = 20,000 Dong
 NET = 2 in which each school has one
 Useful life 5 years

9. 2. Mouth rinsing equipment

Price of 1 glass = 1000 Dong
 Number of glasses = 955
 Price of 1 callus = 5000 Dong
 Number of callus = 2 each school has one callus
 Useful life 5 years
 Number of glasses at the DongDa school = 548
 Number of glasses at the NghiaHung school = 407

9. 3. Dental equipment

a) Dental chair

Price of dental chair = 600,000 Dong in the year 1990
 Useful life: 10 years
 Number of dental chairs: 2 each school uses one chair

b) Dental machine

Price = 700,000 Dong
 Useful life 5 years
 Number of dental machines: 2 each school uses one machine

c) Equipment for examination

There are some types of equipment for examination. Total costs of this equipment are presented in Table 4.17 and each school used half of total following equipment. Their useful life of this equipment is 5 years.

Table 4.17: Costs of Equipment for Examination.

Item	No. of unit	Price of unit	Total cost
Examination tray	20	2,000	20,000
Dental mirror	20	5,000	100,000
Handle mirror and mirror	40	2,000	80,000
Dent. broach	20	2,000	40,000
Dental probe	20	4,200	84,000
Sub Total			324,000

d) Equipment for treatment

Like equipment for examination, there are many types equipment for treatment. The costs of this equipment are presented in Table 4.18 and each school used half of total following equipment

Useful life of this equipment is 5 years

Table 4.18: Cost of Equipment for Treatment

Item	No. of unit	Price of 1 unit	Total cost
AOT	2	31,400	62,000
AOD	2	102,000	204,000
Elevator	6	10,000	60,000
Syringe	2	3,500	7,000
Prince	8	2,000	16,000
Scissors	2	7,300	14,000
Sub Total			363,000

AOT is armamentarium of treatment tools

AOD is armamentarium of davie

9. 4. Cost of other equipment to serve for dental service

Besides dental equipment, there is some other equipment serving for dental service. Their costs are presented in Table 4.19.

Useful life of this equipment is 5 years

Table 4.19 Cost of Equipment to Serve for Dental Services

Item	No. of unit	Price of 1 unit	Total cost
CBS	2	26,000	52,000
CST	6	30,000	180,000
ST	6	3,000	18,000
IB	2	12,000	24,000
Spitton	2	5,300	10,000
Sub total			284,000

Where:

CSB is cotton sterilization box

CST is sterilizing tray

ST is square tray

IB is instrument boiler

10 Consumable Costs

The prices for each year of consumables for running the programme are presented in Table 4.20.

Table 4.20: The Price of Cosumables during 1990 - 1994 Period

Items	1990	1991	1992	1993	1994
Fluoride	3	3	3	3	4
Toothbrush	500	800	1000	1500	2000
ZOP	30	30	40	60	80
Eugenol	10000	10000	20000	25000	30000
Axyl	800	800	800	1000	1000
Xylocaine	200	250	280	320	400
Cotton	12500	15000	20000	25000	40000
Bandage	150	180	200	200	200
Alcohol	1500	1800	2500	3000	4000
Sealant	500	500	500	500	500
Bur	200	400	500	800	1000
Needle	700	750	800	800	1000
Flutex	4000	5000	5500	6500	8000
Chart	200	200	200	200	200

The number of units of each item for running the programme in the DongDa school each year is presented in Table 4.21.

Table 4.21: The Number of Units Used during 1990-1994 Period in the Dong Da School

Items	1990-1991	1991-1992	1992-1993	1993-1994
Fluoride	49	49	49	49
Toothbrush	548	545	543	541
ZOP	229	195	142	137
Eugenol	3	2	1	1
Axyl	10	10	10	10
Xylocaine	357	188	165	123
Cotton	3.5	3	3	3
Bandage	10	10	10	10
Alcohol	3	2	2	2
Sealant	71	88	113	123
Bur	55	42	38	35
Needle	10	10	10	10
Flutex	2	2	1	1
Chart	548	545	543	541

The number of units of each item for running the programme in the NghiaHung school each year is presented in Table 4.22.

Table 4.22: The Number of Units Used during 1990-1994 Period in the Nghia Hung School

Items	1990-1991	1991-1992	1992-1993	1993-1994
Fluoride	39	39	39	39
Toothbrush	407	406	406	404
ZOP	98	81	74	66
Eugenol	1	1	1	1
Axyl	10	10	10	10
Xylocaine	182	87	70	64
Cotton	1.5	2	2	2
Bandage	10	10	10	10
Alcohol	2	2	2	2
Sealant	36	49	50	61
Bur	24	19	13	17
Needle	10	10	10	10
Flutex	1	1	5	1
Chart	407	406	406	404

The number of units of each item for running the programme in the both DongDa and Nghia Hung schools each year is presented in Table 4.23

Table 4.23: The Number of Units Used during 1990-1994 Period

Items	1990-1991	1991-1992	1992-1993	1993-1994
Fluoride	88	88	88	88
Toothbrush	955	951	949	945
ZOP	327	276	216	203
Eugenol	4	3	2	2
Axyl	20	20	20	20
Xylocaine	539	275	235	187
Cotton	5	4	4	4
Bandage	20	20	20	20
Alcohol	5	5	4	4
Sealant	107	137	163	184
Bur	79	61	55	52
Needle	20	20	20	20
Flutex	3	3	1.5	2
Chart	955	951	949	945

11. Cost of dental nurse

Monthly salary of dental nurse during 1990-1994 period is presented in Table 4.24

The time that a dental nurse served in the school was 10.5 months

Number of dental nurses: 2

Proportion of time serving for this group is 34% of the time

Proportion of time of dental nurse serving for dental services at school was 66%

Table 4.24: Monthly Salary of Dental Nurse During 1990-1994

	1990-1991	1991-1992	1992-1993	1993-1994
Salary	60000	60000	150000	200000

12. Supervision time

STP = 1

13. Supervision days

SDS = 4 days

14. Number of supervisors

$$\text{NOS} = 4$$

15. Perdiem for supervisor

$$\text{SPC} = 30,000 \text{ Dong}$$

16. Working proportion of dental nurse

$$\text{PSN} = 34\%$$

17. Working proportion of equipment

$$\text{PSE} = 34\%$$

18. Working proportion of other equipment

$$\text{PSO} = 34\%$$

19. DMFT index each year of two groups of school children at urban area are expressed in Table 4.25.

Table 4.25: DMFT Index of Two Groups of School Children in the DongDa School

		1991	1992	1993	1994
Group I	X1	3.1	3.2	3.36	3.55
Group II	X2	3.5	4.32	4.6	5.5

20. DMFT index each year of two groups of school children at rural area are presented in Table 4.26.

Table 4.26: DMFT Index of Two Groups of School Children in Nghia Hung school

		1991	1992	1993	1994
Group I	X1	0.82	0.80	0.78	0.75
Group II	X2	1.00	1.40	1.70	2.20

21. DMFT Index of Two Groups of School Children in the Both Urban and Rural Area during 1990-1994 are presented in Table 4.27.

Table 4.27: DMFT Index of Two Groups of School Children in the Urban and Rural Areas

		1991	1992	1993	1994
Group I	X1	2.13	2.08	2.26	2.33
Group II	X2	2.44	3.08	3.38	4.09

Output data of calculation of costs for programme.

1 Cost of training teacher

TCO = 3,503,430 Dong

ACT = 390,007 Dong

ACU = 234,004 Dong

ACR = 156,003 Dong

2 Annual cost of equipment

2.1. AET = 8,455 Dong

2.2. AME = 220,773 Dong

2.3. ADE = 358,628 Dong

2.4. AOE = 20,488 Dong

Sub Total = 608,344 Dong

3 Administration cost for establishing the programme

ADC = .05 *(608,344 + 390,007) = 49918 Dong

4. Consumable costs for every year during 1990-1994 period:

Using two schemes for costing, one based on current price and the other based on constant price, the consumable costs of the programme in the urban area, rural area and both urban and rural areas are presented as follows:

a) The consumable costs of the programme in the urban area (DongDa school) are presented in Table 4.28. The results from these show that in the first year during 1990-1991, the consumable costs were 611267 Dong. After 1991, two schemes for costing were used. There was a difference of the results between the two schemes. Annual consumable costs increased very greatly when the current price was used for costing. When using constant price for costing, these costs decreased from the 1st year to the 2nd and then decreased slightly in the following years.

Table 4.28: The Consumable Costs of the Programme in the Urban Area During 1990-1994

	1990-1991	1991-1992	1992-1993	1993-1994
Current price	611267	730597	869627	1164427
Constant price	611267	551497	540907	534557

b) The consumable costs of the programme in the rural area (Nghia Hung school) are presented in Table 4.28. The results from these show that in the first year during 1990-1991, the consumable costs were 399407 Dong. After 1991, two schemes for costing were used. There was a difference of these results between two schemes. Annual consumable costs increased very greatly when the current price was used for costing. When using constant price for costing, these costs fell down from the 1st year to the 2nd and then decreased slightly in the second and the third years and then it increased again in 1994.

Table 4.29: The Consumable Costs of the Programme in the Rural Area (Nghia Hung school) during 1990-1994

	1990-1991	1991-1992	1992-1993	1993-1994
Current price	399407	522997	627127	862957
Constant price	399407	390947	384637	390097

c) The consumable costs of the programme in this study are presented in Table 4.30. The results from this table show that in the first year during 1990-1991, the consumable costs were 1023,174 Dong. After 1991, two schemes for costing were used. There was a difference of these results between two schemes. Annual consumable costs increased very greatly when the current price was used for costing. When using 1990 price for costing, these costs decreased slightly in the first two year and then increased again in the 1994

Table 4.30: The Consumable Costs of the Programme in Both Rural and Urban Areas During 1990-1994

	1990-1991	1991-1992	1992-1993	1993-1994
Current price	1010674	1253549	1496754	2027384
Constant price	1010674	942444	925544	924654

5. Annual cost of dental nurse

As with the consumable costs, the annual cost of dental nurses was also calculated by two schemes: one at current price and the other at 1990 price. The data required for calculating the costs of dental nurse are presented in Table 4.24. The results of the calculation of the costs of dental nurses are given in Table 4.31 and Table 4.32. By using current salary of dental nurses (Table 4.24), the costs of dental nurses in first two years were unchanged. In the third year and the fourth year the costs of dental nurses increased greatly. By using 1990 price the costs of dental nurses were remained

Table 4.31: The Costs of Dental Nurse in Rural Area and Urban Area 1990-1994.

		1990-1991	1991-1992	1992-1993	1993-1994
Current price	Urban Area	214200	214200	535500	714000
	Rural Area	214200	214200	535500	714000
Constant price	Urban Area	214200	214200	214200	214200
	Rural Area	214200	214200	214200	214200

Table 4.32: Costs of Dental Nurse in Both Rural and Area During 1990-1994.

	1990-1991	1991-1992	1992-1993	1993-1994
Current price	428400	428400	1071000	1428000
Constant price	428400	428400	428400	428400

6. Annual retraining to the teacher

At the end of each year, teachers are retrained. Costs for retraining of teachers were shared not only for this year but also for the followed year because the knowledge of these teachers accumulated after training. Annual costs of retraining to the teachers are presented in Table 4.33. Annual cost curves of retraining for teachers have the same direction with annual cost curves of dental nurses when using two schemes for calculation.

Table 4.33: Annual Retraining Cost for the Teacher and Average Retraining Cost for the Teacher per Child

			1990-1991	1991-1992	1992-1993	1993-1994
T O T A L	Curnt. price	Urban Area	128,516	273,643	435,880	623,346
		Rural Area	85,677	128,429	290,667	415,565
		U & R Areas	214,193	456,072	726,467	1,038,911
C O S T	Const. price	Urban Area	128,516	128,516	128,516	128,516
		Rural Area	85,677	85,677	85,677	85,677
		U & R Areas	214,193	214,193	214,193	214,193
A V E R A G E	Curnt. price	Urban Area	235	502	803	1152
		Rural Area	210	316	716	1027
		U & R Areas	224	479	766	1099
C O S T	Const. price	Urban Area	235	224	224	224
		Rural Area	210	224	224	224
		U & R Areas	224	224	224	224

7. Annual repair and maintenance of equipment costs

AME = 60,834 Dong

AMU = 30,417 Dong

AMR = 30,417 Dong

8. Annual supervision costs

Two schemes were used for calculating annual supervision costs. The results of these calculation are presented in Table 4.34. Annual supervision costs during 1990-1994 period had the same trend with consumables costs.

Table 4.34: The Annual Supervision Costs

		1990-1991	1991-1992	1992-1993	1993-1994
Current price	Urban Area	160000	200000	200000	240000
	Rural Area	160000	200000	200000	240000
	U & R Areas	320000	400000	400000	480000
Constant price	Urban Area	160000	160000	160000	160000
	Rural Area	160000	160000	160000	160000
	U & R Areas	320000	320000	320000	320000

Annual capital cost

Annual capital costs are the sum of annual costs of training to the teachers plus annual costs of educational tools plus annual costs of dental equipment plus annual costs of other equipment serving for dental services at school.

ACP = 1,048,269 Dong

AUP = 565,085 Dong

ARP = 483,184 Dong

Where: AUP is annual capital cost of the programme in the urban area

ARP is annual capital cost of the programme in the rural area

Annual recurrent costs

Annual recurrent costs for operating the programme during 1990-1994 period are increased year by year when current price was used for calculation. These costs decreased at a decreasing rate like consumable costs when using 1990 price for calculation. The results of calculation of annual recurrent costs are shown in following tables.

- a) The annual recurrent costs of the programme in the urban area during 1990-1994 are presented in Table 4.35 and Table 4.36

Table 4.35: The Annual Recurrent Costs of the Programme in the Urban Area During 1990-1994 at Current Price

	1990-1991	1991-1992	1992-1993	1993-1994
ACC	611267	730597	869627	1164427
ANC	214200	214200	535500	714000
ARC	128,516	273,643	435880	623,346
AME	30,407	30,407	30,407	30,407
ASC	160000	200000	200000	240000
Sub Total	1144390	1448847	1750114	2272380

Table 4.36: The Annual Recurrent Costs of the Programme in the Urban Area During 1990-1994 at Constant Price

	1990-1991	1991-1992	1992-1993	1993-1994
ACC	611267	551497	540907	534557
ANC	214200	214200	214200	214200
ARC	128,516	128,516	128,516	128,516
AME	30,407	30,407	30,407	30,407
ASC	160000	160000	160000	160000
SubTotal	1144390	1084620	1074030	1067680

- b) The annual recurrent costs of the programme in the rural area during 1990-1994 are presented in Table 4.37 and Table 4.38

Table 4.37: The Annual Recurrent Costs of the Programme in the Rural Area During 1990-1994 at Current Price

	1990-1991	1991-1992	1992-1993	1993-1994
ACC	399407	522997	627127	862957
ANC	214200	214200	214200	214200
ARC	85677	128429	290677	415565
AME	30407	30407	30407	30407
ASC	160000	200000	200000	240000
Sub Total	889691	1096033	1362411	1763129

Table 4.38: The Annual Recurrent Costs of the Programme in the Rural Area During 1990-1994 at Constant Price

	1990-1991	1991-1992	1992-1993	1993-1994
ACC	399407	390947	384637	390097
ANC	214200	214200	214200	214200
ARC	85677	85677	85677	85677
AME	30407	30407	30407	30407
ASC	16000	16000	16000	16000
SubTotal	889691	881231	874921	880381

c) The annual recurrent costs of the programme in the urban and rural areas during 1990-1994 are presented in Table 4.39 and Table 4.40

Table 4.39: The Annual Recurrent Costs of the Programme in the Urban and Rural Areas During 1990-1994 at Current Price

	1990-1991	1991-1992	1992-1993	1993-1994
ACC	1010674	1253549	1496754	2027384
ANC	428400	428400	1071000	1428000
ARC	214193	456072	726467	1038911
AME	60814	60814	60814	60814
ASC	320000	400000	400000	480000
Sub Total	2034081	2598880	3112435	4035509

Table 4.40: The Annual Recurrent Costs of the Programme in the Urban and Rural Areas During 1990-1994 at Constant Price

	1990-1991	1991-1992	1992-1993	1993-1994
ACC	1010674	942444	925544	924654
ANC	428400	428400	428400	428400
ARC	214193	214193	214193	214193
AME	60814	60814	60814	60814
ASC	320000	320000	320000	320000
SubTotal	2034081	1965851	1948951	1948061

Annual total costs

Annual total costs are the sum of annual capital costs plus annual recurrent costs. These results are shown in the following tables. They have the same trend like annual recurrent costs. The change of annual capital costs depends on the change of annual recurrent costs because annual capital costs are unchanged.

Table 4.41: The Annual Total Costs of the Programme during 1990-1994

		1990-1991	1991-1992	1992-1993	1993-1994
Current price	Urban Area	1709475	2013932	2315199	2837465
	Rural Area	1372875	1579217	1845595	2246313
	U & R Areas	3082350	3647149	4160704	5083778
Constant price	Urban Area	1709475	1649705	1639115	1632765
	Rural Area	1372875	1364415	1358105	1363565
	U & R Areas	3082350	3014120	2997220	2996330

By using current price for calculation of costs, the total costs of rural, urban area, and both urban and rural areas increase at increasing rate year by year. By using constant price, the total cost of urban area decrease year by year, while total costs of rural area and both rural and urban areas decrease in the first three years and then increase in the last year.

Annual average cost

Annual average cost equals annual total costs divided by population of each year. Annual average costs during 1990-1994 period are presented in Table 4.42 and had a trend like that of total costs.

Table 4.42: The Annual Average Costs of the Programme during 1990-1994

		1990-1991	1991-1992	1992-1993	1993-1994
Current price	Urban Area	3119.47	3695.29	4263.72	5239.64
	Rural Area	3373.16	3889.7	4545.8	5560.18
	U & R Areas	3227.59	3835.07	4384.3	5379.66
Constant price	Urban Area	3119.47	3026.89	3018.63	3018.05
	Rural Area	3373.16	3360.63	3345.09	3375.16
	U & R Areas	3227.59	3169.42	3158.29	3170.72

Annual marginal cost

Annual marginal cost is the change of total costs divided by the change of DMFT index between the two groups of school children: one implementing the programme and the other not implementing the programme. The results of calculation of marginal costs are also presented in Table 4.43 and had a trend similar to that of total costs and average cost when constant price was used for calculation. But by using current price, the marginal costs are unstable every year.

Table 4.43: The Annual Marginal Costs of the Programme in the Urban, Rural Area, and Both Urban and Rural Areas During 1990-1994

		1991-1992	1992-1993	1993-1994
Current price	Urban Area	271836	242957	266382
	Rural Area	343903	289541	276357
	U & R Areas	627554	458531	503502
Constant price	Urban Area	53366	8540	3256
	Rural Area	14100	6859	3766
	U & R Areas	75871	15089	3270

Cost-effectiveness of School-based Oral Health Programme

In making the comparison, it was assumed that the goal of the programme is to prevent one decayed, missing and filled tooth per person. Cost-effectiveness of the programme was calculated for every year as follows:

$$\text{Cost-effectiveness} = \frac{\text{Cost of procedure/person}}{\text{Mean DMFT saved/person}}$$

$$= \frac{\text{Cost of procedure/person}}{1 \text{ DMFT saved/person}}$$

Where Cost-effectiveness is the ratio between costs of procedures per person divided by 1 DMFT saved per person, i.e. when introducing a given cost per person, one decayed, missing or filled tooth per person was saved.

Effectiveness is the mean DMFT saved per person = the change of DMFT per person between the two groups of school children: one implementing the programme and

the other not implementing the programme. From mean DMFT saved per person, 1 DMFT saved per person was calculated.

The results of calculation of cost-effectiveness of the programme in this study during 1990-1994 period are shown in Table 4.44.

In urban area when current price was used for calculation, cost-effectiveness ratio is very high in the first year and decreased greatly in the second year. Then it increased in the third year and decreased again in the last year. In case constant price was used, the cost-effectiveness ratio decreased year by year.

By using two schemes for calculation, at the beginning the cost-effectiveness ratio was quite high in both schemes. In the second year this result decreased suddenly, but the result by using current price was higher than the result using the 1990 price. From 1993 to 1994, cost-effectiveness increased steadily when using current price for calculation, while this ratio by using 1990 price continues decreasing step by step.

Table 4.44: The Annual Cost-effectiveness Ratio of the Programme during 1990-1994

		1990-1991	1991-1992	1992-1993	1993-1994
Current price	Urban Area	7799	3299	3438	2686
	Rural Area	18739	6482	4941	3834
	U & R Areas	10411	4261	3914	3092
Constant price	Urban Area	7799	2703	2434	1548
	Rural Area	18739	5601	3635	2327
	U & R Areas	10411	3521	2819	1822

Notation of costs

- ADM : Administration cost rate of training
- ADC : Administration cost for establishing the programme
- AMC : Annual cost of repair maintenance of equipment
- ASC : Annual supervision cost

ACC	: Annual cost of consumable
ARC	: Annual cost of retraining teacher
AEC	: Annual cost of equipment
ANC	: Annual cost of dental nurse
AET	: Annual education tool cost
ACD	: Annual dental equipment cost
AOE	: Annual other equipment cost
ATC	: Annual training cost
AME	: Annual mouthrinsing
BC	: Cost of boocklet
CC	: Cost of callus
CTT	: Cost for teachers and trainers
CTS	: Cost for teachers
CTR	: Cost for trainers
COC	: Consumable costs
CSC	: Cost of cotton sterilization instrument
CSN	: Cost for dental nurse
DDC	: Cost of dental chair
DEC	: Cost of dental equipment
DMC	: Cost of dental machine
EC	: Cost of equipment for examination
ESC	: Cost of electric stove
ECO	: Equipment costs
EEC	: Cost of educational tools
GC	: Cost of glasses
IBC	: Cost of instrument boiler
MC	: Material cost
MRC	: Cost of mouth rinsing equipment
MSN	: Monthly salary of dental nurse
NTS	: Number of teacher that were trained
NOS	: Number of supervisor
NTR	: Number of time for training
OEC	: Cost of other equipment to serve for dental service
OIC	: Cost of other items
PDJ	: Perdiem junior for teacher for attending the training
POT	: Proportion of time using equipment
POS	: Proportion of time that dental nurse spends for dental service at this school
PP	: Population at group school children with programme
PSP	: Working proportion
RTC	: Retraining teacher cost
STP	: Supervision times per year
SDS	: Supervision days per time

- SPC : Perdiem for supervisor
 STC : Transportation cost for supervisor
 TBC : Cost of tooth brush
 TCO : Cost for training the teacher
 TD : Training days per person
 TDP : Perdiem for 1 training hour
 TPJ : Travel cost per teacher

4.3 Sensitivity Analysis to Analyze the Impacts of Input Factors on the DMFT Index of the Programme

One of the objectives of study was to analyze the impacts of input activities on the outcome of the programme. These input factors include: Dental Health Education, mouthrinsing, early examination and treatment and the pit and fissure sealant application. The outcome of the programme are influenced by the input factors through the input costs. The recurrent costs shared a greater part in the total cost of the programme establishment and operation. The change in the recurrent cost leads to the change of the total costs, average cost, cost-effectiveness ratio. The recurrent costs consist of five basic items namely consumable cost, cost of dental nurse, cost of retraining the teachers, cost of repair and maintenance equipments and supervision cost. The change of any item will affect the total costs, average cost and cost-effectiveness ratio.

Assumed there is an increase of 20% of one item, and the other items, DMFT index, number of school children remain unchanged, the total cost, average cost and cost-effectiveness ratio have the same trend as before, although the actual value changes (Table 4.45, 4.46, 4.47, 4.48, 4.49).

Table 4.45: Total Costs, Average Cost, and Cost-effectiveness of the Programme Establishment and Operation during 1990-1994 when ACC was Changed

Year	TC	AC	Δ DMFT	C/E	Percentage changed
1990-1991	3299484.00	3455.00	0.31	11145	0.066
1991-1992	3912507.00	4114.00	0.9	4571	0.069
1992-1993	5078654.00	5351.00	1.12	4778	0.062
1993-1994	6488872.00	6866.00	1.74	3957	0.067

Table 4.46: Total Costs, Average Cost, and cost-effectiveness of the Programme Establishment and Operation During 1990-1994 When ANC was Changed.

Year	TC	AC	Δ DMFT	CVE	Percentage changed
1990-1991	3180530	3344	0.31	10787	0.032
1991-1992	3745029	3938	0.9	4376	0.023
1992-1993	4997504	5266	1.12	4702	0.045
1993-1994	6368978	6739	1.74	3873	0.043

Table 4.47: Total Costs, Average Cost, and Cost-effectiveness of the Programme Establishment and Operation During 1990-1994 When ARC was Changed.

Year	TC	AC	Δ DMFT	CVE	Percentage changed
1990-1991	3137688	3285	0.31	10597	0.014
1991-1992	3750563	3944	0.9	4382	0.025
1992-1993	4928597	5193	1.12	4637	0.03
1993-1994	6291160	6588	1.74	3786	0.023

Table 4.48: Total Costs, Average Cost, and Cost-effectiveness of the Programme Establishment and Operation during 1990-1994 when AME was Changed

Year	TC	AC	Δ DMFT	CVE	Percentage changed
1990-1991	3107012	3253	0.31	10493	0.004
1991-1992	3671512	3869	0.9	4299	0.005
1992-1993	4795466	5053	1.12	4512	0.002
1993-1994	6095540	6450	1.74	3707	0.002

Table 4.49: Total Costs, Average Cost, and Cost-effectiveness of the Programme Establishment and Operation during 1990-1994 when ASC was Changed

Year	TC	AC	Δ DMFT	C/E	Percentage changed
1990-1991	3158850	3308	0.31	10671	0.02
1991-1992	3739349	3932	0.9	4369	0.02
1992-1993	4863304	5125	1.12	4576	0.016
1993-1994	6179378	6539	1.74	3758	0.016

Assuming effectiveness index decreases 20%, the costs of the programme establishment and operation remain unchanged, the changes cost-effectiveness ratio are presented in Table 4.50.

Table 4.50: Average Cost, and Cost-effectiveness of the Programme Establishment and Operation during 1990-1994 when Effectiveness Decreased 20%

Year	AC	Δ DMFT	C/E	Percentage changed
1990-1991	3227	0.248	13012	0.24
1991-1992	3835	0.72	5326	0.25
1992-1993	4384	0.9	4871	0.25
1993-1994	5379	1.4	3842	0.25

The results in Table 4.50 show that when 20% of effectiveness of each year were decreased, cost-effectiveness ratio will increase 24% at the first year, and 25% in the following years