CHAPTER V

DISCUSSION

Economic analysis of School based Oral Health Programme at primary schools provides important information in financing and improving the programme in order to achieve the most cost-effectiveness of the programme in the long term. By using the data on prevalence of students suffering from dental caries and DMFT index of two groups of school children, one implementing the programme and the other not implementing the programme, on the costs for establishing and operating the programme collected from two schools in the North of Vietnam were analyzed. This study demonstrates the impacts of the School based Oral Health Programme on dental caries and its potential role in preventing dental caries for school children in the whole country especially for school children in the rural areas where they do not have ability to access the dental service.

5.1 The impacts of School-based Oral Health Programme on dental caries.

Considering the impacts of the School based Oral Health Programme on dental caries based on the difference of prevalence of students suffering from dental caries between two groups of school children: one implementing the programme and the other not implementing the programme and the DMFT index between these groups as well.

Table 5.1. and Figure 5.1 display the prevalence of students at the school in the urban area suffering from dental caries of the two groups school children. A lower prevalence was noticed in the area where the programme under implementation when compared to that of the other without the programme.

The trend of the prevalence of students suffering this disease of both groups have been increasing year by year. But in the group implementing the programme, the prevalence of students suffering from dental caries increased to 44.08 % while in the group not implementing the programme the prevalence of students suffering from dental caries increased substantially to 74.1% during 1990-1994 period.

Table 5.1: The Prevalence of Students Suffering from Dental Caries of Two Groups in the Urban Area

	1990	1991	1992	1993	1994
Group I	42.60%	43.40%	43.80%	43.95%	44.08%
Gpoup II	42.60%	46.70%	54.70%	65.74%	74.10%

Figure 5.1: The Prevalence of Students Suffering from Dental Caries of Two Groups in the Urban Area

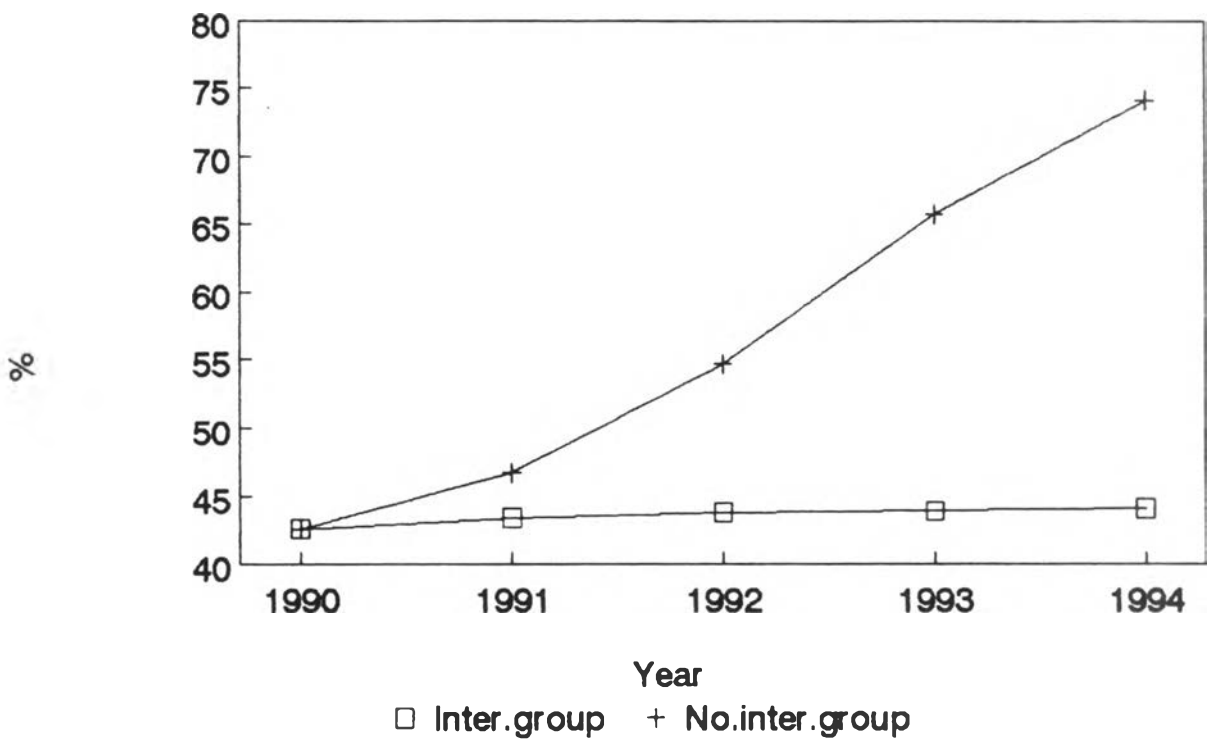


Table 5.2 and Figure 5.2 present the prevalence in students at the school in the rural area, and Table 5.3 and Figure 5.3 also show that data in both rural and urban areas. In the rural area and in both of urban and rural areas, the prevalence of student suffering from dental ceries has the same trend with that in the urban area.

Table 5.2: The Prevalence of Students Suffering from Dental Caries of Two Groups in the Rural Area

	1990	1991	1992	1993	1994
Group I	39.08%	39.4%	39.8%	40.05%	40.3%
Gpoup II	39.08%	42.08%	45.9%	49.5%	53.37%

Figure 5.2: The Prevalence of Students Suffering from Dental Caries of Two Groups in the Rural Area

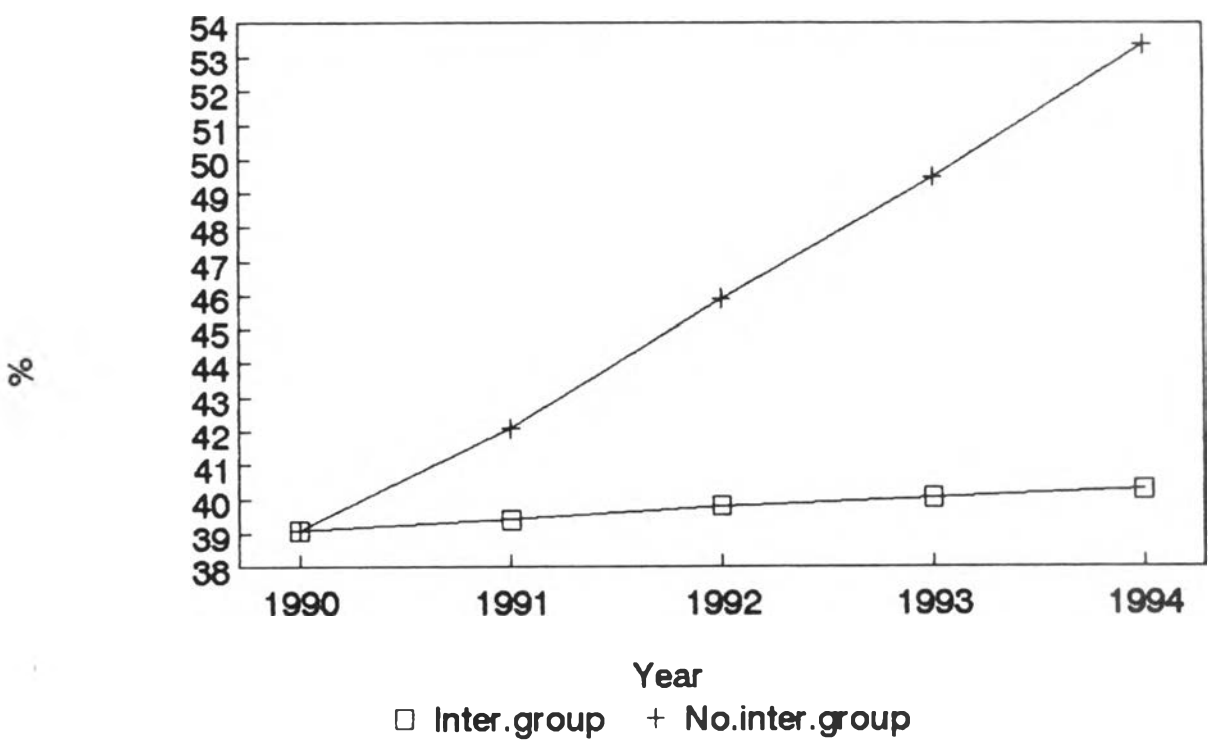
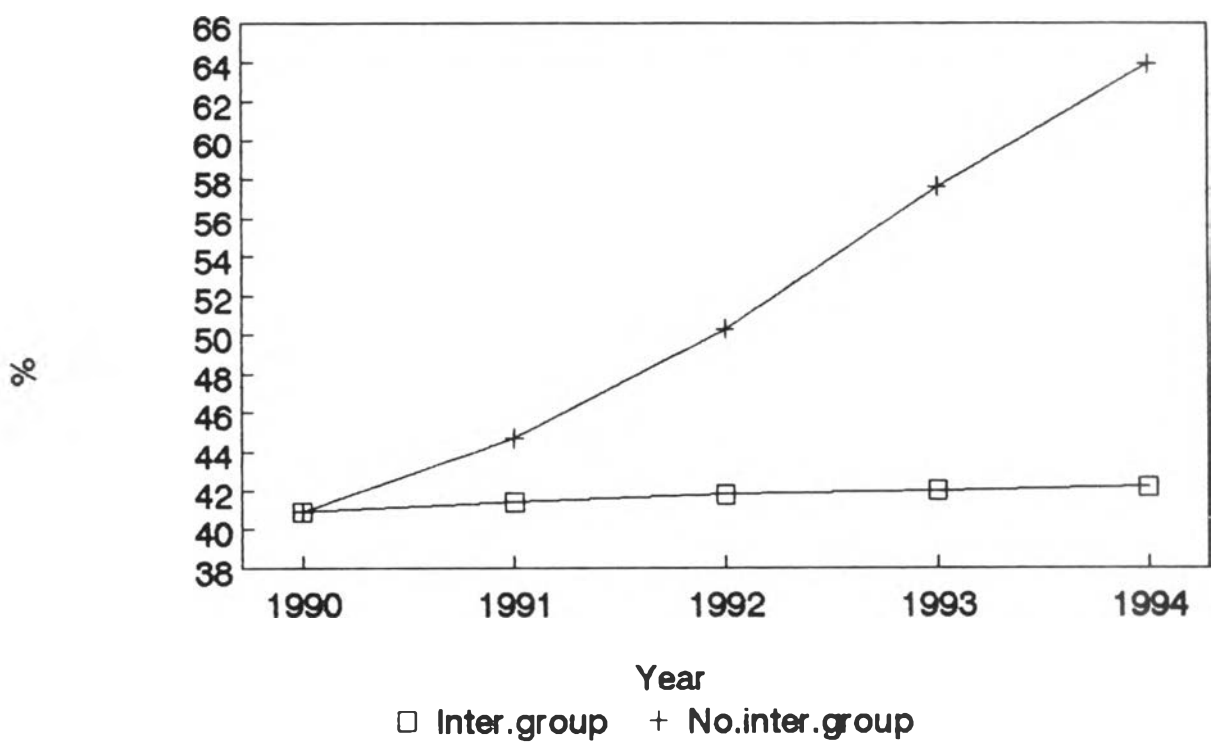


Table 5.3: The Prevalence of Students Suffering from Dental Caries of Two Groups in both Urban and Rural Areas

	1990	1991	1992	1993	1994
Group I	40.9%	41.4%	41.8%	42.0%	42.2%
Gpoup II	40.9%	44.67%	50.3%	57.62%	63.9%

Figure 5.3: The Prevalence of Students Suffering from Dental Caries of Two Groups in both Urban and Rural Areas



In urban area and both urban and rural areas together, with the increase of the prevalence of students suffering from dental caries, DMFT index of the two groups of school children has been increasing (see Table 4.26 and Table 4.28) and it is also different between two groups of school children: the one implementing the School-based Oral Health Programme had a lower DMFT index and its index increased slightly, the other not implementing the programme had a higher DMFT index and its index increased rapidly . But in rural area the DMFT index of the intervention group decreased year by year, while the DMFT of the non-intervention group increased like prevalence of students suffering from dental caries (see Table 4.27).

These results indicated that the progamme has effects on preventing dental disease even though these numbers still increase.

The impacts of the programme were considered not only clinically but also in statistical terms to examine the statistical significance of the results of the programme. For testing pupose on the difference of DMFT index of the two groups of school children, one implimenting the programme and the other not implementing the programme, the differences of variance of DMFT index of the two groups of school children were tested by the F distribution test. Using the required data (see Table 4.2, Table 4.4, Table 4.6) for testing, the results (see Table 4.3, Table 4.5, Table 4.7) showed that there are differences of variance of DMFT index between the two groups of school children and these differences are significant. These results also conform to the trial because there are teeth changes of children in the age range (from 7-10 years old) at the end of the first year. The permanent teeth grow instead of deciduous teeth In the intervention group, besides getting dental health education and mouthrinsing, the school children had care taken of their teeth by early treatment and sealing so very few new cavities appeared and the standard deviation was low. But in the non-intervention group, the children's teeth were not taken care and there were many new cavities, the standard deviation was high, that's why there is a difference of variance of the two groups of school children and this difference is significant.

When examining the significance of the difference of DMFT index of the two groups of school children, one implementing the programme and the other not implementing the programme, t-test was applied by using required data (see Table 4.8, Table 4.10, and Table 4.12). The results of t-test for testing the difference of DMFT index of the two groups of school children (see Table 4.9, Table 4.11, and Table 4.13) show that the difference of DMFT index between the intervention and non-intervention group is significant. These results reflect the fact that DMFT index of the group implementing the programme was lower than DMFT index of the group not implementing the programme because the children in this group were taken care by the programme. The programme had impact on preventive of dental caries but DMFT index had been high and the prevalence of students suffering from dental caries has been increasing. The factors that have an effect on preventing dental caries will be discussed later in paragraph 5.3.

5.2 Analyzing the Costs of Programme Establishment and Operation

The costs of the School-based Oral Health Programme establishment and operation consist of capital costs and recurrent costs in which recurrent costs shared a greater part. There is the different of calculation of these costs. While the capital costs were calculated in annual capital costs for every year, the recurrent costs were calculated by two schems: The first scheme was based on current price, and it reflected the costs for operating the programme every year and the change of these costs. The second scheme was based on constant price (1990 price). This scheme was used for the evaluation of the impacts of the programme on the dental caries. In this scheme the price remain unchanged but the quantity of materials, and activities changed.

The total cost, average cost, maginal cost and cost-effectiveness were cosidered for the costs analysis of the programme establishment and operation.

Firstly, total costs of the programme establishment and operation were taken into account. In three study areas, the recurrent costs shared an greater part in the total cost. If capial costs were calculated in annual capital cost, the recurrent were calculated by two schemes, one based on current price and the other based on 1990 price. Figures 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, and 5.10 present the components of the recurrent costs by using two schemes for calculation in both rural and urban areas.

Figure 5.4: Components of Recurrent Costs 1990-1991

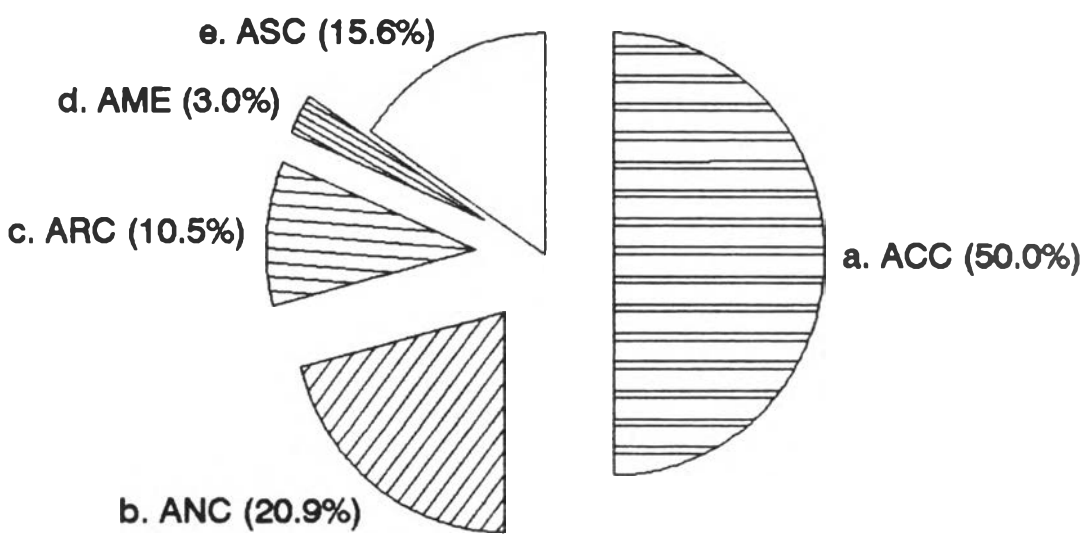


Figure 5.5: Components of Recurrent Costs at Current Price in 1991-1992

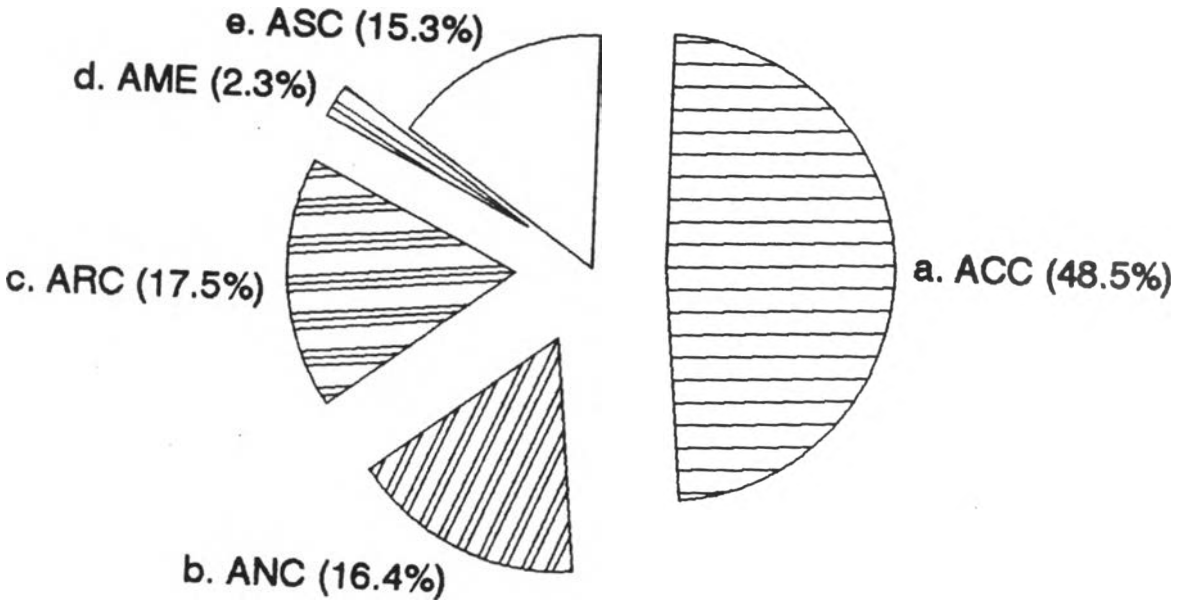


Figure 5.6: Components of Recurrent Costs at Constant Price in 1991-1992

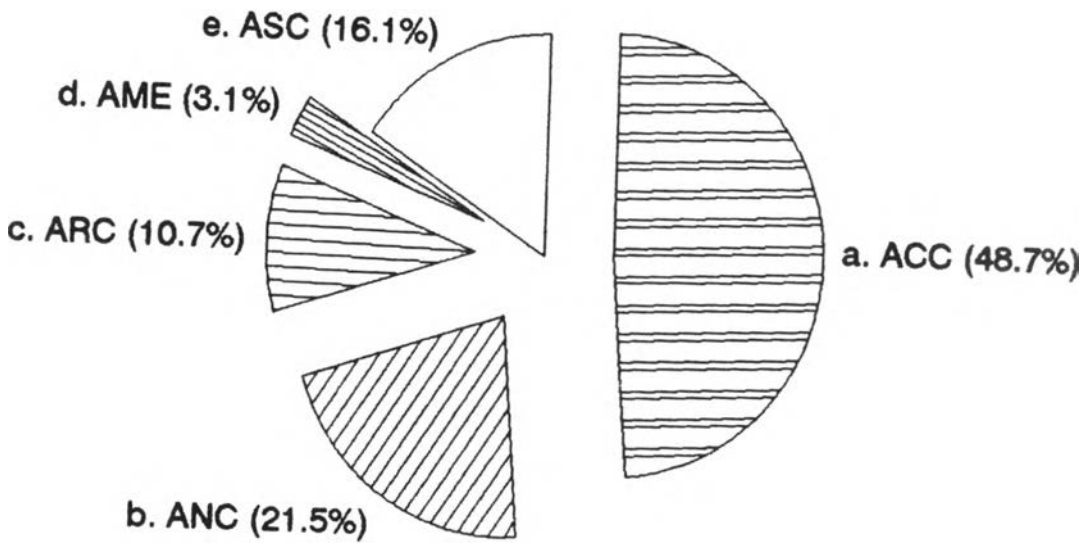


Figure 5.7: Components of Recurrent Costs at Current Price in 1992-1993

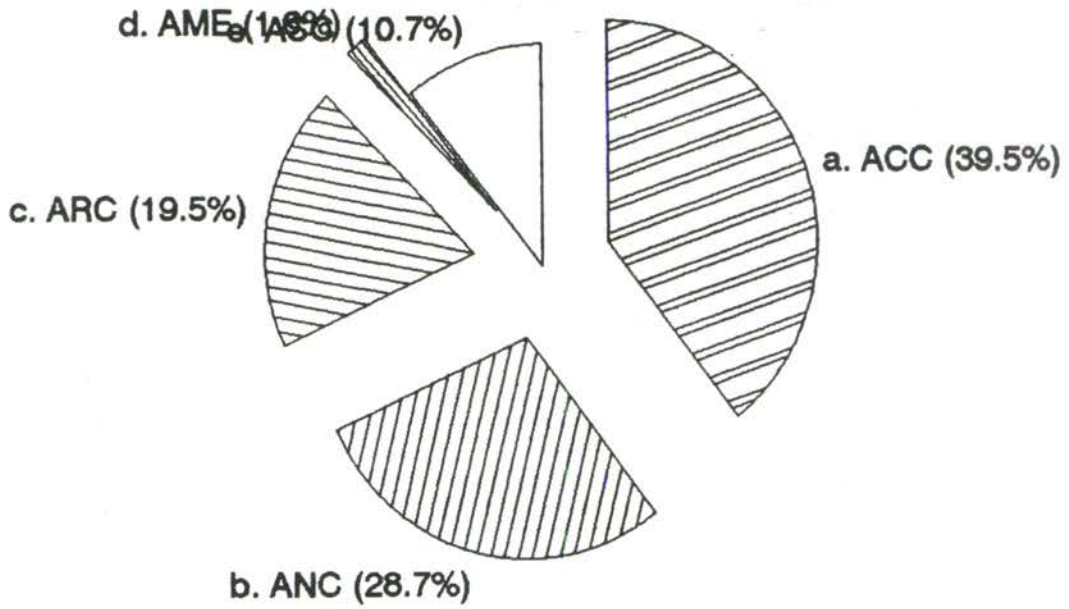


Figure 5.8: Components of Recurrent Costs at Constant Price in 1992-1993

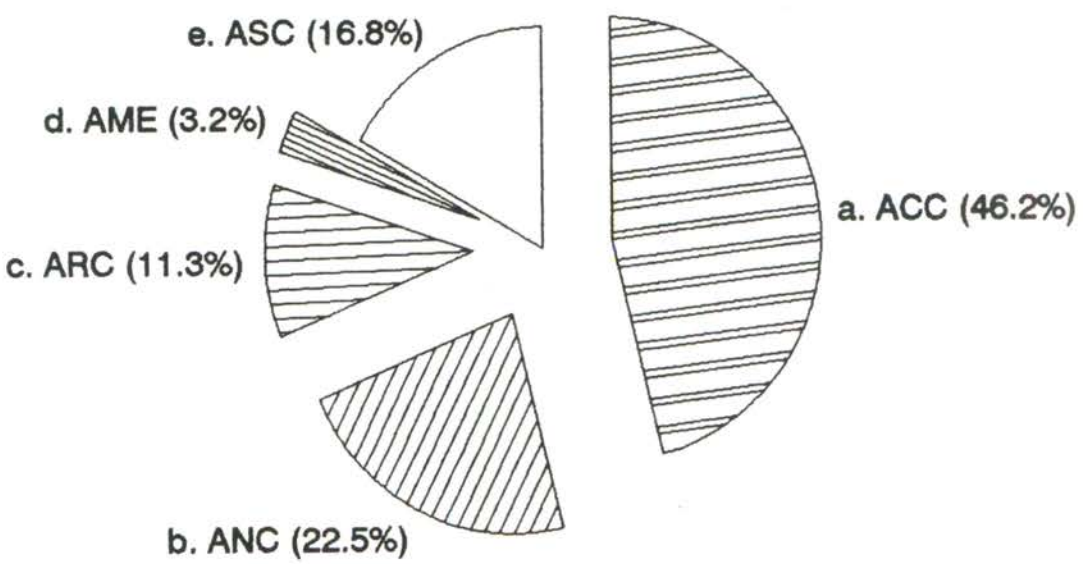


Figure 5.9: Components of Recurrent Costs at Current Price in 1994-1994

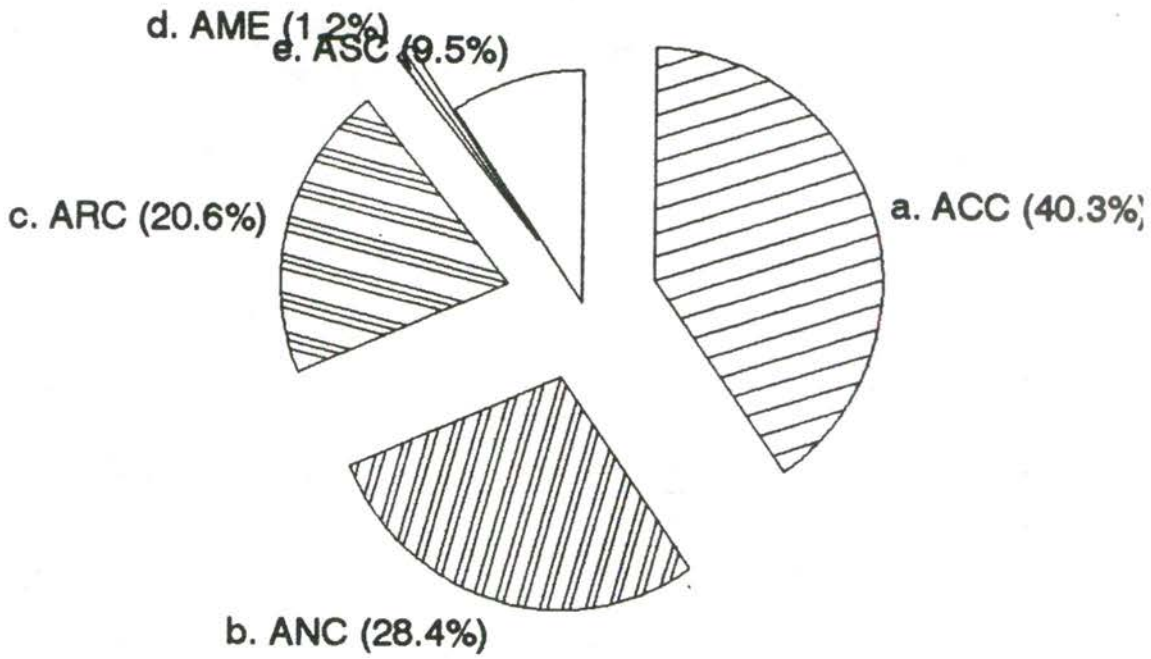
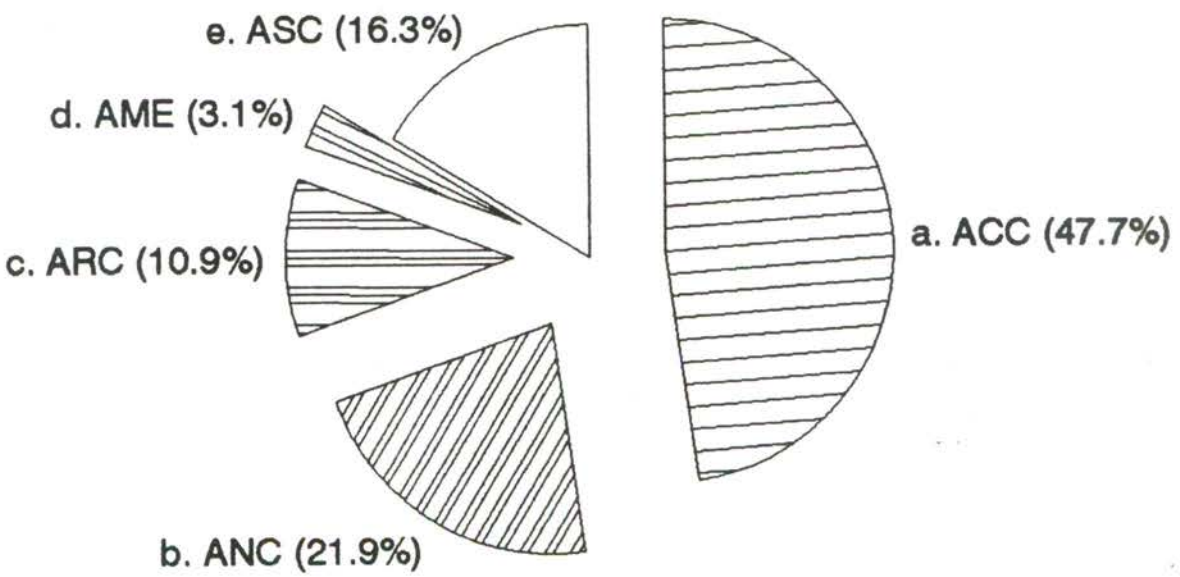


Figure 5.10: Components of Recurrent Costs at Current Price in 1993-1994



In the recurrent costs, annual consumable costs contributed the greatest part and annual supervision the lowest part. Figure 5.11 presents the difference of recurrent costs of the programme by using the two schemes for calculation. The recurrent costs increased in increasing rate when using the current price for calculation, while the recurrent cost of the programme decreased by using the 1990 price in the first three years, and it slightly increased again in the last year.

Figure 5.11: The Difference of Recurrent Costs by Using Two Schemes for Calculation

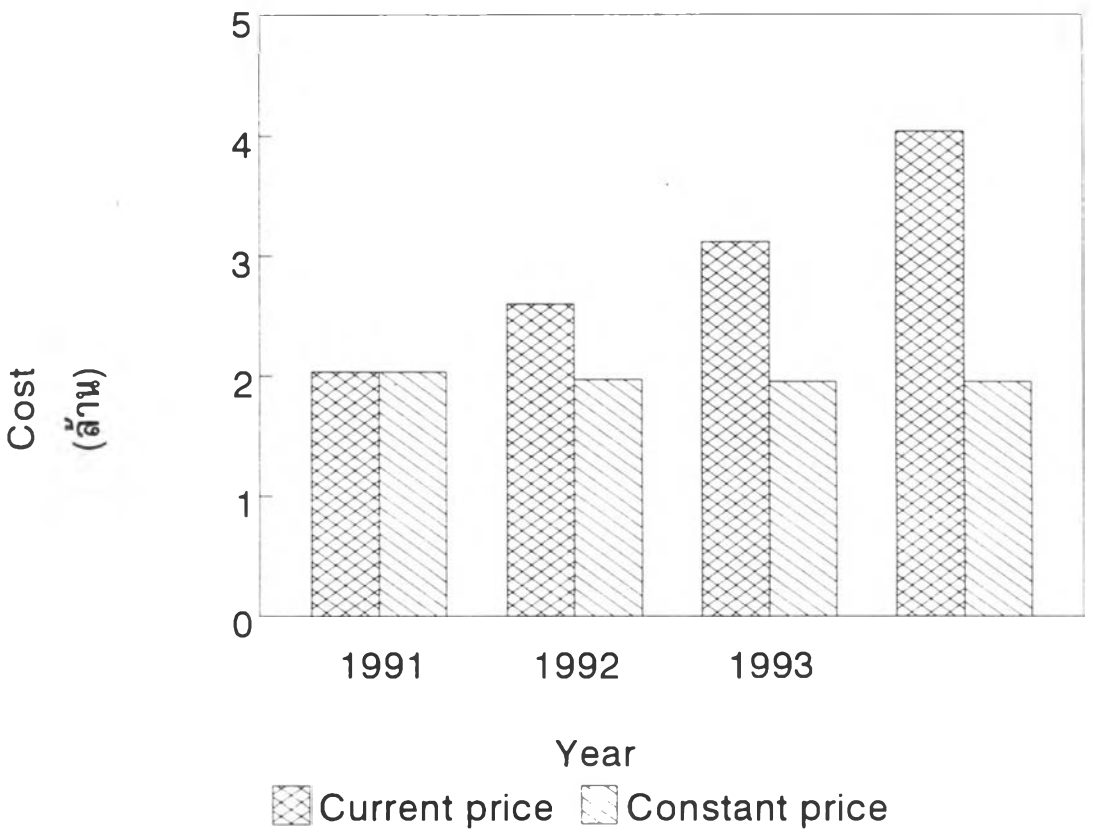


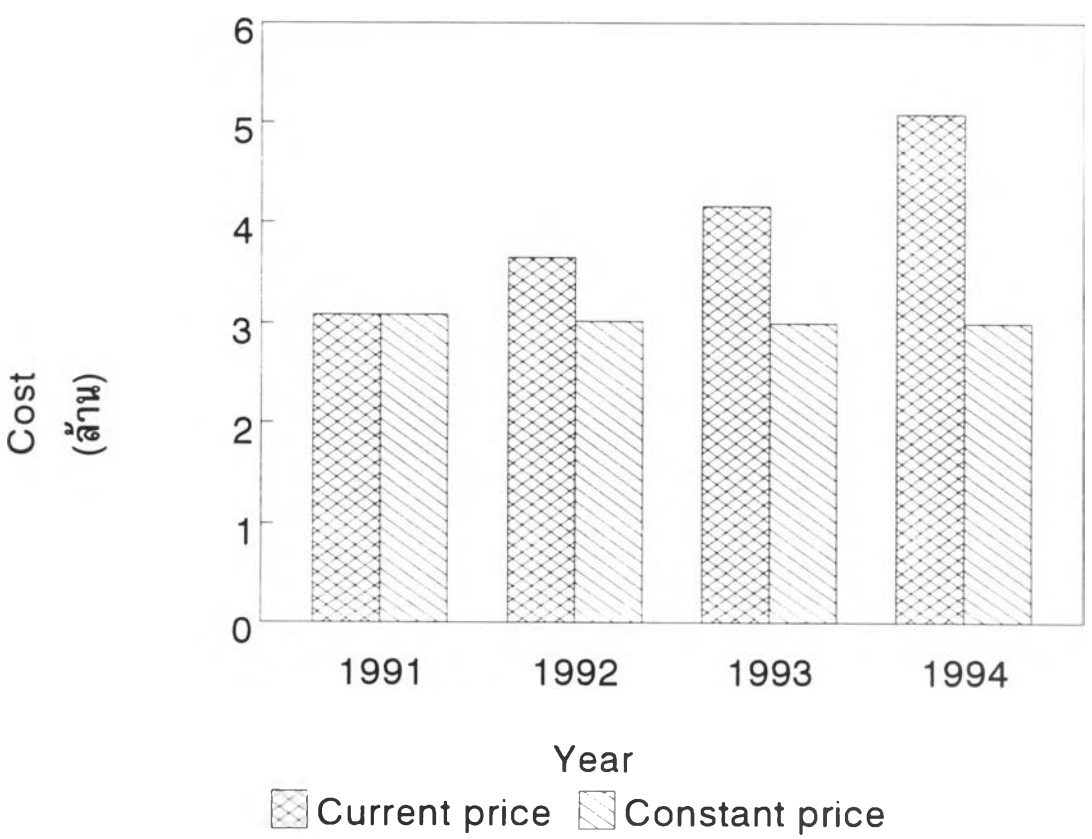
Figure 5.12 displays the trend of total costs of the programme establishment and operation. This trend increased year by year during the 1990-1994 period when current price were used. The total cost curve in this study does not exactly parallel the general shape of the cost curve. But by using the 1990 price for calculation, recurrent costs deacreased as the general shape of the cost curves. This does not mean that the programme is not effective. In order to draw a conclusion about the impact of the programme on dental caries, other factors need to be considered.

Comparing the total costs for running the School-based Oral Health Programme of the two schemes, the cost curve increased at increasing rate since 1992 by using current price for calculation. By using 1990 price, the cost curve decreased year by year, especially it decreased at increasing rate in the second year. In the rural area and urban area the results are similar.

The total costs between the two schemes are different, because there are changes in economic status and policies in Vietnam during that period especially the changes of the policies in the Health sector. Many years ago, Health Care in Vietnam were fully subsidized by government. Since 1987, the economy of Vietnam has been switched from centrally planned to market economy. The overal policies were changed leading to the change of policies in the health sector. Since then, private clinics were allowed to be opened. The price of medical equipment and drugs increased, especially equipment and drugs for dental services when there is no subsidization from the government . The second reason is the improvement of living standard of Vietnamese people in the recent years. The demand for health care also increased, especially for dental care. The change of Vietnam economy has effects on the costs for health care, especially dental care. Therefore, DMFT index must be considered in connection to the costs of the programme when the impact of the programme in preventive dental caries is evaluated.

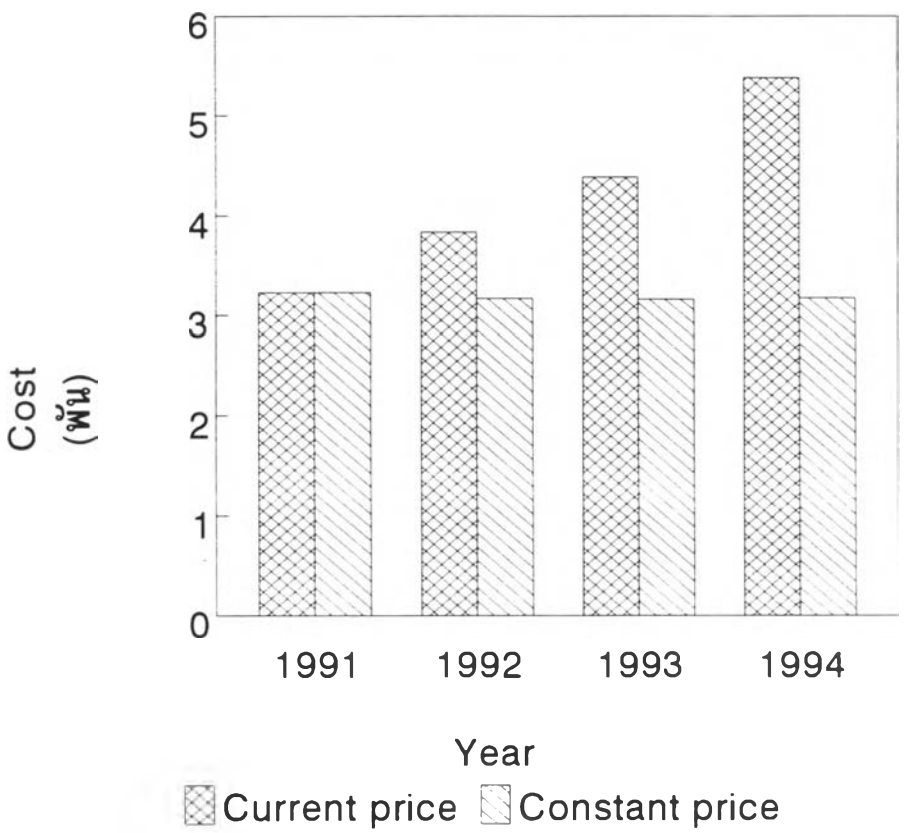
Total costs of programme establishment and operation have the same trend with recurrent costs when using both schemes for calculation. The recurrent costs were influenced by the new incidence of dental caries. Comparing the recurrent costs between the two schemes of calculation, these costs had the same trend as total costs that were mentioned above.

Figure 5.12: Total Cost of the Programme by Using Two Schemes for Calculation



Secondly, average cost and marginal cost have the same direction like total costs when using current price for calculation. By using 1990 price for calculation, average cost still has the same trend as capital cost but marginal cost decreased. This result means that the quality of these activities was not improved. If they increased, the marginal cost would be decreased in the first years and then increased because more input were introduced. Comparing the average costs between urban and rural areas, the average cost in urban area is higher than that of rural area. But it does not mean that the Programme is not effective in the rural area(Figure 5.13)

Figure 5.13: Average Cost of the Programme of Urban and Rural Area



Finally, the cost, the effectiveness and cost-effectiveness ratio of the programme are presented in Table 4.44 and Figure 5.14, 5.15, 5.16.

Figure 5.14: Cost-effectiveness Ratio of the Programme in Urban Area

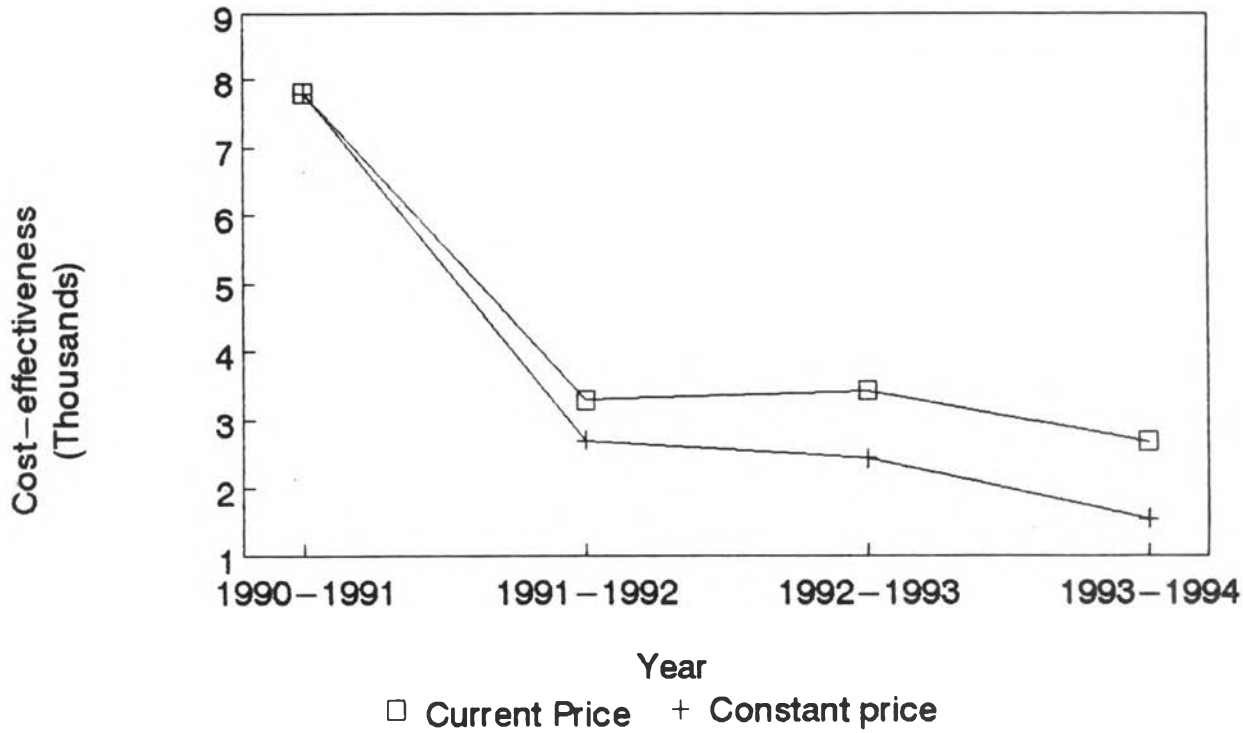


Figure 5.15: Cost-effectiveness Ratio of the Programme in Rural Area

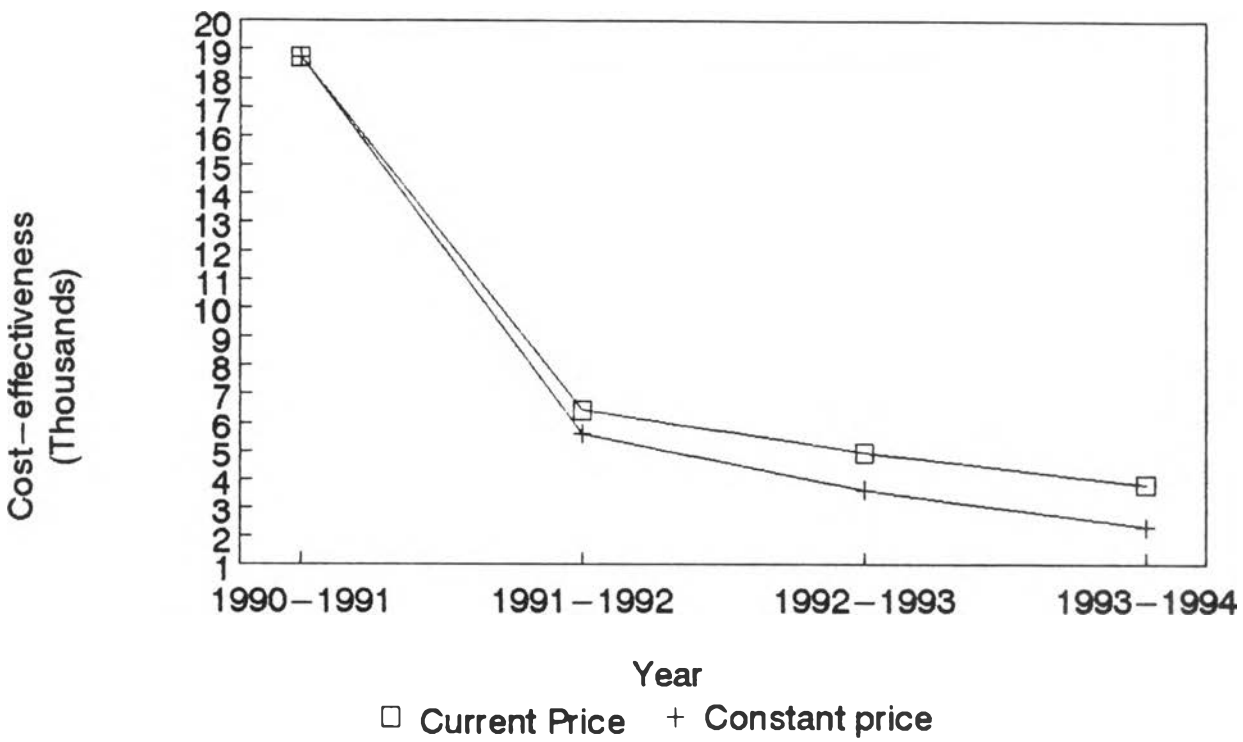
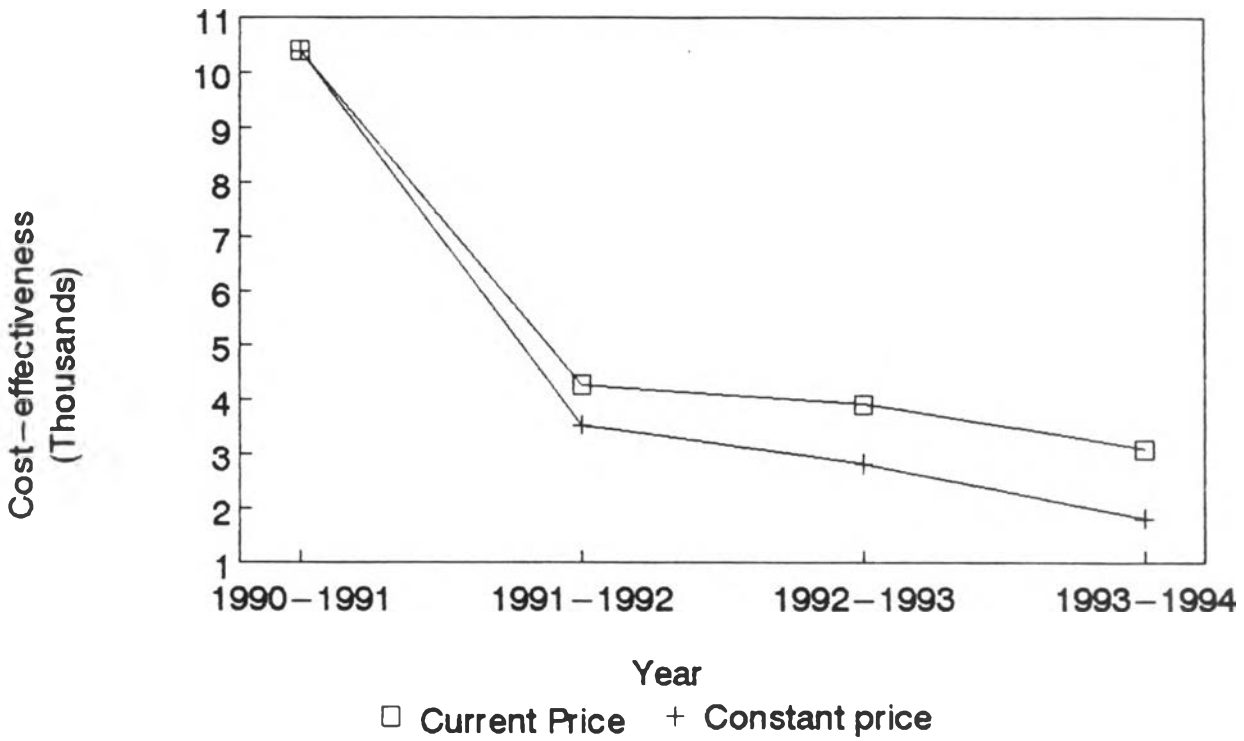


Figure 5.16: Cost-effectiveness Ratio of the Programme in both Urban and Rural Areas



Effectiveness was expressed in this study through the average number of teeth saved from decay per child.

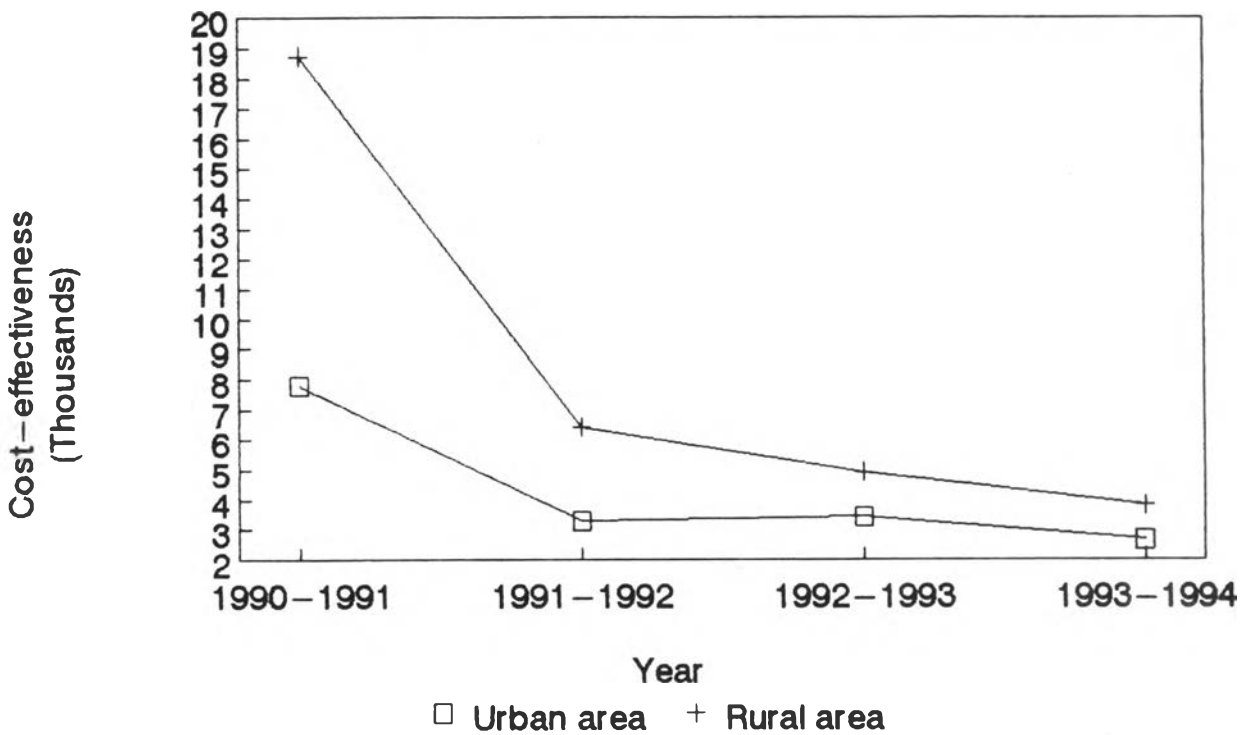
Together with the cost, effectiveness of the programme has increased year by year during the 1990-1994 period.

The cost-effectiveness ratio decreased year by year using 1990 price for calculation and the cost-effectiveness ratio is high in the first year and then decreased steadily in later years when current price was used for calculation of costs. The results in three study areas are similar. These results reflect the instability of the prices of medical equipment and drugs in general and dental equipment and drugs in particular in Vietnam during this period.

The cost-effectiveness ratio showed that one tooth was saved per child when a certain amount of money per child was expended. For example, one tooth was saved per child in 1994, when 2834 Dong (1990 price) or 5276 Dong (current price) was expnended per child.

Looking at the cost-effectiveness ratio between urban and rural area, cost-effectiveness ratio in urban area is lower than that of rural area, especially in the first area. There is a difference of average cost and effectiveness between two areas. In rural area, the average cost is higher than that of the urban area, while it's effectiveness is lower than that of the rural area. That's why it is necessary to reduce the costs of the programme (Figure 5.17).

Figure 5.17: Cost-effectiveness Ratio in the Urban Area and Rural Area 1990-1994



Comparing the costs of saving one tooth per child to the costs of having one treated tooth per child, this cost is still low. If a child suffers from decay, the minimum bill that he has to pay for treatment is 10,000 Dong (Public price). Beside the cost for dental treatment the child will loose time from study and his parent will also loose time from work. Together with the cost for treatment and the lost time from schooling, the child has to incur the pain from suffering dental caries.

Although with this cost for preventing one tooth suffering from decay is effective, the prevalence of students suffering from dental caries and DMFT of the group of students implementing the programme are still increasing. Perhaps these results were influenced by the cosumption of sugar, the effects of advertising on the cosumption of sugar, the quality of care, the knowledge of teacher and their co-operation Because of limitation of manpower, the number of students who received the pit and fissure sealant service in this study was still very low, even though this

activity is most cost-effective. As some other studies mentioned it can prevent permanent teeth from cavity formation. So new lesions appeared but a to very small extent compared with the group not implementing the programme.

3. Sensitivity analyse the impacts of the input factors on the programme.

In sensitivity analysis of the impacts of the programme on the dental caries, it was found that there are two major scenarios for the change of cost-effectivness ratio.

Firstly, in the total costs of the proramme establishment and operation, recurrent costs shared the greater part. The change of any item of the recurrent costs will lead to the change of total costs, average cost and cost-effectiveness ratio. Table 4.45, Table 4.46, Table 4.47, Table 4.48, Table 4.49, in chapter IV present the total costs ,average cost, cost-effectiveness and the change of percentage of the cost- effectiveness ratio for every year when one item was changed. Among these items the results showed that annual consumable costs is the most important item because when ACC were changed, the change of total cost, average, and cost-effectiveness is greatest and vice versa. That means the recurrent costs of the programme mostly depend on the price and the number of units used of consumables. When the price and the number of united used of consumables increase, the total costs, average cost, and the cost for one tooth saved will increase. It is necessary to find the way to reduced the costs of the programme in oder to achieve the greatest cost-effective of the programme.

Secondly, when effectiveness is decreased and the costs remain unchanged, the change of effectiveness leads to the change of cost-effectiveness ratio.Table 4.50 shows that when effectiveness decreases 20%, the cost-effectiveness ratio increase 25% compared to the cost-effectiveness ratio in the beginning.That also means an addotion sum of 25% of costs is needed for one tooth saved. In this case, the factors that have impact on the effectiveness of the programme, have to be carefully thought about such as the knowledge f the teachers, their co-operation in dental health education activities and the quality of dental services in the schools to made the programme more effective.