10th WEDC Conference

Water and sanitation in Asia and the Pacific : Singapore : 1984

Manpower development for the Water Decade in SE Asia

I and Mrs R Vickridge

INTRODUCTION

Shortage of manpower is often given as one of the principal factors in failure to meet water decade goals. This paper examines the roots of the shortage in S.E. Asia, and sets the question of manpower development for the decade within the larger context of education policies in S.E. Asia, since it cannot, we feel, be considered in isolation from the question of educational priorities within national development planning.

Of the many problems relating to manpower development we have chosen to focus on one specifically which we refer to as the "missing link", a product of historical circumstances, value orientations, and previous education policies.

ALLOCATION OF EDUCATIONAL RESOURCES

Universities, Polytechnics and Trade Schools

Ideally, the pyramidal structure of manpower requirements (from artisan to technician to engineer) should be mirrored by the availability of training and education facilities (from apprenticeships and vocational schools to polytechnics to universities). An analysis of post-secondary education however reveals, an imbalance in favour of the universities at the expense of a network of localised trade schools or vocational centres. This stems from the unrealistically high expectations, typical of the 50's and 60's, of the university as a catalyst of economic growth, which skewed the education budgets of many newly independent states at that time (1). Furthermore in previously colonized countries it reflected the perpetuation of a system for creating an indigenous bureaucratic elite, and the immediate post-colonial need to quickly fill vacancies in a newly independent government (2). Educational investment has as a result been highly concentrated within a few urban centres and within a small educated elite, which has subsequently been able to defend the perpetuation of an expensive and arguably wasteful syphoning of resources by universities.

Most S. E. Asian governments have now recognised the need to expand provision of technical and trade schools and have made plans to accelerate manpower development in these areas. In part this stems from saturation of government departments following rapid tertiary expansion, and growing unemployment among graduates. Furthermore, it represents a recognition that university expansion does not of itself ensure socio-economic development. In Thailand, students are now being encouraged to take vocational training instead of entering universities (3). The Malaysian government has planned more polytechnics, vocational and trade schools and stress is to be placed on vocational subjects (3,4). Although the first polytechnic in Indonesia was not established until 1976, six more were in operation by 1982 and eleven more are now being planned. Development and upgrading of vocational schools throughout Indonesia is also under way (5).

One of the major obstacles to expansion however, is the lack of qualified and experienced staff required for the new institutions. Whereas in industrialised countries it is possible to recruit experienced technicians from industry, in developing countries industry is in its infancy and skilled experienced personnel is more rare (5). This fact and the excessive value placed on formal paper qualifications (see below) means that many teachers are selected with little or no hands-on experience. A recent workshop on industrial training in technician education supplied examples of polytechnics recruiting staff from their own graduates without their being able to meet requirements of industrial experience, and this is reflected in curricula within vocational schools "which are still too theoretical and academic in nature without proficient skill training facilities" (5). In addition the wage differentials between industry and teaching act as a deterrent in recruitment of teaching personnel in Thailand, Malaysia and Indonesia (5).

Regionalisation

The top heavy distribution of educational resources has had an added geographical dimension in that universities have been heavily concentrated in capital cities or other major urban areas. Lack of community

and regional establishments has heightened the gap between city and rural hinterland and has strengthened the pull and primacy of the capital. For those students from rural areas who have succeeded in gaining access to university, there has been little benefit to their community of origin since most graduates choose to remain close to the jobs and opportunities of the metropolis.

The current concern with regional and especially rural development however has led most S.E. Asian countries to adopt some form of regionalisation of its tertiary education. Thus in Malaysia, although the universities are concentrated in Kuala Lumpur, the MARA Institute of Technology has set up four regional campuses offering lower level courses which can prepare students for more advanced courses at the main campus (6). Indonesia has a number of universities outside the Jakarta area and has recently developed a Teleprogrammed Educational System, whereby educational programmes can be transmitted from Boger/Jakarta to eight state universities (3). Since 1964, three regional universities and a community college have been established in Thailand. Other Thai innovations designed to make education more accessible to the rural population include the Open University (established in 1978) and the rural doctor scheme operated by Mahidol and Chulalongkorn Universities in Bangkok. Under this scheme, 10% to 15% of places in the medical schools are allocated to applicants from rural areas in anticipation that they will return to practice there on completion of their course (7). It is understood that this scheme is to be extended to engineering schools of some Thai universities.

While innovations like these mark significant breaks with the centralisation of the past, one could argue that institutional decentralisation has no impact on regional development unless incorporated within a comprehensive and multi layered system embracing local and regional levels. Whereas tertiary education may have a role in rural development, many would now argue that this is only as one part of an integrated system made up of primarily non-formal education through for instance adult education, apprenticeship programmes and vocational training, and on to a step system of education linking lower to higher level institutions. Such a system would have an important geographical dimension in that it would create a network of opportunities incorporating village, district and regional centres, and would increase the regional significance of tertiary institutions. We suggest that this would also be a prerequisite for tackling the training needs of the water decade, since this would create the decentralised and integrated structure necessary both for manpower training and project implementation (8).

Meeting Regional and National Needs

The orientation of the typical engineering department limits its contribution to national and regional development programmes. Thus curricula compare closely with their counter parts in industrialised countries, more because of the educational backgrounds of their teaching staff (many of whom train in the west) than their appropriateness to local needs and circumstances. This has been variously explained as a particular type of post colonial dependency in the form of the 'captive mind' (9) within the academic population, or perhaps more correctly, as an indication of the orientation and personal career aspirations of the staff to the status and privilege of established western institutions. Whatever the reason, the result has been a failure, for the most part, to interpret theory creatively or to develop curricula appropriate to local circumstances. This absence of a local or national orientation within the universities has been critical in view of the limited development of alternative forms of post-secondary education. The implication for the water decade is that graduate engineers are poorly equipped to deal with the pressing problems of environmental and community health (e.g. in terms of rural development or urban squatter upgrading), in which the role of the water and sanitation engineer is crucial.

Nevertheless the university in some S.E. Asian countries has seen some substantial curricula restructuring in areas central to a diversifying economy. For instance the "advanced developing" countries of Singapore and Malaysia have achieved considerable success in linking specialized research and curricula development to key economic targets i.e. finance and marketing, and agriculture respectively (1). By contrast there are few direct economic pay-offs to be had from water decade objectives and there has been no comparable motivation in curricula restructuring. The current concern with rural development, particularly in Malaysia and Thailand has encouraged some universities to set up multi disciplinary field projects and yet even these have not yet included engineers within their development teams (7). However, there are degree courses in Water Resources and Rural Development being offered by universities in Thailand (10). An optional subject in rural engineering is also offered as part of the engineering degree programme at Chulalongkorn University in Bangkok.

On the whole, in the absence of external pressure for appropriate curricular development, academics seem slow to recognise and respond to the needs and challenges of regional and national development, which clearly call for a rethinking of conventional approaches and imported solutions. Lack of funds, shortage of staff and facilities, problems of co-ordination and communication have all been cited as obstacles to innovations in Thailand (7). However severe these obstacles may be, we suggest that it is the conservatism of academics, who are often constrained by inappropriate and outdated notions of academic excellence and lack the confidence to initiate curricula reforms which have not originated in established institutions of the west, that is the major stumbling block to any innovation. Curriculum reform may prove impossible when 'appropriate' and 'practice-oriented' engineering is seen as a threat to the aspirations of academics who equate 'appropriate' with unprestigeous, rural with backward, and 'practice' in engineering as best befitting operative, technician and non-professional levels. It is to this latter problem of value orientation among graduate engineers that we now turn.

VALUE ORIENTATIONS, THE 'MANDARIN' SYNDROME AND 'DIPLOMA DISEASE'.

We suggest that, in S.E. Asia, there is a cultural and historical predisposition to regard manual and practical work as being of low status and personally demeaning, whilst the 'mandarin', whose long fingernails symbolise a life of the intellect, devoid of labour, still represents for most students the promise and meaning of higher education (11). This cultural tradition in, for example, both Chinese and Indian societies was preserved and perpetuated in colonial periods around a formal and qualification - oriented education system, and exists still as a deep rooted bias which clings tenaciously despite changed economic circumstances. Thus the irony is that engineering students aim, not at a career on the factory floor or construction site, but rather one which emphasises desk work. Many students newly returned from higher education overseas have moved immediately into administrative positions with no experience of engineering practice other than that acquired during their education.

Even in the relatively well developed nation of Singapore, which has a well established tradition of engineering education at university and polytechnic levels, it is apparent that the majority of engineers are employed as administrators or designers in government departments or consultancy firms. There is only a small proportion of civil engineers employed by construction companies with the inevitable result that the country is largely dependant on the services of overseas contractors for major civil engineering works. However, it is interesting to note that, in this case, a strong government with a pragmatic approach has been able to establish a totally new institute (Nanyang Technological Institute) which publicly adopts a 'practice-oriented' approach to engineering education in order to meet the demands of the manufacturing and construction industries. The establishment of the Nanyang Technological Institute (NTI) in 1981 was in itself an implicit recognition of the 'mandarin syndrome' and an attempt to overcome it. The majority of academic staff employed by the Institute have recent industrial experience and emphasis is placed on laboratory work, projects, design and industrial attachments. More importantly, in terms of overcoming the 'mandarin syndrome', the degree course incorporates a ten-week in-house practical training programme, which, for civil engineering students, involves the actual construction of a reinforced concrete structure (12). The greatest resistance to, and sceptism towards, such innovative programmes has come, not from government administrators or local engineers, but rather from the academic staff themselves. The success of these innovations has now largely overcome this resistance, but the point is that, even with strong government direction backed with substantial financial resources, it may still be difficult to implement radical innovations in educational programmes, particularly in long established institutions.

Secondly, the screening or selection theory of education is extremely widespread and resilient in S.E. Asia (2). According to the theory, the principal purpose of education is to screen students for entry to a small elite (ie. the modern-day mandarin concept). Formal qualifications thus become of supreme importance as a determinant of social position, and students aim at a university education for the qualification it brings rather than its content, and for the economic security this guarantees. Even the present incidence of graduate unemployment has failed to diminish the aspirations of school students to eventual university entry. "As a means of selecting a small colonial or post-colonial elite ... qualification-oriented schooling was a feasible (if arbitrary and expensive) method" (2). However it makes less sense in technologically emerging societies. An excessive 'qualification-consciousness' begets the 'diploma disease' (13) which has a stultifying and economically dysfunctional effect on

practising professions like engineering, by undervaluing the crucial importance of experience and overrating paper qualifications.

Thus figures on manpower availability often conceal the true potential of a population by excluding those who may already be practicing as plumbers, fitters, welders etc. but have not received formal training as such. Furthermore, engineering education is overloaded with qualified teachers with no practical experience (5), and whose teaching reflects this absence, yet qualifications still have more weight than experience in all but the most innovative of programmes. It could however be argued that experience is as, if not more, appropriate at all levels, but especially in artisan and technician training, where current shortage of teaching staff is said to be most severe.

THE MISSING LINK

The lack of 'practical' professionals and 'educated' artisans has resulted in what might be described as the 'missing link' in the operative-professional chain - a link which is vital to the successful implementation of civil engineering works in general, but even more so in the context of water decade objectives. It is the void that exists between designers and implementers of projects - a void that should be filled by an overlap in training and experience to provide a common ground and common language.

This problem of the missing link in the administrative chain is compounded by its geographical dimension. Professional engineers tend to be heavily concentrated in the urban areas whereas it can be argued that it is the rural areas which have the most urgent needs in water and sanitation. Rural artisans and technicians have little opportunity for upgrading their skills, and graduate engineers show little desire to return to or work in rural communities. Thus, the problems of implementing plans made at a national or even regional level are immense and plans made at community level are liable to be either unworkable or ineffective due to insufficient input from suitably qualified engineers.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion we put forward proposals which fall roughly into two categories - those which need to be accepted and operationalised at government policy making level, and those which relate to existing institutions and which normally could be adopted without reference to a higher authority.

Within the former category, we recommend firstly a 'stepped' system of education whereby students could move from trade to technician to professional engineer levels, preferably with periods of practical work experience between each step. This training and education should take place in regional centres, should be specifically geared to water and sanitation and should incorporate a substantial amount of practical training and project work.

Secondly, there should be continued expansion of 'lower level' trade and vocational schools, combined with apprenticeship schemes, and furthermore, that the value of 'non formal' education be recognised and its expansion included within development planning.

Thirdly, that this multi level system of manpower training and education be developed at regional and district level thus providing a decentralised training structure to which rural village as well as urban squatter community would have access.

These recommendations stem from our belief that 'bottom-up' skills development as opposed to 'top-down' formal knowldege filtering is the only framework within which water decade objectives can be met. However, redirecting educational resources and establishing new training institutions takes political will, time and money. The goals of the water decade and the training required to meet these do not have the same political pull or clear-cut economic payoffs as areas more central to national economic growth.

Unless, therefore water and sanitation are incorporated under a politically more fashionable, or growth-related umbrella (like for instance 'rural development' which has high current acceptability in S.E. Asia) then they are likely to receive low priority, despite official statements to the contrary.

With regard to existing educational institutions, we recommend firstly that substantial curricula reforms be made in order to reflect and meet national and regional needs. The boundaries between the traditional engineering disciplines (civil, mechanical and electrical) are, after all, fairly arbitrary and there seems no reason why courses in, for example, rural development engineering (as opposed to municipal engineering) or water resources engineering (as opposed to structural engineering) should not be offered. Secondly, practical training should form an integral part of engineering courses at all levels and although practical training project can be expensive (12), we suggest that costs can be

minimised and benefits gained by organising real field projects rather than simulated ones.

Although reforms within existing education institutions may be more economically feasible than the more far reaching national reforms previously recommended, we suspect that there is likely to be strong resistance from within the institutions to such change for reasons already outlined. Thus, the recommendations made so far, would appear to have little prospect of successful implementation in the short term. Lastly, however, there is one major innovation that governments could make which may have a substantial effect on skilled manpower availability for national development generally and the water decade in particular. That is the explicit recognition of the importance of practical experience as opposed to paper qualifications, in assessing ability at all levels from engineer to artisan. The 'learning by doing' argument is gaining increasing support, and in terms of decade objectives it may be necessary to follow the Japanese example, set in the period of national reconstruction following World War II, when requirements for formal qualifications were shelved in the face of the massive task of reconstructing and upgrading water supply facilities (14).

All recommended changes, including this last one, are likely to meet with resistance and some may require substantial financial resources to implement. Realistically therefore, we suggest that, until this opposition can be overcome or the necessary finance made available, there will continue to be a need for and reliance upon the industrialised nations to provide specialised education and training through consultants and contractors (who are becoming increasingly aware of and able to meet the need for training) and specialised university departments (such as WEDC) who are able to tailor courses to specific needs.

REFERENCES

1. Altbach, P. G., Higher Education in the Third World. Maruzen Asia, 1982.

2. Snodgrass, D. R., Inequality and Economic Development in Malaysia. Oxford University Press, 1980.

3. RIHED Bulletin. Regional Institute of Higher Education and Development. 1983, Oct-Dec, Vol. 10, No. 4.

4. RIHED Bulletin. 1983, Jan-Mar, Vol. 10, No. 1.

5. F. J. C. Pala, Regional Workshop on Industrial Training in Technician Education. Journal of Engineering Education in Southeast Asia. 1983, June, Vol. 13, No. 1, 25-47.

6. RIHED Bulletin. 1983, July-Sept., Vol. 10, No. 3.

7. Wichit Srisa-an. Innovations in Higher Education for Development in Thailand. Maruzen Asia, 1982.

8. I. and R. Vickridge. The Water Decade - The Need for an integrated approach to training and education. 4th Asia Pacific Regional Water Supply Conference, Jakarta, 1983, Nov.

9. Syed Hussein Alatas. The captive mind and creative development. Asian values and modernization (ed. Seah CM), Singapore University Press, 1977.

10. Paiboon Suthasapa et al. Tertiary Education and Rural Development in Thailand. Maruzen Asia, 1982.

11. Ho Wing Meng. Asian Values and Modernization, in Seah, C.M., op. cit., 1977.

12. C. N. Chen, I. G. Vickridge, W. K. Yip and P. Ang. In-house practical training programme for civil and structural engineering students. Recent Developments in Engineering Education, AEESEA, 1983, Dec.

13. Dove, R. P. The Diploma Disease; Education, Qualification and Development. University of California Press, 1976.

14. Hidenori Aya. Efficient system for dissemination of water supply technology. 4th Asia Pacific Regional Water Supply Conference, Jakarta, 1983, Nov.