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THE NATIONAL TRANSPORT RESEARCH CENTRE

(FINAL REPORT)

NTRC-21

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SECRET
(When Applicable)

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INTRODUCTION

The remit for the mission was :

- a) Advise on organization and staffing of the National Transport Research Centre.
- b) Identify areas of research and formulate a work programme for the Centre, further to the Interim Report of last year.
- c) Advise on the implementation of recommendations made under a) and b) above.

The mission was to be in two stages: the first stage was undertaken in April 1977 and the findings contained in an Interim Report; the second stage has just been completed and this report relates to that second visit to Pakistan. The report concerns itself with changes in staffing that have taken place since the first visit and recommendations were made, and with an analysis of the current and proposed research programme of the Centre. In my first report I commented on the position on the NTRC in the general planning process. Its position today is identical with the situation 12 months ago and I see no reason to alter my opinion relating to this which I expressed in my previous report. I have accordingly repeated that section of my previous report here both on account of the unchanged situation and recommendation, and also as general background information to this report. There then follows a section on the present and proposed research programme and on staff.

Summary of Recommendations:

1. There is little organized transport planning research taking place in Pakistan either within or outside Government. The NTRC has, therefore, a very vital role to play. In two or three years when the NTRC has built-up experience and a body of data it should be vital source

of advice and information.

2. There is still a great need to change the staff emphasis: towards Economists in the NTRC.
3. Senior staff would benefit from short periods abroad with research institutions to obtain exposure to research organization.
4. There is a very great need to increase substantially the number of posts below Deputy Chief. These lower level staff, however, will probably need basic training abroad.
5. It is very inadvisable for the NTRC to lose control of any of its research projects through employing national consultants or relying on national transport agencies for data collection, i.e. the NTRC must control data collection carried out by others.
6. Given the present skills and manpower of the NTRC it is advisable to concentrate on fairly small research projects. These should, however, be so selected that they form elements of an overall planning process.

SECTION-I

1. Transport is the responsibility of four Federal Ministries the Ministry of Railways responsible for the Railways; the Ministry of Defence responsible for air transport; the Ministry of Communications responsible for road transport, shipping and ports; and the Planning and Development Division (formerly the Planning Commission) which is responsible for co-ordinating and approving requests from all other Ministries.
2. The Provincial Governments of Punjab, Sind, North West Frontier, and Baluchistan are responsible for highway planning except where a road is designated a Federal road. Up to the present only one road has been so designated, namely the planned Indus Super Highway which is scheduled to run from Karachi to Peshawar on the West Bank of the river Indus.
3. Responsibility for the Indus Super Highway lies with the Indus Super Highway Board. This Board⁽¹⁾ is part of the Ministry of Communications.

(1) Since my last visit the Board has been renamed and is responsible for all Federal Highways.

The importance attached to this Project by the Federal Government is reflected in the fact that the Indus Super Highway Board is larger than the Communication Division of Ministry of Communications, the Ministry of Railways, and the Ministry of Defence.

4. Additionally, there are a number of autonomous operating companies. The most important of these are Pakistan International Airways, the two State Shipping companies, Pakistan Railways, the Karachi Port Trust, and the four Provincial Road Transport Corporations, which are responsible for inter-urban bus operations. Since the beginning of 1977 responsibility for urban bus services has been assumed by the Federal Government through the Urban Transport Corporation.
5. The planning process can start at any level, i.e. it can start with the operating companies and move through the relevant Ministry to the Planning & Development Division itself.
6. The Ministries of Communications and Railways and the Aviation Division of the Ministry of Defence are all small Ministries with no specialist Economic or Statistical sections, and this of necessity places constraint on their actions with respect to planning.
7. The Planning & Development Division is sectionalised with the Transport & Communications Section responsible for transport matters. The Transport & Communications Section is very small (six officers at present) and staffed entirely by Engineers. The National Transport Research Centre is an offshoot of the Transport & Communications Section of the Planning and Development Division.

8. The Establishment of the National Transport Research Centre:

During the period 1969-71 the International Bank for Reconstruction and Development financed the West Pakistan Transport Coordination Project (TRACO). In its recommendations of June, 1971, TRACO suggested inter-alia the establishment of :

- 1) A Permanent Inter-Provincial Transport Council
- 2) A Central Transport Cell.

It was suggested in the recommendations that the Council was necessary to coordinate transport activities, and that it should comprise representatives of the Federal and the Provincial Govts., with power to agree to investigation programmes. Additionally it was suggested that the value of the Council would be enhanced if it included a representative of the Pakistan Western Railway, the Highways, the Karachi Port Authorities and of Pakistan International Airways. Private transporters should also be represented though their role would be mainly that of Observer. In order to allow the discussions of the Council to be based upon expert and impartial advice it was further recommended that a Central Transport Planning Cell be established.

9. The TRACO report recommended that the Central Transport Planning Cell should be organised along the lines of the Institute of Transport Economy in Norway, and that it should continue the research commenced by TRACO. In relation to staffing it was recommended that the Cell be headed by a 'highly qualified and dynamic transport economist', and that after commencing on a small scale it should grow after a few years to 40 or 50 members.

10. In the event the Government did not take up the recommendations to establish a Permanent Inter-Provincial Transport Council, but in 1975 it was decided to set up the National Transport Research Centre as a part of the Planning & Development Division. The Secretary of the Planning & Development Division has pointed-out

that the establishment of the NTRC stemmed directly from the TRACO recommendations, and although separate research Cells were not generally favoured it was considered advantageous in this instance because transport was the responsibility of a number of Ministries and agencies, and some coordinating body was necessary.

11. The concept of the coordinating role was, therefore, identical with the recommendations of the TRACO report, the difference lay in the fact that the NTRC was a branch of the Planning and Development Division itself staffed by career civil servants, and not an independent cell with remuneration not falling into 'a rigid government scale', as suggested in the TRACO report. It should be noted that there is not general agreement that this research centre should be an off-shoot of the Planning & Development Division, with the Secretary of the Ministry of Communications expressing the view that it should be attached to his Ministry.

12. I consider the concept of a Permanent Inter-Provincial Transport Council to have been ill founded. It was to have no direct role in the planning process in that it could make recommendations but there was no obligation for the relevant Ministries or agencies to heed them, let alone act upon them. Secondly, it was to have been composed of vested interests (i.e. the Provincial authorities plus the State Transport Operating Companies), but not all vested interests (i.e. the private operators - including the whole of road haulage and a major part of road passenger transport). I support the decision not to implement the TRACO recommendation.

13. Given that real power in relation to planning appears to reside in the Planning & Development Division and also that it is the only place in government where all modes of transport can be considered, it is appropriate that transport research should be located in that Division.

14. A restructuring of government departments and the overall planning process might lead to different conclusions, but I consider such a discussion to be outside my remit.
15. As presently constituted the NTRC is part of the Planning & Development Division and the head of the Transport & Communications Section of the Planning & Development Division was the first head of the NTRC. The advisability of such a situation might be questioned, for the Centre is neither in a position to dispense independent advice (as originally recommended in the TRACO report) nor an integral part of the decision making process in the Planning and Development Division (as is the case of Economists and Statisticians in the United Kingdom Department of Transport). I feel that the present position of the NTRC within the present governmental structure is a satisfactory one.
16. The present form of the NTRC allows it to be consulted much more freely than a normal Government Department; it can attract foreign experts more easily and it is able to hold Seminars and Training sessions. On the other hand it also has direct access to the Planning & Development Division, and members of the NTRC participate in the Planning & Development Division's committees and discussions. There are financial advantages in such a situation in that the NTRC is financed out of the Development Budget whilst sections in the Planning and Development Division are financed out of the revenue budget.

At the present stage of development I would not advocate a change in the position of the NTRC within the machinery of government.

SECTION-II

Research Programme

1. At the present time the NTRC has suggested nineteen research projects including the establishment of a Data Bank. Of these nineteen, six have received financial approval. The six for which financial approval has been gained are listed below with their respective budgets:

	<u>Total Cost (R's)</u>	<u>Exp. 1977-78 (R's)</u>	<u>Exp. 1978-79 (R's)</u>
1) Psychological attitudes towards highway safety	16,000	8,000	8,000
2) Accident study for Punjab	9,644	9,644	-
3) Fuel Consumption study	17,000	23,500	23,500
4) Use of liquid propane gas	7,000	7,000	-
5) Travel Speed Study	60,000	30,000	30,000
6) Selection of buses for public sector road transport agencies.	30,000	15,000	15,000
	<u>169,644</u>	<u>93,144</u>	<u>76,500</u>

The remaining projects for which financial approval is sought are:

	<u>Estimated Cost (R's)</u>
7) Effect of Driver Education on Highway Safety.	50,000
8) Traffic Factor for Pakistan	67,900
9) Manual of Uniform Traffic Control Devices.	50,000
10) Inter-model choice motivation	100,000
11) Manual for Technical Appraisal of Projects.	75,000
12) Selection of Road Construction Machinery for Highway Agencies.	60,000
13) Rural Highway Planning System	8,300,000
14) Origin and Destination Survey	1,000,000
15) Vehicle Operating Costs	75,000
16) Traffic Forecast	20,000
17) Up-dating Manual of Economic Appraisal of Transport Projects	50,000
18) Criteria for selection of Transport Projects for ADP	50,000
19) Setting up data bank in NTRC.	500,000
	<u>10,397,900</u>

The Government has approved a sum of 900,000 R's towards the cost of these projects in the next financial year.

2. Files are available in five of the six approved studies (no file is available for the study on the use of liquid propane gas); no detailed files are available on the remaining projects.
3. On the basis of an examination of the files for the five approved studies and discussions with the main staff members of NTRC involved in these and the proposed studies, the following general observations can be made in relation to the scope and planning of research projects.

Scope of Research:

4. There is a natural tendency to want to tackle the major transport problems facing Pakistan and to tackle them immediately. However, at this stage I feel it is important that a young research team develops its expertise and its skills in this area of research before tackling major projects. Further, it is much easier to verify the accuracy of the data base for small, as opposed to large, projects. From the investigations I have made I feel that the NTRC should collect its own data, rather than rely on those collected by other bodies, and this must of necessity limit the scope of the research programme (the point is dealt with in more detail below in relation to the discussion of particular projects).

Organization and Planning of Research:

5. Although an individual member of staff should be responsible for a particular project it is important that each project be discussed at length between the senior members of staff. The idea behind the suggestion of multi-disciplinary research centre was that different disciplines could be brought to bear upon a particular problem. But even if only a single discipline is concerned regular exchange of views is vital to the research process.

6. Great attention must be paid to establishing hypotheses and defining the exact nature of problems about which information is being sought. The intended analysis, including tabulations, should be clearly defined before any survey or investigation commence. This is vital on two counts: (1) it ensures that the necessary information will be collected, (2) it avoids the collection of unnecessary data. There is a tendency to try and acquire as much information from a survey as possible - this has negative results and should be avoided.

7. Questionnaires should be as short as possible on the ground that :

- 1) The response rate is improved,
- 2) A small number of questions tend to be more accurately answered than a large number,
- 3) The actual collection of data and their processing are thereby simplified.

Where questionnaires are used advice should be widely sought on their form.

8. It is important that the methodology be accurately recorded. This has two advantages: firstly, it requires the researcher to go step by step through the project, and secondly, it prevents any misunderstandings between the researcher and his investigating team.

9. In the following discussion of the specific projects the points made above will be highlighted.

Specific Research Projects

Psychological attitudes towards highway safety

10. It was hypothesised by the NTRC that a possible factor leading to the higher accident rates and traffic offences in Pakistan than Western Europe was due to psychological factors. Particularly the attitude of drivers in Pakistan towards fate and death.

11. It is the intention to interview 160 road users who had committed traffic offences, i.e. twenty in each of eight categories. The categories of road user are: drivers of buses, vans, trucks, cars, rickshaws, motorcycles, plus learner drivers (all vehicle types) and pedestrians.
12. I have read the letter of Mr. H.S. Plunkett of the U.S. Agency for International Development - Mission to Pakistan of 27 Feb., 1978, replying to a request for comments on a draft questionnaire, and find myself fully in agreement with his remarks. In particular his first comment about lack of initial preparation is most important. It is absolutely vital to set out hypotheses, methodology, and analysis in detail before any field work is attempted.
13. Because no testable hypotheses have been set out, an extremely long questionnaire has been prepared which tries to cover everything. Further, there was no information available on the type of analysis, and from the form of the questionnaire it did not appear that ranking-scales of the type commonly employed in this type of work were being used.
14. In relation to the methodology, there are obvious advantages in being able to relate the interviews to a specific case which is still fresh in the memory of the interviewee. I am not aware of the legal position in relation to holding such interviews, in particular where prosecution is contemplated, immediately after the offence. However, presuming there is no legal problem, I would not advise holding such interviews at the roadside at the time of the offence, as was suggested in the methodology for some of the interviews. The situation is likely to be too tense, especially with a police presence, to elicit very meaningful information. Interviews should preferably take place away from the scene of the offence but within a relatively short time of the offence taking place.

15. In order to reduce the number of variables it might be possible to take a number of road sites - selected because a certain specific offence is likely to occur at each individual site which is different from the other sites - and only interview people who commit the specific offence for which an individual site has been earmarked. Car drivers, for example, would be interviewed who had committed offence A at site X, thus problems of comparing different offences under different circumstances are avoided.
16. It is necessary to differentiate between types of road user as peoples' attitudes possibly vary with vehicle type.
17. Finally, the use of small group sessions and in-depth interviews which are standard practice in social-psychology should be seriously considered. Such techniques are extremely valuable in developing hypotheses to be later tested with a questionnaire survey.

Accident study for Punjab

18. The aim of this study is to identify the accident rates at roads & links of the Punjab highway network in the first instance, and subsequently to extend the study to all four provinces. Basically it is intended to analyse the police accident reports on a computer, identify black-spots on the network and possible causes of accidents at each. An on-site investigation would then be made of the individual accident black-spots and remedial suggestions made.
19. Normally one would not expect such a study to be made by Central Government. It is much simpler for accident black-spots to be identified by local authorities and the necessary action taken (with the assistance of Central Government if necessary). However, if local machinery cannot be established it might be better to try to carry out the exercise nationally rather than not to act at all.

20. There, are, however, serious doubts as to whether such a study could be carried out at the present time. It appears from enquiries that the police accident figures are very incomplete; it has been suggested that damage and injuries are only recorded when a fatality is involved.

21. It is vital, in the first instance, to establish a satisfactory system of accident reporting. I understand that an advisory team from the United Kingdom is assisting in this respect, and would only add that I feel it necessary to keep the length of the accident reporting from to the barest minimum.

Vehicle fuel consumption

22. This study is justified on the basis of a need for vehicle (mode) operating cost figures. It is argued that fuel costs are the most accurately measured element of operating costs as well as being a major element in those costs.

23. The tests will be carried out for different types of road and vehicle (i.e. bus or car: not make of vehicle) at various constant speeds. One important road condition not specifically mentioned is road congestion. It is important to tie this study in with the Travel Speed Study discussed below in which congestion will play an important role. Test should, therefore, be made of fuel consumption on the roads selected, on the basis of differing congestion levels, for the travel speed study. The two studies can then be combined to provide information for road investment analysis.

24. I feel it is highly dangerous to use anything other than specialist testing equipment to carry out this investigation, and suggest that the appropriate equipment should be purchased.

Travel Speed Study

25. Travel speeds are an important input in transport investment studies and in modal choice studies. It is on these grounds (and the lack of such information for road transport) that the

justification for this study is made. This is a well prepared study, and pre-coded data collection forms follow the standard lines.

26. The basic factors being tested are terrain, type of road, and congestion on speeds of different vehicle types. The important point upon which to concentrate is the effect of road up-grading on vehicle speeds. This is particularly important in relation to the lessening of congestion, rather than improvement of road surfaces, as the bulk of traffic moves on metalled roads.
27. It had been suggested that the speed tests should be conducted in various parts of the country in order to take account of regional variations as well as the four factors (terrain, road and vehicle types, and congestion) already mentioned. I feel, however, that the regional factor is not likely to be very important, and that it is more important for the NTRC to retain direct control and obtain accurate information over a limited area of the country, rather than less accurate (due to loss of control) and less extensive (due to budget constraints) information for the whole country.
28. The study was far enough advanced for tests to be made. The important factor in relation to these tests besides training the team, is to obtain evidence on statistical variances so as to determine the sampling technique. Two variances need to be established: firstly, variation in speeds due to road width, and variation of speeds between roads of the same type for similar traffic flows. The first variance is likely to be very important and will provide the information necessary to establish the variable sampling fractions; the second is likely (holefully) to be unimportant.
29. As mentioned previously it is important to tie in this study with the previously discussed study on fuel consumption rates.

Selection of buses for public sector road transport agencies

30. The aim of this study is to determine which are the most suitable makes of bus for each of the urban and inter-urban operations. A questionnaire has been prepared and this is being completed by an NTRC Investigator visiting bus companies and taking the information from bus company records.
31. The technique is, in fact, most unsatisfactory. The bus companies are only able in many instances to provide broad averages over all makes of buses. Thus, for example, all buses are presumed to be on the road 312 days per year, and have the same fuel consumption and tyre wear. Clearly, the information being obtained is of no value in relation to the aims of the study.
32. It is again vital to emphasize the importance of initial planning; different techniques should have been considered in the planning stages. Again, the questionnaire contains everything that the investigator considered might have a bearing on the subject, yet it does not contain one explanatory note giving precise definitions nor allow for the fact that buses may have been obtained second-hand. Questions are posed which can be answered in a number of different ways; it is just not sufficient to have a question which reads 'Manoeuvrability (in hills) _____', some type of ranking scale has to be employed so that answers from different people are as comparable as possible.
33. I suggest that a laboratory type experiment be conducted, and special records maintained for ear-marked buses. Again, so that the NTRC can keep close control of data collection, a local bus company should be used as the source of the information, provided that a sufficient range of operations and operating conditions are covered.

Proposed Studies

Effect of driver education on highway safety

34. A team from the U.K. is currently in Pakistan advising on this area and I make, therefore, no comment.

Traffic factors for Pakistan

35. This is the type of exercise that should be part of the data bank. It should, however, involve the use of automatic traffic counters. I understand, however, that there is only one such counter in the Punjab and only six in the country. The NTRC should make a strong effort to obtain more automatic traffic counters and have them directly under its own control.

Manual of uniform traffic control devices

36. This is an important exercise. I feel, however that the NTRC needs considerable advice in relation to this.

Highway needs study

37. To try and attempt to determine an optimum highway network for Pakistan on the basis of U.S. experience will not provide meaningful results. International comparisons between fairly similar countries are notoriously difficult, and between two such different countries would be meaningless. I would advise that should such a study be undertaken, even if it were possible to establish what the length of the ideal road network should be, the analysis gives no indication of where and when investment should take place - very vital factors given budget constraints. In other words there is no practical use to which the information could be put, and normal ranking processes would still need to be pursued.

Inter-modal choice motivation

38. I would disagree with the opening statements of the outline that it has been 'conclusively established' that road is cheaper than rail up to 150 miles, and over 300 miles rail is cheaper. Nevertheless, I think the intention to study short-distance rail passenger traffic is a vitally important

the NTRC has built up its own reliable data bank such exercises must of necessity be very simple. However, I feel that it is important that there be a break-down of global national forecasts. Forecasts broken down regionally and by types of freight and passenger movements are much more valuable for planning purposes.

Manual for the appraisal of transport projects

52. An original Manual was prepared by Adler and this exercise is basically to up-date it in the light of experience and time.

Criteria for selection of transport projects for the Annual Development Programme:

53. The study aims of laying down standard criteria for analysing highway investment projects and ranking them. It is sensible to lay down not too complicated standard procedures which can be applied to all requests for funds. The important thing here is simplicity, if the procedure is too complicated it will not be employed and the position will be no better than the current one. Even if only a minority of factors are standardised this is still an improvement on a situation where none is.

DATA BANK

54. A list of information which is published by the different transport agencies has been prepared and this will be brought centrally together. The vital factor here, however, is to concentrate on a few key indicators and make sure that definitions are compatible between modes. The key indicators for planning purposes which are readily available from the agencies are :

- 1) tonnages by commodity group
- 2) ton/mileages
- 3) capacity and capacity utilization
- 4) passengers moved
- 5) passenger miles.

55. It is necessary to obtain uniformity of information between the different sources in relation to such factors as :

- 1) time periods
- 2) commodity classification
- 3) the definition of capacity utilisation
- 4) the method of calculating passenger and ton miles.

Again it is important to emphasise that effort should be concentrated on a few key factors and accuracy and comparability of information ensured. The standardising of definitions for the key indicators mentioned will require lengthy discussions with the various agencies to arrive at acceptable common formulas.

56. Cost and revenue figures derived from annual accounts are impossible to unravel and are best left.

57. The origin and destination information and accident statistics mentioned earlier under the individual projects should be collected regularly and form a part of the data bank.

Staffing

58. In my interim report I suggested an organization as in chart below. Since then a full-time Chief has been appointed, a Statistician as Deputy Chief and an Engineer as Assistant Chief. The current staffing of the NTRC is, therefore, 1 Chief, 3 Deputy Chiefs, 1 Assistant Chief (an Engineer) and 1 Research Officer (an Engineer). A Research Advisory Committee to vet the research proposals of the NTRC has also been formed composed of 1 Statistician and 5 Engineers.

59. It is absolutely vital to have more research staff at the junior level, Deputy Chiefs are currently having to undertake tasks that could be carried out by Investigators and this is seriously undermining their ability to organise research. Above all Economists must be appointed; in a planning organization the staff should be biased towards Economists and not Engineers. This also applies to the

Research Advisory Committee where I feel it is extremely important to strengthen it by the inclusion of Economists. Most of the projects being undertaken and proposed are by nature of an economic assessment, and also in a planning research centre it is vital to appreciate the inter-play of transport in the whole national planning process.

60. A lack that I felt was knowledge research organization on the part of senior staff. By this is meant the ability to plan, organize and direct research projects. The organizational ability of one of the staff in relation to research projects was particularly noticeable. There seems no doubt that his professional approach had been very much assisted by a recent three month stay that he had at the U.K. Deptt: of Transport.
61. I feel, therefore, that it is important that the senior staff spend short periods in institutions abroad where they can be exposed to research organization.
62. Junior staff will also need rigorous basic training than is currently available in Pakistan, and much staff will need to acquire degree from foreign universities.
63. I understand from the Embassy and British Council that any person on a training scheme in the United Kingdom is treated as a student irrespective of his status in his home country and the type of training he is receiving. Senior staff do not consider it is financially feasible for them to undertake short training schemes at current rates of subsistence.
64. Finally, I do not consider that it is possible to overcome the staff shortage problem, even in the short-run, by handing out work to national consultants. As is mentioned earlier, it is absolutely essential, given the present state of research ability in this area, and the absence of reliable information, that NTRC staff retain control of projects at all stages.
65. Over the next two or three years the NTRC will require assistance in relation to its overall work, but after this initial period should only need to call on assistance in relation to specific projects for which they do not have the expertise.