Roads as temporary flood shelter and evacuation routes

Roads are important part in flood disaster response. Because of their higher location, they serve as emergency flood shelters and provide evacuation roads. In the past years many cyclone shelters have been constructed. The cyclone shelters however are not in all areas able to accommodate the entire population in an effected area; hence roads complement cyclone shelters and other flood response measures.
The following good practices are recommended:

- Prioritize the development and heightening of roads leading to designated cyclone shelters and killas
- Create heightened road bodies in low lying areas of the polder to create safe routes to the temporary cyclone shelters during flood events and refuge areas in the post flood scenario
- Create berms along internal roads and along specific embankments sections to temporary (15-30 days) shelter people and livestock
- Plan evacuation routes using road infrastructure, making it higher where possible

Cyclone shelter

Cattle shelter

Temporary shelters (house, garden)

Road Development to Support Water Management and Flood Resilience

With 40,000 kilometres of embankment roads, polder roads and footpaths and a population of 30 Million in coastal polders of Bangladesh - roads provide a large opportunity to serve water management and flood resilience. “Roads to the Rescue” focuses on strengthening the practicality of using roads for water management within polders and making roads instruments for flood protection. Within the polders, rural transport structures such as roads, bridges, and culverts strongly influence water flow, distribution, and water levels. These structures can contribute to better management of flood inundation, can avoid flood drainage congestion, provide better embankments and provide flood and post flood shelters.

- improved design and construction of road infrastructure in polders contributes to:
- improved road and flood safety
- inner-polder water management
- reduced road damage by water erosion and maintenance costs

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Roads for Water

Improving roads for better water management inside the polders

Coastal areas are major supplier of agricultural produce due to their proximity to urban centres and the usually conducive circumstances of adequate land and moisture. An important challenge is to manage the water levels in the extensive low-lying flat area. Roads in these area can play a major role, as usually they are in the only infrastructure present in the low-lying area that can be used to control water levels. A number of practices can be considered:

- Conduct a basic hydrological assessment for internal rural roads
- Planning and use roads and paths to more systematically serve as boundaries that separate high, middle and low lands in the polders – based on community suggestions
- Integrate cross drainage from beginning in road development, as well as dimensioning and placing culverts and pipes in accordance to hydrological catchments in the polder. For tertiary roads have adequate provision for cross drainage and engage with local communities to identify places for pipes.
- Using gated culverts and pipes so as to make these road structures instruments for water level control
- Extend culverts and pipe inlets, where feasible, and outlets to allow future widening of road embankments
- Consider in lowlying area the possible effect of roads on sediment retention and consider using road to retain sedimentation and have land rise gradually to deal with river water level rise
- Have road side borrow pits to serve as drainage ditches and provide critical dry peak/ dry season irrigation or use for fishery
- Excavating pond, canals and khals to create adequate storage for the dry season and to reuse the sediment among others, for making road embankments or flood levees
- Avoid damage to road surface by using proper water draining road templates

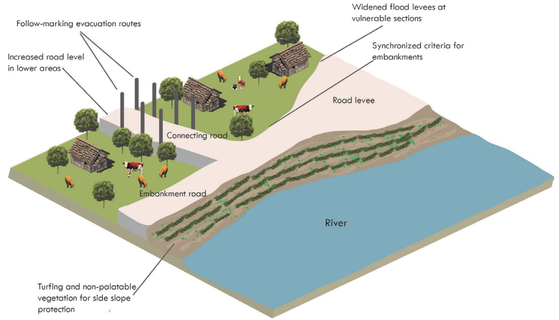
Managing water levels with gated cross drainage

Borrow pits along the road for water management

Roads and embankments as flood defence

In coastal areas flood embankments next to their role in flood protection are used for transportation. In addition, some newly developed roads in coastal areas double up as flood embankments. As different organizations may be involved (road departments, disaster risk reduction department or water departments) it is important that the criteria for roads and embankments are synchronized – with regards width, side slope and height. Similarly the planning of the development of roads and embankments should be coordinated. Traffic functions and flood safety should be combined and not compromised either way.
This is an overview of recommended improved practices in this field:

- Synchronize criteria for roads and flood embankments
- Consider the use of low embankment roads with controlled overflows to save costs and have managed flooding
- Plan the effect on roads on wetting and drying of upstream and downstream flood plain
- Use turfing or vegetation with high value non palatable crops such as vertiver for side slope protection



Synchronize road and flood embankment criteria

Use of turfing combined with jute netting for slope protection