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STRENGTHENING BANGLADESH: TRANSPORT, SUSTAINABILITY AND BETTER LIVES

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Abstract

Bangladesh confronts extreme levels of traffic congestion and air pollution, with resulting traffic accidents and health problems for those who live in urban areas. Potential alleviation of these problems lies in the progressive closure of sections of Bangladesh's major cities to motorised traffic so as to prioritise the use of rickshaws in those sections. Rickshaws are an efficient, versatile and sustainable form of transportation. Virtues of this solution include the practicality of its implementation and the way in which it takes account of, and utilises, Bangladesh's existing strengths. Outcomes include less congested and safer roads; less noise and pollution; enhanced accessibility; and rickshaw pullers being more valued and held in higher regard. Implementation brings with it the possibility of economic, social and welfare improvements for low- and middle-income people of Bangladesh. Prioritising rickshaws and non-motorised transport prioritises environmental quality and improves the quality of life of all Bangladeshi people.

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Rapid and ongoing urbanisation in Bangladesh has resulted in a myriad of problems including extreme levels of traffic congestion and air pollution. It has also caused traffic accidents, health problems and access issues for the urban population – and this despite non-motorised forms of transportation (NMT) being the dominant mode of transport. One such form of NMT - the rickshaw - is one of the most important sectors of the domestic economy.

We propose in this paper the progressive closing of sections of Bangladesh's major cities to motorised traffic so as to prioritise the use of rickshaws, and to prioritise pedestrians, in those sections. Such closure would proceed in stages, first in Dhaka and then in other cities. It is a practical and innovative solution to the urban problems which lies entirely within Bangladesh, and which has the ability to improve the lives of low- and middle-income people of that country in direct and indirect ways.

The first part of the paper provides an outline of the problems of urbanisation in Bangladesh to which our proposal provides a solution. Part two sets out the characteristics and advantages of rickshaws as a form of NMT. The third part sets out in some detail our sustainable transport proposal and its implementation across the country.

We refer throughout to "rickshaws" rather than "cycle rickshaws" and to "rickshaw pullers" rather than "rickshaw cyclists."

Parts one and three of the paper focus to some extent on Dhaka city. We use Dhaka as an example of the problems of urbanisation and rickshaw issues which can be found in other cities across Bangladesh. We also focus on Dhaka in parts one and three because our proposal would first be implemented in certain sections of that city prior to being expanded to other sections of Dhaka and then to other cities.

1. Bangladesh and urbanisation

A century ago the world's population was less than two billion people. Today, that population is more than six billion and, every 14 years, it increases by one billion (Sterling 2006). Sometime next year, more people worldwide will live in cities than in rural areas; we will, for the first time, be an urban species (Foroohar 2006). Such urbanisation has been described as "a watershed in human history, comparable to the Neolithic or Industrial revolutions" (Davis 2006, 1).

The statistics of urbanisation are staggering. There are currently 400 cities with a population of more than one million, up from 86 in 1950; by 2015 there are projected to be at least 550 (UNDESA 2002). Two-thirds of global population growth since 1950 has been absorbed by cities, and cities are presently growing by a million babies and migrants each week (Johns Hopkins Bloomberg School of Public Health 2002).

Nearly all future world population growth - ten billion people by 2050 - will take place in the developing world. As Davis puts it, "[n]inety-five percent of this final buildout of humanity will occur in the urban areas of developing counties" (Davis 2006, 2). None of the 150 fastest-growing cites are in the developed world (Foroohar 2006). On current trends, because of urban growth, "poor countries will have to build the equivalent of a city of more than one million people each week for the next 45 years" (Cohen 2005).

The cities of Bangladesh, as Begum and Sen note, "have been experiencing overwhelming population growth and extreme poverty" (2005, 11). According to the United Nations the population of Bangladesh in 2003 was almost 142 million (UNFPA 2007). 49.8% of the population live below the poverty line, and 82.8% live on less than USD 2 a day. Together with increasing national population density – Bangladesh is the world's most densely populated country (UNICEF 2007) – rapid urbanisation of the rural poor of Bangladesh places extraordinary demands on infrastructure and service provision within Bangladesh's urban centres.

One of the issues raised by this urbanisation is that of an appropriate and sustainable means of transport to service the needs of Bangladesh's urban populations.

Dhaka[1] is Bangladesh's largest and fastest growing city. The population of the Dhaka Division in 2001 was 40,592,431, with a principal metropolitan area numbering 10,403,597. Dhaka's urban area numbered 3,612,850 in 1991 (Brinkhoff 2003). 70% of the city's population is estimated to be concentrated in 20% of its surface area (Mahmud and Duyar-Kienast 2001, 272). This urbanisation process has been characterised by the migration of millions of the rural poor into the streets and slums of the city; extreme levels of poverty have both accompanied and driven this process.

Only the cities of Bombay and Mexico City have more slum dwellers than Dhaka (UN-HABITAT, 2003), prompting one writer to conclude that, in Dhaka, "it probably makes more sense to consider the nonslum areas as enclaves in an overwhelming matrix of extreme poverty" (Davis 2006, 27). Further, in Dhaka and Chittagong, about a third of those living in slum communities are considered to be ill at any one time (Barkat et al 1997, 1). 65% of the population of Dhaka exists in an "informal" economy (Ubaidur et al 2005, 36), with a number of studies noting that the most important informal economy occupation held by migrants to Dhaka from rural areas is that of rickshaw pulling (Siddiqui et al 1990; Begum 1997).

1.1 Pollution

Historically, Bangladesh's transportation policy has been focused on expensive road-building programmes[2] (Gallagher 1992, 125-127), such policy adopting a modernist "transport economics" perspective of expanding private car dependency (Barter 1998, 3). However, although per capita levels of motorisation are low (less than five vehicles per 1000 persons), the levels of pollution - and the extent of congestion (as further set out below) - are extreme. High

1 One of the five great metropolises of South Asia (with Karachi, Mumbai, Delhi and Kolkata).

2 With a landmass that is subject to flooding, most roads in Bangladesh are required to be "built up" and serviced by extensive drainage facilities. And, as stone, tar and cement are not available locally, all of these items must be imported (Gallagher 1992, 125).

levels of airborne pollution pose serious risks to human health, and the high levels of congestion contribute to the loss of working-hours and an associated loss in the national GDP.

These high pollution levels are attributable to a number of different causes – for example, presence of lead in the automotive fuel, the poor state of maintenance of many vehicles (especially buses and trucks), traffic congestion, extreme population density and a humid climate, causes that apply to all Bangladeshi cities. However, quantifying the average levels of air pollution in Dhaka, for example, has proven to be difficult due to the variation of particulate suspension that occurs with changes in ambient humidity. General estimates for residential areas place the average suspended particulate matter (SPM) level at roughly double the Bangladeshi standard of 200μg/m. In commercial areas, it is estimated that the average SPM levels exceed the Bangladesh standard by a factor of 6, and the WHO guidelines of 120 $\mu g/m^3$ by a factor of 10.

Although the general levels of pollution in Dhaka from vehicular emissions are excessive, it is the associated high lead content in the air that that poses the greatest risk to human health. The Bangladesh Atomic Energy Commission has estimated that, each year, 50 tons of lead are emitted in Dhaka. This has led to air content lead levels *which are among the highest in the world*. Further, abnormally high levels of lead in the blood of those who are most vulnerable to this kind of pollution - children and those undertaking strenuous activity – have been recorded. For example, a 1991 study of rickshaw pullers recorded an average blood lead level of 53 micrograms per decilitre and a study of street children revealed blood lead levels of 90-200 micrograms per decilitre. Such lead levels are well in excess of the WHO recommended safe blood lead level of 25 micrograms per decilitre.

The excessive lead content in the air in Dhaka is attributed by agencies such as the Asian Development Bank and the World Bank to the almost exclusive use of leaded fuel within Bangladesh. While these agencies argue for the need to switch to unleaded fuel, this will require a massive financial investment as Bangladesh's only oil refinery cannot process unleaded fuel. However, according to proponents of sustainable transport, it is not primarily the use of leaded fuel but private car ownership, the resulting congestion and fossil fuel dependency that is the primary cause of pollution in Bangladesh.

1.2 Congestion and traffic accidents

Rickshaws, given their prevalence on the streets of Dhaka, are commonly blamed for the traffic chaos there (Meenar 2000). The Dhaka City Council has previously moved to ease traffic congestion by restricting the free movement of rickshaws within the city. This has included strategies which vary from the banning or eviction of rickshaws in certain *chowks*[3] and major roads to proposals for the elimination of rickshaws.[4] While strategies aimed at totally eliminating rickshaws have thus far proved to be unsuccessful, policing strategies aimed at restricting rickshaw access remain.

[3] A "chowk" is a central area where several streets meet.

[4] There have been numerous incidents in Dhaka where large numbers of cycle rickshaws have been burnt, or compacted into scrap metal, in an attempt to reduce their numbers on the road.

Implementation of these strategies has been only partially successful. A lack of general awareness of traffic rules, insufficient numbers of police, a high incidence of police corruption and associated lack of faith in the policing system all contribute to the ineffectiveness of policing strategies. In addition, police have failed to prevent the encroachment of pedestrian traffic, construction materials and parked vehicles onto dedicated road space, such failure exacerbating road congestion.

It could be argued that a lack of road space is the major cause of congestion in Dhaka. Within Dhaka road area densities are approximately 8 to 10% of the total city area;[5] such densities are well below the recommended planning densities of around 25% of the total city area (Meenar, 2000). However, the argument that traffic congestion is directly linked to road service area provision can be questioned on the basis that (a) planning for an increase in road area densities does not address other "user" issues such as the commingling of vehicles with different travel speeds; and (b) increasing road area densities does nothing to diminish the likelihood of pedestrian and building material encroachment onto dedicated road space.

Attributing the traffic congestion in Dhaka to inadequate road area densities infers that congestion issues could be addressed by increasing the number and width of roads in the city. This would require the substantial and costly demolition of existing houses and infrastructure, particularly within the Old City, and it is invariably the poor who would be most affected by such developments as low cost housing, slums and lower socio-economic areas are usually targeted as the preferred sites for road network expansion in Asian cities (Barter, 1998).

A programme to increase road area densities would require massive financial investment and structural readjustments. While it may reduce some traffic congestion in the short term, many transport issues, particularly those pertaining to the urban poor, would remain unaddressed. In addition, facilitating greater levels of motorised transport would lead to even higher levels of air pollution.

Finally, while statistics on traffic accidents in Bangladesh are inadequate, it is clear that the country has one of the highest rates of traffic accidents in the world, and road deaths are increasing. It is almost twice as bad as its neighbours India and Pakistan, and 40 times as bad as most developed countries (Gallagher 1992, 293).

Traffic accidents have often been blamed on the presence of rickshaws, and such accidents are one of the justifications for rickshaw restrictions and evictions. However, as Gallagher's own research shows, "rickshaws were not the main source of accidents" (1992, 297). Rather, he found that in almost 90% of road accidents causing death, a bus, truck or minibus was involved (1992, 300). Gallagher concluded that "[r]ickshaws are not the most risky mode of transportation in Dhaka" (1992, 299) and that risks that do pertain to rickshaws are related to the motorised traffic with which they share the roads.

Pedestrians are the main casualties of traffic accidents involving rickshaws, the rate of pedestrian deaths exacerbated by inadequate pedestrian facilities. Pedestrian crossings are disregarded and many roads have no crossings and are, as a result, at times impossible to cross.

[5] The road area densities are significantly lower than this in the Old City portion of Dhaka.

1.3 Non-motorised forms of transport

Non-motorised, non-polluting forms of transport such as walking, cycling and travelling in rickshaws are extremely important in South Asian cities such as Dhaka. In Dhaka, the vast majority of daily inner-city journeys are made using NMT. It has been estimated that 79% of the total number of trips undertaken in Dhaka utilise such forms of transportation (Karim 1997), and they are essentially renewable – for example, walking and cycling. Hook and Replogle (1996, 71) state that non-motorised trips within Bangladesh's other cities "account for as much as 96% of total trips."

Given the low road service area in Dhaka (both per capita and per unit area), the spatial efficiency of different modes of transportation is an extremely important consideration. In our view the low spatial efficiency of private cars renders their increasing usage untenable in Dhaka city. This is best exemplified in the Old City, where the dense maze of streets results in vehicular one-way travel. Barter notes that the high levels of congestion in many Asian cities even at the current, relatively low levels of per capita motorisation is indicative of their structural inability to sustain high rates of private car usage (1998, 4).

Nevertheless, transport policy in Bangladesh has been characterised by the promotion of higher levels of motorisation, greater private car ownership and discouragement of NMT. The government of Bangladesh has, for example, taxed imported bicycles and most bicycle components at 150% (and at 170% for imported bicycle tyres), with taxation on small engine automobiles at 50%, buses, jeeps and station wagons at 30% and mini-buses and trucks at 20% (Replogle 1991, 12). While heavy taxation of bicycle components was justified on the basis that it protected domestic bicycle producers, this justification seems to be self-defeating when over two-thirds of bicycle components were imported, with attendant higher costs for bicycle and cycle rickshaw operation and ownership (Replogle 1991,12). Import duties thus favoured motorised transport. In addition, cars have been and are viewed as symbols of prestige and success.

Hook and Replogle have argued that policies adopted across much of Asia (including Bangladesh) regarding street-space allocation and use, transportation subsidies and transport system investments promote "rapid motorization and the destruction of economically and environmentally sustainable low-cost non-motorized transportation modes." They conclude that Asian cities

> will need to do more to protect and enhance opportunities for non-motorized and public transportation or risk losing the competitive advantage offered by efficient, low-cost transportation modes and the spatial patterns of development they support and sustain (Hook and Replogle 1996, 69, 84)

2. The rickshaws of Bangladesh[6]

The bias against NMT has been most visible in the implementation of road policing strategies in Dhaka (such strategies referred to earlier), specifically the banning of rickshaws on major roads and *chowks*, such bans first implemented in a significant way in 1986 and then again after the election of the BNP-led four-party alliance in 2002. In April 2004 under its National Land Transport Policy, the government decided to remove rickshaws from eight major roads of Dhaka – for a total length of 120 kilometres – by July 2006, and subsequently evicted thousands of rickshaw pullers.

Such bans have had little impact on reducing the levels of traffic congestion. A recent study of rickshaw "evictions" carried out in Dhaka in September and October 2005 concluded that the evictions failed to prevent traffic jams and congestion – indeed, post-evictions, "more cars keep plying the city roads, creating more congestion than before" (*New Age* 2006). In addition to the economic impact on the affected rickshaw pullers and those directly and indirectly reliant on them, transport costs for commuters on the affected routes increased by 10 to 15%, with mobility reduced by some 50% (Kabir 2006).

In a further attempt to restrict the numbers of rickshaws on the road, the Dhaka City Council has in the past required that all rickshaws be licensed, and has limited the number of registrations, with resulting "violent competition" between licensed and unlicensed rickshaw pullers and, for the latter, fear of police who "regularly seize and burn their illegal 'vehicles'" (Davis 2006, 189).

With regard to rickshaw numbers, Gallagher's classic 1992 study, *The Rickshaws of Bangladesh*, put rickshaw totals in Bangladesh in 1988 at, conservatively, 700,000 (Gallagher 1992, 2, 4) and, in Dhaka, at 200,000 (Gallagher 1992, 3); he calculated the number of rickshaws as 30 to 70 per 1000 people (Gallagher 1992, 2). In 2006 Bangladesh's *New Age* newspaper put the number of rickshaws in Dhaka at 400,000 and the number of rickshaw pullers at 800,000 (each rickshaw driven daily by two rickshaw pullers in two separate shifts), with 3.2 million people dependent on the rickshaw-pulling profession. Taking further account of rickshaw owners and their families, rickshaw mechanics and their families, and spare parts traders and so on, the paper concluded that the survival of more than 5 million people in Dhaka alone are directly dependent on the rickshaw industry (Kabir 2006).

Replogle (1991, 3) estimates more than 75% of rickshaws in Bangladesh are found in urban areas, each accounting annually for an average of more than 30,000 passenger miles and almost 100 ton-miles of goods movements. In Dhaka, rickshaws account for 50% of the total number of vehicles on the city streets, with more than 50% of commuters using the rickshaws (*New Age* 2006).

Rickshaws, Gallagher states, contributed 34% of the total value-added by the transport sector to the GDP of Bangladesh and directly supported 4.5% of the country's total population (Gallagher 1992, 5, 9). Replogle states that rickshaw pullers and those employed in ancillary services related to rickshaws account for almost 25% of all employment "in metropolitan Dhaka" (Replogle 1991, 5); Gallagher put the figure at 23% (Gallagher 1992, 9). Based on the Gallagher figures,

[6] The title comes from Gallagher's 1992 study.

Whitelegg et al concluded in 2003 that "[t]he rickshaw is one of the most important sectors of the Bangladeshi economy and provides a means of subsistence for groups of people for whom there is quite literally no alternative" (Whitelegg et al 2003, 160).

Gallagher states the average rickshaw trip in Dhaka as being 2.5 kilometres; few trips were less than 1 kilometre or more than 5 kilometres. A typical rickshaw in Dhaka made about 14 to 15 trips per shift in two shifts per day, with a daily output of approximately 117 passenger kilometres per day (Gallagher 1992, 188-189). Seabrook estimated that a rickshaw puller pedalled an average of 60 kilometres per day (1996, 35-37).

The physically demanding nature of rickshaw pulling necessarily means that most rickshaw journeys are short. As Begum and Sen note, "[w]orn tires, rough roads and repeated stopping and starting in busy traffic each raise the power required [to "pull" a rickshaw] by up to 100 per cent." They conclude that, in these adverse conditions – that is, conditions which are normal in Dhaka – the rickshaw pullers "work nearly as hard as Olympic athletes" (Begum and Sen 2005, 16).[7] Continual exposure to direct air pollution and traffic conditions affect the health of rickshaw pullers, as does less than optimal rickshaw technology and fit-out. Nonetheless, in their 2005 study, Begum and Sen cite Gallagher's statistics and note that, as a livelihood, the importance of rickshaw pulling has increased over the past decade (Begum and Sen 2005, 25).

A final point to note is that a large proportion of rickshaw pullers appear to come from the rural extreme poor (Begum and Sen 2005, 14) and work not only under the conditions identified above but also within a framework of poverty and malnutrition. In addition, rickshaw pulling is unskilled and requires no particular level of education. This exacerbates an already negative view of rickshaws pullers, such view manifested, for example, in police harassment of rickshaw pullers and rickshaw bans and evictions.

Government policies, practices and actions fail to recognise the utility which rickshaws provide. Rickshaws provide the basis for what is an extremely efficient and versatile system of transportation. They provide a door-to-door service, often at a moments notice, utilising a renewable and non-polluting (zero emissions) energy source. As a small and low energy means of transport, this system can work efficiently as a feeder to a larger public (intermodal) transport system comprised of buses and trains. It is also a means of transport which is reasonably manoeuverable, space-efficient and easily adapted to transporting goods as well as people. Additionally, as a taxi service, the cycle rickshaws require only a space allocation for "standing" rather than parking. This significantly reduces the allocation of parking areas within the business districts of Bangladesh's cities.

In terms of year round usage, rickshaws are the most reliable form of transport in Dhaka. During the seasonal floods that accompany the monsoon it is often only the cycle rickshaws which are

[7] Gallagher (1992, 345-346) notes that the British cycling record for 100 miles involved an average output of 0.44 horsepower over 3.75 hours.

capable of operating in the flooded streets. It is also the case that, during *hartels*,[8] rickshaws are the only form of vehicular transport that is allowed to operate. These *hartels* witness a spectacular change to the road-scape of Dhaka; the streets are transformed into a free- flowing mass of pedestrians and rickshaws. Congestion, noise and pollution – all of which are considered to be endemic to Dhaka – disappear during the period of the *hartel*. With the ban that a *hartel* places on all other modes of transport, the rickshaws deployed in Dhaka raise their fees and increase their work-rate in an attempt to meet the increased demand for transport services.

3. Improving the lives of low- and middle-income people of Bangladesh: A proposal for nation-wide sustainable transport

> This … is about redefining the role of the rickshaw within a 21st century vision of well managed cities, urban sustainability and a societal framework that rewards its citizens with clean air, low noise, high accessibility and safety and security. We know that these qualities cannot be delivered by the car. We know that the car swallows up vast amounts of the planet's finite resources and uses these to exceed the planet's ability to absorb pollution and renew the life support systems on which we all depend. We know that the car is killing the residents of developing countries through road traffic accidents at a rate only seen before in major pandemics and we know that the poorest in society breathe the most polluted air and suffer the most degraded environments (Whitelegg et al 2003, 159).

Using Dhaka as an example, we identified at parts 1 and 2 above a number of critical urban problems and problems associated with urbanisation which confront Bangladesh. These include extreme levels of urban traffic congestion and air pollution, together with resulting access issues, traffic accidents and health problems for those who live in urban areas. This part 3 sets out our proposed solution to these problems, how that solution can be implemented, and its advantages and benefits.

3.1 The proposal

We propose the progressive closing of sections of Bangladesh's major cities to motorised traffic so as to prioritise the use of rickshaws, and to prioritise pedestrians, in those sections. The relevant streets would then be reserved for pedestrians and rickshaws. Such closure would proceed in stages, beginning by way of a pilot scheme in three sections of Dhaka city (thus the focus in the first and second parts of this paper). Appropriately adapted and tailored based on experience in these three sections, the scheme would then expand in stages to other sections of the city and, subsequently, to Bangladesh's other cities where NMT accounts for as much as 96% of total trips.

3.2 Implementation: A staged approach

As mentioned above, our proposal would be implemented on a trial basis in three sections of Dhaka, then in stages in other sections of the city and, finally, in other cities. Experience and

[8] Political strikes.

knowledge gained during the initial trial implementation would be incorporated in subsequent areas of Dhaka and other cities in which the use of rickshaws is progressively prioritised.

Three areas of Dhaka have been selected for initial prioritisation of rickshaw and pedestrian traffic, either because of their specific features, their profile in Dhaka or because their layout is, in part, conducive to such prioritisation.

(a) Section 1: Motijheel

The Motijheel area of Dhaka is a hub for business activities. The nature of the offices located in this area necessitates a large number of commuters entering and exiting each day for work, together with people conducting business and other transactions. There is also other "traffic" normally associated with business districts such as couriers and deliveries.

A number of national and international banks are located in the Motijeel area, together with international airlines. Other businesses include DHL Couriers and the University Press Bookshop.

This presently busy and congested area could be made a more peaceful, safe and clean environment (and certainly less noisy, congested and polluted) for workers and visitors by closing its roads to all but essential motorised vehicles and prioritizing the use of rickshaws.

Our proposal involves closing (a) Motijheel Avenue (a length of less than 1km); (b) the section of DIT Extension Road from the point at which it meets Motijheel Road until it meets Secretariat Road; and (c) the section of Secretariat Road from the point at which it meets Motijheel Road until Shapla Circle, to motorised transport.
In addition, smaller roads in between the triangle that these three major roads create (including the Dilkusha I and II circles) would be closed. A parking area and pick-up/drop-off point would also need to be created close to Shapla Circle (also known as Lotus Flower Fountain Circle).

The Motijheel area lends itself to progressive, straightforward expansion of a rickshaw prioritised zone. The zone could be extended by way of rickshaw-designated lanes along Inner Circular Road and out to Kamalpur Railway Station where trains leave for Mymensing in the North and Jessore in the South West. Rickshaw-designated lanes could also be established from Shapla Circle along Hatkhola Road to the Sayedabad Bus Terminal where buses leave for Comilla, Chittagong and Sylhet.

Because of the nature of the roads leading to these major terminals, and because personal baggage as well as commercial freight need to be transported along them, we propose the use of designated rickshaw lanes as set out above rather than a complete ban on non-essential motorised vehicles in these areas. In addition, or possibly as an alternative, the idea of designating "baggage only" rickshaws could be explored.

(b) Section 2: Gulshan

Gulshan is a combination of high-end residential living, Dhaka's better restaurants, guest houses, and shops. Many of the embassies and the international clubs are located in this area, and the international schools are nearby. International businesses are also located here.

Our proposal is to allow only essential motorised vehicles on the stretch of Gulshan Avenue from DIT I Circle to DIT II Circle (a section a little over 3 kilometres in length) and to limit traffic on the side streets of this section to those residents holding permits. Parking and pick-up/drop-off points would need to be established at both circles. Motor-vehicle lanes would be established to cater for the service, delivery and emergency vehicles as well as for permit-holding residents and their visitors. Rickshaws would, thus, be prioritised.

By forcing through traffic to use the alternative route of either Airport Road or Shaheed Suhrawardi Avenue, congestion would be relieved and rickshaws would be promoted in an area where many people can legitimately afford to pay more for transportation.

The section of Gulshan north of the DIT II circle is where most of the embassies are located. With appropriate support structures and promotion, we believe many people working, residing and engaging in leisure activities in this area could be encouraged on an environmental and social platform to use rickshaw transport as an alternative to their motorised vehicles without the area needing to be closed to motorised transport in a structured way.

This section of Gulshan is not as congested as other sections referred to in this paper. The benefits in this section, therefore, would be focussed on the higher social value placed on rickshaw pullers and the project's environmental profile.

(c) Section 3: The area around Mogh Bazar through to Minto Road

This section includes Dhaka's two five star hotels (the Sheraton and Pan Pacific Sonargaon Hotels), airline offices, tourism-related businesses, restaurants and the Holy Family Hospital. It is a focal point for international business travellers; restricting certain areas of it to rickshaws is a way to showcase the project – the use of environmentally sound transport, an indigenous and decorative symbol of city life in Bangladesh, in a practical and innovative manner – to a wider, international community.

While Pantha Path and Mogh Bazar Road must remain open to motorised traffic (they are major thoroughfares), we propose to restrict the roads that run between them to rickshaws and essential traffic. These roads are the section of Pantha Path from the roundabout to Mogh Bazar Road; New Eskaton Road and Eskaton Garden Road (in their entirety); Elephant Road from Islam Avenue to Mogh Bazar Road; and all of Minto Road. These roads are each approximately 1 kilometre in length and more or less parallel. This prioritisation of rickshaws would also include the smaller streets and lanes in this, roughly 1 kilometre, enclave

This third section is located in between Motijheel and Gulshan (the rickshaw priority zones mentioned in (a) and (b) above) and a later stage of the project could include the designation of rickshaw-only lanes on the arterial roads to connect the three sections set out in this proposal.

The exact form of the street closures in each of the three sections identified above - Motijheel, Gulshan and the area around Mogh Bazar through to Minto Road - varies slightly. In part this results from the areas themselves being distinct. In part, however, it also results from our view that slightly different forms of implementation of our proposal in the Dhaka city trial phase maximises both feedback on the street closures and knowledge, learning and experience gained during this initial trial implementation ahead of further staged implementation in Dhaka city and, subsequently, throughout Bangladesh. We also accept that, in terms of development initiatives, a "one size fits all" philosophy often results in weaker outcomes, and sometimes in unintended consequences. In part, the strength of this proposal lies in its low technology framework and, thus, its potential to be flexible with regard to local contexts and requirements.

A number of practical issues attend the proposal: Drop-off points around the business districts would need to be established, for example (we note that many Bangladeshis who can afford a private vehicle have drivers, so drop-off points should suffice rather than car parks, further enhancing ease of implementation), as would rickshaw standing facilities. Administrative issues of policing and enforcement of the street closures clearly also arise. As we have indicated, there would also be exceptions to the prohibition on motorised traffic in the relevant areas; emergency vehicles is an obvious category of exception, and there are others such as maintenance and delivery vehicles which could perhaps be permitted entrance at certain non-peak times of the day or night. Such issues have not, however, prevented the successful creation of vehicle-free zones in many cities around the – albeit mostly developed – world.[9]

Street closures and the prioritisation of rickshaws could also promote the urban integration of differing modes of transport. For example, travel by rickshaw could form part of a journey which also included travel by bus. It is possible that such a journey could involve the purchase of one ticket at an agreed rate to be used on both the bus and the rickshaw, with the rickshaw puller being reimbursed upon presentation of the ticket.

The prioritisation of rickshaws must also, in our view, necessitate the replacement of the present rickshaw licensing system with a far more efficient and standardised one.[10] We propose a voluntary system whereby licensing would be based on an annual inspection by cycle or engineering professionals (and not the police) and, if the inspection is successful, some form of "mark" or "sticker" could be affixed to the rickshaw. Subsidised rickshaw repair and servicing could also be provided, the costs of which – together with the costs of the inspections - could be borne by an increase in car taxation.

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9 For example, cities in Japan, Germany, France, Italy, Sweden and the Netherlands. See, generally, Low et al (2005, 133-165), Crawford (2002) and Newman and Kenworthy (1999, 141-153).

10 We do not address here the issues of rickshaw quotas, in part because it is a matter perhaps best considered after the implementation of the proposal.

Such taxation could also fund, in association with the licensing check, an annual health inspection of rickshaw pullers, and subsidised medical treatment if necessary. Consideration could also be given to ways in which such health benefits could also be extended to the families of rickshaw pullers.

3.3 Clarity of purpose and ease and practicality of implementation

Our proposal to strengthen Bangladesh is simple, straightforward and, we think, easy to contemplate and understand. Its purpose is to improve the lives of low- and middle-income people of Bangladesh, but it also improves the lives of all people who live and work in Bangladesh's cities; the ways in which such lives are improved are set out at part 3.4 below.

The proposal is also practical, and its implementation costs are comparatively low; it simply calls for a change in urban transport policy (please note that we do not include here details of the mechanics, government-related or otherwise, involved in effecting such change) rather than, for example, a major capital works programme. From its inception in Dhaka city and its implementation in stages in that city, it can easily be replicated in Bangladesh's other cities, beginning with Chittagong and then to Khulna, Rajshahi and so on.

Further, the proposal represents an innovative solution to Bangladesh's urban problems identified earlier in this paper *which lies entirely within Bangladesh*. It requires no foreign investment, no assistance from the World Bank or the Asian Development Bank, and can be actioned (allowing time, for example, for policy development and various levels of consultation) relatively quickly.

Finally, it takes account of Bangladesh's existing strengths – thus, in part, our title "Strengthening Bangladesh." Our proposal - prioritising the use of rickshaws through progressive closure of sections of Bangladesh's cities, and prioritising pedestrians - is labour-intensive (as opposed to capital-intensive). It builds upon, and suggests ways of improving, existing infrastructure. As stated in the preceding paragraph, the solution offered in this paper is one that is "manufactured" in Bangladesh.

3.4 A design for living: Clean air, low noise, accessibility and safety and security

The impact and results of our proposal are clear. It is also clear that, together with crucial links between transportation systems and poverty, "non-motorised transport offers significant benefits for low income groups, the sick, the elderly, women and children" (Whitelegg et al 2003, 163). This is especially so in developing countries (see Barter 1998 and Replogle 1992). Through ongoing elimination of motorised traffic from sections of Bangladesh's major cities so as to prioritise pedestrians and the use of rickshaws, the lives of people who live and work in Bangladesh's cities are improved – in particular, those of low- and middle-income people.

→ *Less congested and safer roads, and fewer accidents*

As the number of clearly defined sections of the city which are closed to motorised traffic and which prioritise rickshaw use grow and increase in size, and as the scheme expands throughout

the country, congestion and pollution will continue to decrease. Congestion - and pollution - in terms of their effect, know no societal or other boundaries.

It also follows that, with less traffic volume and with increasing sections of Bangladesh's cities closed to motorised traffic, the roads will become safer and more secure, and the incidence of traffic accidents will decrease. Pedestrians will enjoy a safer journey.

Less congestion means a reduction in the loss of working-hours and a corresponding reduction in any loss associated with congestion in national GDP.

→ *Less noise and pollution*

The levels of air and noise pollution in Bangladesh's urban areas are severe; private car ownership and congestion are two of the primary causes of pollution in those areas. And high levels of air pollution pose serious risks to human health. Our proposal results in less traffic and, thus, less polluted and noisy urban areas. It results in a healthier - and more productive - urban populace, and calmer living and working environments. Life is less intolerable and less dangerous.

Prioritising rickshaws and non-motorised transport prioritises environmental quality and improves the quality of life of all Bangladesh people.

→ *Enhanced accessibility*

Prioritising rickshaws and closing urban areas to motorised traffic further enhances the ability of low- and middle-income people in Bangladesh to access the cheapest and most reliable form of transport in Bangladesh, the form of transport on which they rely. Rickshaws become even more efficient and, when combined with intermodal forms of transport, enable passengers to travel further. Access to services and employment is increased.

→ *Rickshaw pullers more valued and held in higher regard, with associated implications for the population of Bangladesh; impact*

Prioritising rickshaws as public transport – which our proposal does – would, it appears to us, increase the price rickshaw pullers could charge for a journey as, in many cases, the rickshaw would be the only available form of transportation; this could also result in the ability to earn more money for less hours worked. Rickshaw pullers should come to be held in higher regard as, in addition to increased prices, the rickshaw would no longer be a mode of transport for those who could afford nothing else; they could come to be seen as symbols of clean and sustainable transport. This important human rights and dignity component of our proposal would assist in the creation of a community where rickshaw pullers are valued and supported.

Such enhanced status would also result from the increased profile the program to close sections of Bangladesh's cities to motorised traffic would receive as it gained momentum. Indeed, given its unique, timely and innovative nature – and its focus on issues of current global concern - it may well receive an international profile.

Rickshaw pullers, their families and dependents, and those directly and indirectly involved with the rickshaw industry (a huge number of people), together with the great numbers of Bangladesh's citizens utilising the rickshaw are the direct beneficiaries of this proposal. Cleaner air, less noise, enhanced accessibility and greater safety and security affect everyone.

In the developed world millions of people who can afford to choose between a myriad of transport options are choosing to cycle to work, and cycle generally, for reasons of fitness or enjoyment, or because of environmental concerns. In the developing world, however, this form of transport is not highly regarded because it is a symbol of poverty. In emphasising the human, economic, environmental and societal value of rickshaws and rickshaw pullers through implementation of this proposal, it may be that Bangladesh could lead the developing world in changing the way cycles are perceived – and change for the better the health of its citizens.

3.5 Environmental factors and tourism

Our proposal has obvious positive environmental results - less pollution, for example. And the unique and innovative nature of the proposal (coupled with the fact that its central feature is an indigenous and decorative symbol of city life in Bangladesh) could form part of a campaign, with an environmental focus, to attract tourists to Bangladesh - with all of the attendant benefits for low- and middle-income earners in the country. The environment is a focus of global attention, and tourism dollars are something for which all developing countries strive. Figures for Bangladesh indicate a gradual and steady increase in tourist numbers; the slogan for the Bangladesh Tourism Organisation is "Come to Bangladesh before the tourists …"[11]

An innovation such as this would also be consistent with existing Bangladesh policy. Bangladesh is one of the few countries to have already met its Millennium Development Goals,[12] such goals forming a blueprint for building a better world in the 21st century. It is also a signatory to the Kyoto Protocol, and prioritising the use of rickshaws and closing parts of city centres to motorised traffic reduces carbon emissions; emissions savings can be traded. In this way, Bangladesh could become a positive global example, and a focus of attention. And Bangladesh's environmental bona fides are additionally enhanced *as it is one of the countries that will feel the effects of global warming first and most acutely*. A Columbia University survey of nations most vulnerable to the effects of climate change ranks Bangladesh second only to Sierra Leone (Yohe et al 2006, 5), given its low elevation coastal zones. The IPCC (2007) and the study by McGranahan et al (2007) confirm Bangladesh's exposure to increasing climate change risks.[13]

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11 See Bangladesh's *The Financial Express*: http://www.financialexpress-bd.com/index3.asp?end=10/31/2006 (last accessed 31 October 2006).

12 See http://www.un.org/millenniumgoals/ (last accessed 29 December 2006).

13 The IPCC concludes that "Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise and the effect will be exacerbated by increasing human-induced pressures on coastal areas … Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s … Coastal areas, especially heavily-populated mega-delta regions in South, East and Southeast Asia, will be at greatest risk due to increased flooding from the sea and in some mega-deltas

4. Conclusion: "Meaning and significance for ordinary citizens"[14]

It seems to us that, for people who live in what has been termed one of the "global capital[s] of slum-dwelling" (Davis 2006, 23), hope that a better future is possible is vital. Prioritising the use of rickshaws has environmental and quality of life outcomes that improve the lives of low- and middle-income people of Bangladesh. Our proposal demonstrates that lives can alter through simple changes leading to shifts in perception – in this case perceptions of rickshaw pullers and what they do. The policy changes (reducing motorised traffic); the occupation remains the same.

The implementation of the proposal set out here can have meaning and significance for the ordinary citizens of Bangladesh. To be the owner of an innovative environmental project with the real possibility for economic, social and welfare improvements rather than to be seen, amongst other things, as a capital of slums would be an exciting development for Bangladesh. Everything necessary for the project is today within the nation's grasp.

flooding from the rivers. Climate change is projected to impinge on sustainable development of most developing countries of Asia as it compounds the pressures on natural resources and the environment associated with rapid urbanisation, industrialisation, and economic development" (IPCC 2007, 9, 11). Sea levels are *currently* rising in the Bay of Bengal and pushing salty water inland (Hertsgaard 2007, 78). And Bangladesh is, of course, already vulnerable to typhoons (Linden 1996, 65; Sheridan 2007, 69), with the result that many foreign investors steer clear of the country.

[14] The quotation comes from Whitelegg at al (2003, 159) in the context of rickshaw pullers in Calcutta.

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