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The Challenges Facing Landlocked Developing Countries

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Abstract In spite of technological improvements in transport, landlocked developing countries continue to face structural challenges to accessing world markets. As a result, landlocked countries often lag behind their maritime neighbours in overall development and external trade. While the relatively poor performance of many landlocked countries can be attributed to distance from coast, this paper argues that several aspects of dependence on transit neighbours are also important. Four such types of dependence are discussed: dependence on neighbours' infrastructure; dependence on sound cross-border political relations; dependence on neighbours' peace and stability; and dependence on neighbours' administrative practices. These factors combine to yield different sets of challenges and priorities in each landlocked country. The paper concludes with a brief set of policy recommendations. A detailed appendix presents maps and regional overviews that outline key challenges facing the landlocked countries in each region.

Key words: Globalization, Landlocked countries, Geography, Transit, Transport, Conflict, Markets, Economy

Introduction

In 1776, Adam Smith observed that the inland parts of Africa and Asia were the least economically developed areas of the world. Two hundred and twenty-six years later, the *Human Development Report 2002* still painted a stark picture for most of the world's landlocked countries. Nine of the twelve

countries with the lowest Human Development Index scores are landlocked, thirteen landlocked countries are classified as ‘low human development’ and not one of the non-European landlocked countries is classified as ‘high human development’ (UNDP, 2002).¹

Why do landlocked developing countries face such persistent challenges? Smith argued that, due to the difficulty of trade, geographically remote areas have difficulty realizing gains to specialization and associated benefits. He based his analysis on the difficulty of land transportation over great distances — a problem that, despite huge technological advances, remains today. High transportation costs typically place landlocked countries at a distinct disadvantage relative to their coastal neighbours when competing in global markets.

Distance alone, however, cannot explain why landlocked countries are at a disadvantage compared with equally remote, inland regions of large countries. For instance, some regions of China, India and Russia lie further from the coast than many landlocked countries like Azerbaijan and Moldova. While these inland subnational regions indeed face great distance-based cost disadvantages relative to their maritime counterparts, they do not have to face the challenges of border crossing that Smith also identified.

The commerce besides which any nation can carry on by means of a river which does not break itself into any great number of branches or canals, and which runs into another territory before it reaches the sea, can never be very considerable; because it is always in the power of the nations who possess that other territory to obstruct the communication between the upper country and the sea. (Smith, 1976, I.3.8)

Landlocked countries not only face the challenge of distance, but also the challenges that result from a dependence on passage through a sovereign transit country, one through which trade from a landlocked country must pass in order to access international shipping markets. While rivers were a more common form of trade transit in Smith’s time, the principle of dependence on neighbours applies equally to the more modern transport modes of roads and railways. Such dependence can take several forms, many of which are less deliberate than the power politics suggested by Smith.

This paper describes the key ways in which landlocked developing countries face structural challenges to accessing global markets.² After first outlining the relatively low development levels in landlocked developing countries, we outline the various forms of transit dependence and discuss ways in which they interact to inhibit the landlocked countries’ economic development. Recognizing that these factors combine to affect specific countries and regions differently, we highlight the places most and least affected by each aspect of landlockedness. A series of policy implications is then briefly proposed. A detailed appendix presents regional overviews (including maps) that outline the key challenges facing the landlocked countries in each region.

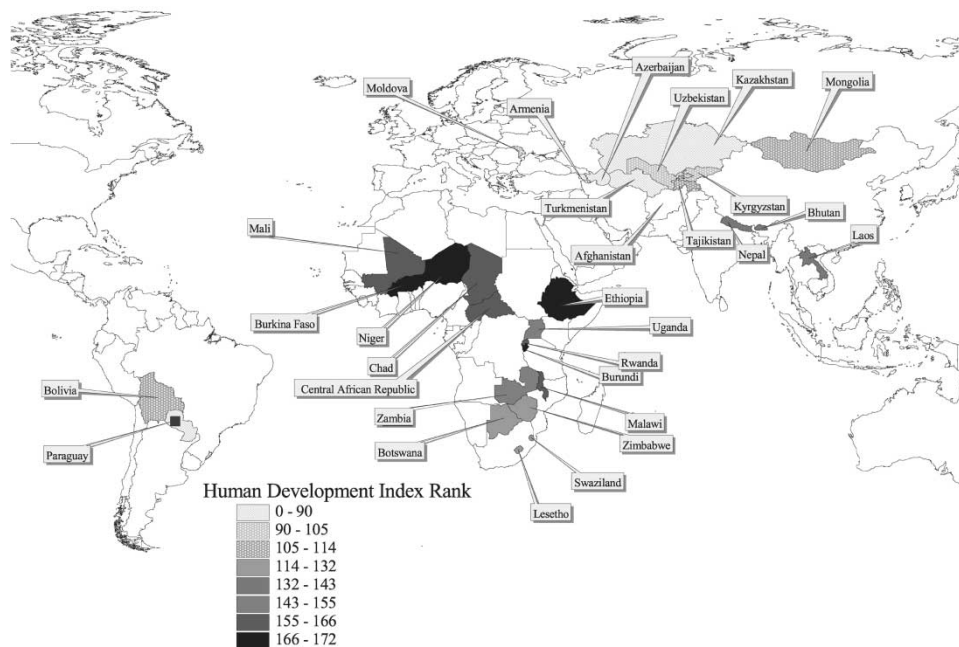
Landlocked countries' indicators of development

Landlocked countries very often achieve lower average development levels than their maritime neighbours. This can be demonstrated by looking at the Human Development Index (HDI), trade costs, and per-capita export levels.

Human development

The relative state of human development in landlocked countries is presented in Table 1 and Map 1, where the landlocked countries are shaded. A brief examination of the table shows that landlocked countries are distributed across the table but concentrated towards the bottom. As stated earlier, nine of the twelve countries with the lowest human development are landlocked.

Overall, the landlocked countries do worse than their maritime neighbours in each component of the HDI. The average Gross Domestic Product (GDP) per capita of landlocked countries is approximately 57% that of their maritime neighbours. Life expectancy index scores are 0.3 lower on average, equivalent to 3.5 years, and education index scores are 0.36 lower. Progress in many landlocked developing countries has also been slow. In the *Human Development Report 2003*, twenty out of twenty-seven landlocked countries with adequate data are considered 'top priority' or 'high priority' due to their lack of progress towards the internationally agreed-upon Millennium Development Goals. (UNDP 2003)



MAP 1. HDI rankings of developing landlocked countries. *Source:* Human Development Report 2002. *Note:* No data available for Afghanistan.

TABLE 1. Human development — rankings and components

HDI rank	Country	HDI	HDI Components		
			GDP per capita	Life Expectancy	Education
Medium human development					
54	Mexico	0.80	9 023	0.79	0.84
55	Cuba	0.80	—	0.85	0.90
56	Belarus	0.80	7 544	0.73	0.92
57	Panama	0.79	6 000	0.82	0.86
58	Belize	0.78	5 606	0.82	0.86
59	Malaysia	0.78	9 068	0.79	0.80
60	Russian Federation	0.78	8 377	0.68	0.92
61	Dominica	0.78	5 880	0.80	0.86
62	Bulgaria	0.78	5 710	0.76	0.90
63	Romania	0.78	6 423	0.75	0.88
64	Libya	0.77	7 570	0.76	0.84
65	Macedonia	0.77	5 086	0.80	0.86
66	Saint Lucia	0.77	5 703	0.81	0.83
67	Mauritius	0.77	10 017	0.77	0.77
68	Colombia	0.77	6 248	0.77	0.85
69	Venezuela	0.77	5 794	0.80	0.83
70	Thailand	0.76	6 402	0.75	0.84
71	Saudi Arabia	0.76	11 367	0.78	0.71
72	Fiji	0.76	4 668	0.73	0.90
73	Brazil	0.76	7 625	0.71	0.83
74	Suriname	0.76	3 799	0.76	0.90
75	Lebanon	0.76	4 308	0.80	0.83
76	Armenia	0.75	2 559	0.80	0.92
77	Philippines	0.75	3 971	0.74	0.91
78	Oman	0.75	13 356	0.77	0.67
79	Kazakhstan	0.75	5 870	0.66	0.91
80	Ukraine	0.75	3 816	0.72	0.92
81	Georgia	0.75	2 664	0.80	0.89
82	Peru	0.75	4 799	0.73	0.87
83	Grenada	0.75	7 580	0.67	0.85
84	Maldives	0.74	4 485	0.69	0.90
85	Turkey	0.74	6 974	0.75	0.77
86	Jamaica	0.74	3 639	0.84	0.79
87	Turkmenistan	0.74	3 936	0.78	0.88
88	Azerbaijan	0.74	2 936	0.78	0.88
89	Sri Lanka	0.74	3 530	0.79	0.84
90	Paraguay	0.74	4 426	0.75	0.83
91	Saint Vincent and the Grenadines	0.73	5 555	0.74	0.79
92	Albania	0.73	3 506	0.80	0.80
93	Ecuador	0.73	3 203	0.75	0.87
94	Dominican Republic	0.73	6 033	0.70	0.80
95	Uzbekistan	0.73	2 441	0.73	0.91
96	China	0.73	3 976	0.76	0.80
97	Tunisia	0.72	6 363	0.75	0.72
98	Iran, Islamic Republic of	0.72	5 884	0.73	0.75
99	Jordan	0.72	3 966	0.76	0.78
100	Cape Verde	0.72	4 863	0.75	0.75
101	Samoa (Western)	0.72	5 041	0.74	0.75

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TABLE 1. *Continued*

HDI rank	Country	HDI	HDI Components		
			GDP per capita	Life Expectantancy	Education
102	Kyrgyzstan	0.71	2 711	0.71	0.87
103	Guyana	0.71	3 963	0.63	0.88
104	El Salvador	0.71	4 497	0.75	0.74
105	Moldova	0.70	2 109	0.69	0.90
106	Algeria	0.70	5 308	0.74	0.69
107	South Africa	0.70	9 401	0.45	0.80
108	Syrian Arab Republic	0.69	3 556	0.77	0.71
109	Viet Nam	0.69	1 996	0.72	0.84
110	Indonesia	0.68	3 043	0.69	0.79
111	Equatorial Guinea	0.68	15 073	0.43	0.77
112	Tajikistan	0.67	1 152	0.71	0.88
113	Mongolia	0.66	1 783	0.63	0.85
114	Bolivia	0.65	2 424	0.62	0.80
115	Egypt	0.64	3 635	0.70	0.62
116	Honduras	0.64	2 453	0.68	0.70
117	Gabon	0.64	6 237	0.46	0.76
118	Nicaragua	0.64	2 366	0.72	0.65
119	Sao Tome and Principe	0.63	1 792	0.67	0.75
120	Guatemala	0.63	3 821	0.66	0.75
121	Solomon Islands	0.62	1 648	0.72	0.68
122	Namibia	0.61	6 431	0.33	0.81
123	Morocco	0.60	3 546	0.71	0.50
124	India	0.58	2 358	0.64	0.57
125	Swaziland	0.58	4 492	0.32	0.77
126	Botswana	0.57	7 184	0.25	0.75
127	Myanmar	0.55	1 027	0.52	0.75
128	Zimbabwe	0.55	2 635	0.30	0.81
129	Ghana	0.55	1 964	0.53	0.62
130	Cambodia	0.54	1 445	0.52	0.66
131	Vanuatu	0.54	2 802	0.72	0.35
132	Lesotho	0.54	2 031	0.34	0.76
133	Papua New Guinea	0.54	2 280	0.53	0.55
134	Kenya	0.51	1 022	0.43	0.72
135	Cameroon	0.51	1 703	0.42	0.65
136	Congo	0.51	825	0.44	0.75
137	Comoros	0.51	1 588	0.58	0.49
Low human development					
138	Pakistan	0.50	1 928	0.58	0.42
139	Sudan	0.50	1 797	0.52	0.50
140	Bhutan	0.49	1 412	0.62	0.42
141	Togo	0.49	1 442	0.45	0.59
142	Nepal	0.49	1 327	0.56	0.48
143	Laos	0.49	1 575	0.47	0.52
144	Yemen	0.48	893	0.59	0.48
145	Bangladesh	0.48	1 602	0.57	0.40
146	Haiti	0.47	1 467	0.46	0.50
147	Madagascar	0.47	840	0.46	0.59
148	Nigeria	0.46	896	0.44	0.58

TABLE 1. *Continued*

HDI rank	Country	HDI	HDI Components		
			GDP per capita	Life Expectantancy	Education
149	Djibouti	0.45	2 377	0.30	0.50
150	Uganda	0.44	1 208	0.32	0.60
151	Tanzania	0.44	523	0.43	0.61
152	Mauritania	0.44	1 677	0.44	0.40
153	Zambia	0.43	780	0.27	0.68
154	Senegal	0.43	1 510	0.47	0.37
155	Congo DR	0.43	765	0.44	0.51
156	Côte d'Ivoire	0.43	1 630	0.38	0.44
157	Eritrea	0.42	837	0.45	0.46
158	Benin	0.42	990	0.48	0.40
159	Guinea	0.41	1 982	0.38	0.37
160	Gambia	0.41	1 649	0.35	0.39
161	Angola	0.40	2 187	0.34	0.36
162	Rwanda	0.40	943	0.25	0.58
163	Malawi	0.40	615	0.25	0.65
164	Mali	0.39	797	0.44	0.37
165	CAR	0.38	1 172	0.32	0.39
166	Chad	0.37	871	0.35	0.39
167	Guinea-Bissau	0.35	755	0.33	0.38
168	Ethiopia	0.33	668	0.31	0.35
169	Burkina Faso	0.33	976	0.36	0.23
170	Mozambique	0.32	854	0.24	0.37
171	Burundi	0.31	591	0.26	0.38
172	Niger	0.28	746	0.34	0.16
173	Sierra Leone	0.28	490	0.23	0.33
	Average	0.61	3 636	0.60	0.69
	Average over maritime	0.82	4 902	0.80	0.93
	Average over landlocked	0.55	2 420	0.50	0.67

Source: Human Development Report 2002.

Note: No data available for Afghanistan

*Shading indicates landlocked countries

While Table 1 shows that many low HDI countries are landlocked, the dispersion of these landlocked countries across the table makes it unclear the extent to which landlockedness affects overall development. For instance, the concentration of landlocked countries at the bottom of the table could merely reflect the large number of landlocked countries in Sub-Saharan Africa and other development challenges present in that region.

More information regarding the challenges of landlockedness is presented in Table 2, which lists the same human development indicators as Table 1 but separates the countries by region. Table 2 shows that, despite the global variation in landlocked countries' HDI scores, landlocked countries generally have significantly lower levels of development than the maritime countries of their region. In fact, not one landlocked country outside of southern Africa has a higher level of human development than the average

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TABLE 2. Human development — rankings and components by region

HDI rank	Country	HDI	HDI Components		
			GDP per capita	Life Expectancy	Education
Southern Africa					
107	South Africa	0.70	9 401	0.45	0.80
122	Namibia	0.61	6 431	0.33	0.81
125	Swaziland	0.58	4 492	0.32	0.77
126	Botswana	0.57	7 184	0.25	0.75
128	Zimbabwe	0.55	2 635	0.30	0.81
132	Lesotho	0.54	2 031	0.34	0.76
153	Zambia	0.43	780	0.27	0.68
161	Angola	0.40	2 187	0.34	0.36
163	Malawi	0.40	615	0.25	0.65
170	Mozambique	0.32	854	0.24	0.37
	Average over maritime	0.51	5 211	0.32	0.63
	Average over landlocked	0.51	2 111	0.30	0.73
Western Africa					
111	Equatorial Guinea	0.68	15 073	0.43	0.77
117	Gabon	0.64	6 237	0.46	0.76
129	Ghana	0.55	1 964	0.53	0.62
135	Cameroon	0.51	1 703	0.42	0.65
136	Congo	0.51	825	0.44	0.75
141	Togo	0.49	1 442	0.45	0.59
148	Nigeria	0.46	896	0.44	0.58
152	Mauritania	0.44	1 677	0.44	0.40
154	Senegal	0.43	1 510	0.47	0.37
156	Côte d'Ivoire	0.43	1 630	0.38	0.44
158	Benin	0.42	990	0.48	0.40
159	Guinea	0.41	1 982	0.38	0.37
160	Gambia	0.41	1 649	0.35	0.39
164	Mali	0.39	797	0.44	0.37
165	CAR	0.38	1 172	0.32	0.39
166	Chad	0.37	871	0.35	0.39
167	Guinea-Bissau	0.35	755	0.33	0.38
169	Burkina Faso	0.33	976	0.36	0.23
172	Niger	0.28	746	0.34	0.16
173	Sierra Leone	0.28	490	0.23	0.33
	Average over maritime	0.47	2 588	0.42	0.52
	Average over landlocked	0.35	912	0.36	0.31
Eastern Africa					
134	Kenya	0.51	1 022	0.43	0.72
139	Sudan	0.50	1 797	0.52	0.50
149	Djibouti	0.45	2 377	0.30	0.50
150	Uganda	0.44	1 208	0.32	0.60
151	Tanzania	0.44	523	0.43	0.61
157	Eritrea	0.42	837	0.45	0.46
162	Rwanda	0.40	943	0.25	0.58
168	Ethiopia	0.33	668	0.31	0.35
171	Burundi	0.31	591	0.26	0.38
	Average over maritime	0.46	1 311	0.43	0.56
	Average over landlocked	0.37	853	0.29	0.48

TABLE 2. *Continued*

HDI rank	Country	HDI	HDI Components		
			GDP per capita	Life Expectancy	Education
South and Southeast Asia					
70	Thailand	0.76	6 402	0.75	0.84
109	Viet Nam	0.69	1 996	0.72	0.84
124	India	0.58	2 358	0.64	0.57
127	Myanmar	0.55	1 027	0.52	0.75
130	Cambodia	0.54	1 445	0.52	0.66
140	Bhutan	0.49	1 412	0.62	0.42
142	Nepal	0.49	1 327	0.56	0.48
143	Laos	0.49	1 575	0.47	0.52
145	Bangladesh	0.48	1 602	0.57	0.40
Average over maritime		0.60	2 472	0.62	0.68
Average over landlocked		0.49	1 438	0.55	0.47
Eastern Europe and Central Asia					
60	Russia	0.78	8 377	0.68	0.92
62	Bulgaria	0.78	5 710	0.76	0.90
63	Romania	0.78	6 423	0.75	0.88
76	Armenia	0.75	2 559	0.80	0.92
79	Kazakhstan	0.75	5 870	0.66	0.91
80	Ukraine	0.75	3 816	0.72	0.92
81	Georgia	0.75	2 664	0.80	0.89
85	Turkey	0.74	6 974	0.75	0.77
87	Turkmenistan	0.74	3 936	0.78	0.88
88	Azerbaijan	0.74	2 936	0.78	0.88
95	Uzbekistan	0.73	2 441	0.73	0.91
102	Kyrgyzstan	0.71	2 711	0.71	0.87
105	Moldova	0.70	2 109	0.69	0.90
112	Tajikistan	0.67	1 152	0.71	0.88
113	Mongolia	0.66	1 783	0.63	0.85
Afghanistan					
Average over maritime		0.76	5 661	0.74	0.88
Average over landlocked		0.72	2 835	0.71	0.89
Latin America					
34	Argentina	0.84	12 377	0.81	0.92
38	Chile	0.83	9 417	0.84	0.90
40	Uruguay	0.83	9 035	0.82	0.92
73	Brazil	0.76	7 625	0.71	0.83
82	Peru	0.75	4 799	0.73	0.87
90	Paraguay	0.74	4 426	0.75	0.83
114	Bolivia	0.65	2 424	0.62	0.80
Average over maritime		0.80	8 651	0.78	0.89
Average over landlocked		0.70	3 425	0.89	0.82

Source: Human Development Report (2002).

*Shading indicates landlocked countries.

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of its regional maritime countries. In contrast, the landlocked countries in western Africa are doing the worst relative to their maritime neighbours.³ The difference in the average HDI between the western African landlocked and maritime countries is sizeable at 0.12 (0.35 versus 0.47). The landlocked countries in Latin America and South East Asia are doing only slightly better relative to their neighbours with a HDI difference of 0.11.

Of course, there is also variation among the landlocked countries in each region. Figure 1 plots the HDI score of each landlocked country relative to the average of its regional HDI, highlighting the different outcome distributions within regions. For example, while there is great variation in southern Africa, the former Soviet republics have relatively similar levels of HDI. In southern Africa, the landlocked countries that border South Africa are performing significantly better than those that do not. This underscores the potential benefits of a relatively wealthy neighbour. The two countries that are the best performers in the region, Swaziland and Botswana, are exceptional cases. Botswana benefits enormously from its diamond trade, which utilizes air transport and thus overcomes many possible burdens of landlockedness, and Swaziland benefits from its close location to ports in both Mozambique and South Africa. Meanwhile, the variation in the east Africa region is particularly illuminating. HDI levels decrease as one moves inland along the major transit route through Kenya used by Burundi, Rwanda and Uganda.

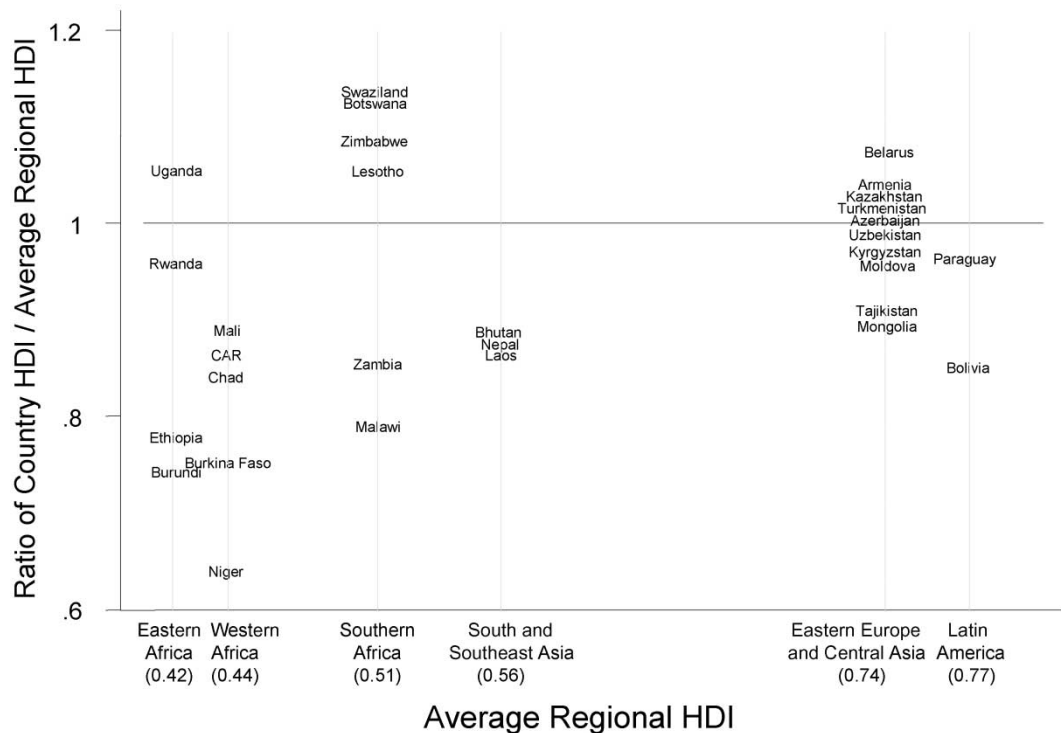


FIGURE 1. Human Development Indicator: landlocked countries versus their regional neighbours.

Trade costs

The landlocked countries' high average cost of trade is reflected in Table 3, which presents the ratio of transport and insurance costs to the total value of exports. In aggregate, this ratio is roughly 9% greater for landlocked countries than for the maritime countries. For a majority of regions, the average ratio for landlocked countries is nearly double that of the maritime countries. The notable exceptions are Bhutan, Laos, and Swaziland. These countries do not engage in significant volumes of transoceanic trade, instead exporting overwhelmingly to their immediate neighbours, India, Thailand and South Africa, respectively.

Exports

In line with their higher trade costs, landlocked countries on average export less than one-half of the per-capita amount of their maritime neighbours, as presented in Table 4. Nearly all landlocked countries export less per capita than the average of the regional maritime countries. A regional breakdown shows that the landlocked countries of western Africa are faring the worst in relative terms, exporting only 12% of their maritime neighbours' value on a per-capita basis. Meanwhile, the southern African landlocked countries fare the best in relative terms, exporting nearly 70% of the per-capita value of their maritime neighbours.

Variation within regions is presented in Figure 2, again as measured by the ratio of a country's exports per capita to the regional average. A comparison of Figure 1 and Figure 2 shows that even fewer landlocked countries outperform the regional average for exports per capita than was the case for HDI. The three exceptions—(Kazakhstan, Turkmenistan and Swaziland)—are all extraordinary cases. Kazakhstan and Turkmenistan export primarily oil and natural gas to their neighbours, and Swaziland has a particularly open trade regime that links its economy closely with South Africa.⁴

Two other interesting observations can be drawn from this figure. First, Uganda exports significantly more than the other eastern African landlocked countries. As was the case with the HDI, the level of exports per capita roughly corresponds to the distance inland on the major transit route. Second, there is little variation in export levels in western Africa. All are extremely low and reflect the severe political and infrastructural challenges facing these countries.

Dimensions of landlockedness

Why are economic and human development indicators for landlocked countries generally so much worse than those for maritime neighbours? Much can be attributed to the landlocked countries' dependence on other countries' transit routes for access to overseas markets. This dependence can take at least four forms: (1) dependence on transit infrastructure; (2) dependence on political relations with neighbours; (3) dependence on peace and stability

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TABLE 3. Cost of trade — ratio of transportation and insurance to value of exports

Country	Ratio of transport costs to value of exports	Country	Ratio of transport costs to value of exports
Southern Africa		South and Southeast Asia	
Swaziland	0.02	Nepal	0.05
Angola	0.08	Laos	0.08
South Africa	0.08	Thailand	0.08
Namibia	0.09	Cambodia	0.11
Lesotho	0.12	India	0.13
Zimbabwe	0.15	Bangladesh	0.14
Botswana	0.16	Myanmar	—
Zambia	0.17	Vietnam	—
Mozambique	0.28	Bhutan	—
Malawi	0.55	Average over maritime	0.12
Average over maritime	0.13	Average over landlocked	0.07
Average over landlocked	0.20		
Western Africa		Eastern Europe and Central Asia	
Nigeria	0.05	Russia	0.00
Sierra Leone	0.09	Ukraine	0.02
Cameroon	0.09	Kazakhstan	0.04
Cote d'Ivoire	0.11	Romania	0.05
Mauritania	0.12	Turkey	0.06
Guinea	0.14	Azerbaijan	0.07
Gabon	0.15	Georgia	0.08
Congo	0.17	Moldova	0.10
Senegal	0.18	Bulgaria	0.11
Ghana	0.18	Kyrgyzstan	0.13
Togo	0.21	Turkmenistan	0.15
Central African Republic	0.26	Mongolia	0.16
Burkina Faso	0.27	Armenia	0.29
Niger	0.28	Afghanistan	0.35
Guinea-Bissau	0.30	Tajikistan	—
Mali	0.35	Uzbekistan	—
Benin	0.37	Average over maritime	0.05
Chad	0.51	Average over landlocked	0.16
Liberia	—		
Equatorial Guinea	—	Latin America	
Average over maritime	0.17	Brazil	0.08
Average over landlocked	0.33	Argentina	0.08
		Uruguay	0.10
Eastern Africa		Peru	0.11
Kenya	0.13	Chile	0.11
Tanzania	0.18	Paraguay	0.17
Djibouti	0.21	Bolivia	0.21
Ethiopia	0.29	Average over maritime	0.10
Sudan	0.29	Average over landlocked	0.19
Burundi	0.31		
Uganda	0.35		
Rwanda	0.51		
Eritrea	—		
Somalia	—		
Average over maritime	0.20		
Average over landlocked	0.36		

Source: International Monetary Fund (2001); World Development Indicators (2002). Transport costs and exports have been matched by year.

*Shading indicates landlocked countries.

TABLE 4. Exports per capita (2000 current US\$)

Country	Exports per capita	Country	Exports per capita
Southern Africa		South and Southeast Asia	
Swaziland	927	Thailand	1349
South Africa	854	Bhutan	179
Angola	606	Cambodia	106
Zimbabwe	178	India	63
Lesotho	126	Nepal	57
Zambia	88	Bangladesh	50
Malawi	43	Laos	—
Mozambique	32	Myanmar	—
Botswana	—	Viet Nam	—
Namibia	—	Average over maritime	392
Average over maritime	498	Average over landlocked	118
Average over landlocked	272		
Western Africa		Eastern Europe and Central Asia	
Equatorial Guinea	2784	Bulgaria	859
Gabon	1484	Russian Federation	791
Congo, Republic	837	Turkey	746
Cote d'Ivoire	268	Kazakhstan	722
Cameroon	183	Romania	557
Nigeria	169	Turkmenistan	534
Gambia, The	155	Ukraine	394
Mauritania	145	Azerbaijan	266
Senegal	140	Mongolia	265
Ghana	132	Georgia	226
Togo	96	Moldova	150
Guinea	105	Uzbekistan	137
Togo	96	Tajikistan	130
Guinea-Bissau	57	Armenia	117
Benin	53	Kyrgyz Republic	115
Mali	53	Afghanistan	—
Central African Republic	34	Average over maritime	596
Chad	30	Average over landlocked	271
Niger	26		
Sierra Leone	22	Latin America	
Burkina Faso	21	Chile	1477.1
Liberia	—	Uruguay	1140.4
Average over maritime	442	Argentina	829.8
Average over landlocked	33	Brazil	380.0
Eastern Africa		Peru	333.0
Djibouti	390	Paraguay	277.5
Kenya	91	Bolivia	174.5
Sudan	62	Average over maritime	832
Tanzania	39	Average over landlocked	226
Uganda	28		
Eritrea	23		
Rwanda	18		
Ethiopia	15		
Burundi	9		
Somalia	—		
Average over maritime	121		
Average over landlocked	18		

Source: World Development Indicators (2002).

*Shading indicates landlocked countries.

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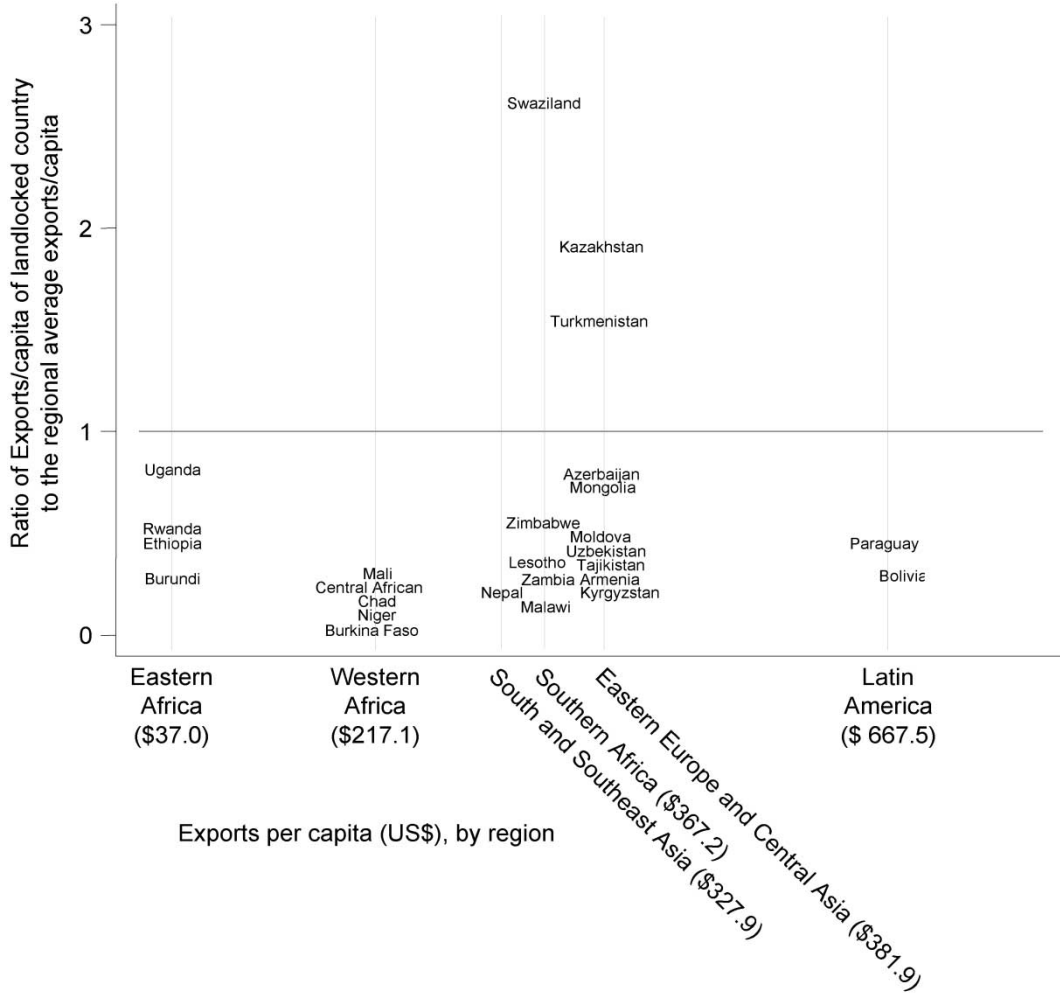


FIGURE 2. Exports per capita: landlocked countries versus their regional neighbours.

within transit neighbours; and (4) dependence on administrative processes in transit.

The relative impact of these challenges varies greatly by country. It is therefore essential to consider how each aspect interacts with a country's economic structure in order to understand how landlockedness is affecting the country's development processes. To this end, we now highlight some of the worst and least affected countries for each aspect of landlockedness.

Dependence upon infrastructure of transit countries

Landlocked countries are completely dependent on their transit neighbours' infrastructure to transport their goods to port. This infrastructure can be

weak for many reasons, including lack of resources, mis-governance, conflict and natural disasters. Regardless of the cause, weak infrastructure imposes direct costs on trade passing through a transit country and thus limits the ability of landlocked country products to compete in global markets. The relative impact of weak surrounding infrastructure is particularly severe for the least developed landlocked countries that mainly export primary commodities with low value to cost ratios rather than high value products or services. Weak transit infrastructure also limits the return to investment on landlocked countries' internal infrastructure, since market opportunities are constrained.

Worst affected areas. The challenges confronted by poor transit infrastructure are perhaps most acute in eastern Africa. Burundi, for example, boasts a relatively good internal road network but is severely constrained by the surrounding infrastructure of its transit neighbours. The most direct route to the sea from Burundi is through Tanzania to Dar es Salaam along what is known as the Central Corridor, but infrastructure levels on this route are so poor that Burundi's primary transit route still follows the more distant path to Mombasa, known as the Northern Corridor. When the latter was closed due to political reasons in the 1990s, an alternative transit route to Durban via Mpulungu on Lake Tanganyika was investigated, and used. The fact that this route was even considered, at a total distance of nearly 4500 km with several border crossings and modal changes, highlights the severity of the transit challenges faced by Burundi, one of the world's poorest countries.

Similar transit neighbour infrastructure problems exist for western African landlocked countries. The Central African Republic, for example, does not have a dependable all-weather route to the sea. Its corridor through Cameroon is often impassable during the rainy season, owing to the poor condition of Cameroonian roads. Its only other corridor, through the Democratic Republic of Congo (DRC), travels on the Oubangui River, which is impassable during the dry season due to low water levels. This corridor is also currently impassable due to the ongoing crisis in the DRC.

Least affected areas. Countries exporting goods and services that do not require land transport are least susceptible to transit infrastructure concerns. In the case of Botswana, the economy's heavy dependence on diamonds, which account for 84% of the total export value, allows the country to bypass transit neighbour infrastructure by utilizing air transport. The high value/weight and value/volume ratios for diamonds make this possible, since air transport has a high cost/volume ratio. Bolivia has also had moderate success in bypassing its neighbours' transit network by trying to capitalize on its central geographic location to become the South American fibre-optics hub. Modern technological advancements and the development of telecommunications have expanded such opportunities for landlocked countries to develop industries less affected by transport costs.

Some landlocked countries benefit from relatively high-quality surround-

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ing transport infrastructure. This is the case for the landlocked countries of south and southeast Asia and South America, even though they have often been unable to take advantage of the neighbours' transit systems due to weak domestic networks. Laos, for example, still has a limited internal transport network and borders Thailand's modern infrastructure facilities. This example is particularly interesting as Thailand's transport system is characterized by four-lane highways, while transport within Laos is mainly limited to single-carriage highways. The Thai government has also recently extended its rail line to the Laotian border. The rail line, however, does not continue the short distance to the Laotian capital, Vientiane, since Laos does not have a domestic rail system.

Political relationship between landlocked and transit countries

Landlocked countries depend on strong political relations with transit countries. If a landlocked country and its transit neighbour are in conflict, either military or diplomatic, the transit neighbour can easily block borders or adopt regulatory impediments to trade. Even when there is no direct conflict, landlocked countries are extremely vulnerable to the political vagaries of their neighbours. Although there is a legal basis for rights of landlocked transit as outlined in Article 125(1) of the United Nations Convention on the Law of the Sea (United Nations, 1982), in practice, this right of access must be agreed upon with the transit neighbour (Article 125(2) and (3))⁵ and is determined by the relationship between the countries.

Worst affected areas The landlocked countries of the South Caucasus and Central Asia have been acutely affected by cross-border disputes. After the dissolution of the Soviet Union, the former republics were divided according to previous administrative boundaries. These boundaries have been the source of many disputes. As a result, borders are regularly defended with landmines and physical blockades. The ongoing tensions have also resulted in the general failure of regional cooperation. Uzbekistan has been particularly affected by such challenges as it suffers from strained relations with four of its five neighbours: Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan. Uzbekistan's other neighbour, Afghanistan, suffers from extremely weak infrastructure. In the South Caucasus, fighting between the two landlocked countries, Armenia and Azerbaijan, has not only closed the Armenia-Azerbaijan border, but has also led to the closure of the Armenia-Turkey border. Armenia's only alternative transit routes, through Georgia and Iran, are restricted by mountainous terrain and relatively weak infrastructure (Tavitan, 2001).

Ethiopia has also suffered immensely from conflict with its transit neighbour, Eritrea. War between the two countries restricted Ethiopia's access to the Eritrean port of Assab where three-quarters of Ethiopian trade (75%) passed through duty-free until 1997. There has now been a major shift of Ethiopia's trading routes, away from Assab to the port of Djibouti, which now handles the large majority of Ethiopian trade. The Djibouti corridor,

however, is hampered by a poorly functioning railroad and limited port facilities.

Relations with neighbouring countries need not be in violent conflict to severely hamper a landlocked country's economy. For example, India, Nepal's sole transit neighbour, blockaded the border between the two countries in 1990, an action cited as a major cause of the overthrow of the Nepalese *panchayat* government (Economist Intelligence Unit, 2002).⁶ Moreover, between 2001 and 2002, India instituted significant trade restrictions on Nepal during the negotiation of a bilateral trade agreement. These restrictions were alleged to have been instituted to extract concessions in negotiations. In Bolivia, the effects of weakened international relations are also apparent. Long-standing tensions with neighbouring Chile, which go back to the war of 1878-1883 when Bolivia lost control of the coastal province of Atacama, have recently delayed the export of newfound gas reserves as the Bolivian people protest the use of Chilean ports.

Least affected areas While nearly all landlocked countries have at some point experienced tensions with their maritime neighbours, southern African countries have witnessed this less frequently. The landlocked countries of southern Africa have also benefited from relatively strong attempts at regional cooperation. Such cooperation has led to the development of the Southern African Transport and Communications Commission, which is intended to integrate transport policy, provide freedom of transit, and strengthen regional infrastructure. Meanwhile, in eastern Africa, the re-introduction of the East African Community aims to strengthen already improving relations. One of the first areas of cooperation agreed upon was the transport infrastructure linking the nations. Key international corridors have already been identified for priority development.

Vulnerability to civil conflict within transit countries

Even when relations with transit neighbours are good and the core transit infrastructure is sound, a landlocked country still must rely on peace and stability within the transit country. When transit countries suffer from civil war, transit routes can be damaged or closed, which often requires a rerouting of major trade corridors or, in the worst case, a stoppage of transit.

Worst affected areas The landlocked countries of western Africa have been particularly affected by neighbours' internal conflicts. Mali, for example, has recently been recognized for its political stability and commitment to democracy, but has suffered tremendously from conflict and instability in its neighbours. Each of Mali's coastal neighbours has experienced some form of violent civil conflict in the past decade, often making transport routes unusable. Togo was devastated by violent political protests and deep internal conflict in the early 1990s. Algeria was involved in a bloody civil war for much of the same decade. Ghana suffered from ethnic violence primarily between 1993 and 1994. Sierra Leone's decade-long civil war has just recently

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come to a tenuous settlement. Guinea has been stricken by a series of coups and rebel wars. Liberia has spent most of the decade in violent civil wars that have threatened to spill over into neighbouring countries, thus jeopardizing regional stability even further. Finally, and most importantly for Mali, Cote d'Ivoire has recently fallen into a devastating political crisis, with severe effects on Mali's primary corridor to the sea.

The landlocked countries of southern Africa, most notably Malawi, have suffered significantly from the surrounding civil wars in Mozambique, Namibia and Angola. As a result, much of the Southern African Development Community's (SADC) trade has been forced to use longer north-south corridors, largely relying upon the port of Durban in South Africa. During the Mozambican civil war, Malawi was forced to reroute its freight, 95% of which normally passed through the ports of Beira and Nacala, to the much more distant ports of Durban and Dar es Salaam. It is estimated that the average surface costs to these ports are more than double those to Nacala and Beira via the traditional rail routes. The average transit times to Durban (7 days) and Dar es Salaam (6 days) are also nearly double that to Nacala (4 days) and Beira (3 days) (World Bank, 1995). The rerouting is estimated to have cost Malawi an additional US\$50-80 million (4-6% of the GDP) per year, with insurance and freight costs doubling from 20% of the import bill in the early 1980s to 40% by the latter half of the decade (World Bank, 1995). While the corridors to Beira and Nacala have recently been reopened, infrastructure damage from the war has thus far limited their use.

Civil conflict has also been a significant impediment in central Asia and the South Caucasus, where the dissolution of the Soviet Union has led to several internal conflicts. The Georgian civil wars of the 1990s have had dramatic effects on the region by severely hampering the vital corridor link across the Caspian Sea. These wars not only required that trade be rerouted during the war, but also destroyed much of the internal infrastructure and significantly weakened the port of Poti, which is only now being rehabilitated.

Least affected areas Few developing landlocked countries have been unaffected by civil conflicts in neighbouring countries. Bolivia and Paraguay have perhaps been least affected in this regard — their borders have not been closed due to a civil conflict in their neighbours. The countries of South and South-eastern Asia have been similarly fortunate.

High administrative burden due to transit

Landlocked countries are also subject to the administrative burdens associated with border crossings, with these often adding the greatest amount to shipping costs. To transit a country, there are a host of direct transit and customs charges⁷, some of which must be paid upfront and some *en route*. The direct costs, however, form only a small part of the picture. International transit also requires burdensome paperwork and bureaucratic procedures that are costly to deal with and place a high administrative burden on

shippers. Border crossings also cause long delays on transit traffic. It is regularly noted that the time delays and the variability of time in transit are a greater concern to traders than direct costs, as they hinder the ability to meet delivery contracts without large inventory stocks.

Worst affected areas While there is little direct cross-country evidence on the fees and administrative burdens facing importers and exporters, these costs are most regularly cited in reports on western Africa. These costs are also often cited for eastern Africa, where they are estimated at as much as 20% of the direct freight costs (Anyango, 1997). Where it is necessary to cross more than one border, such as the route from Burundi through Rwanda, Uganda and Kenya, one must often pay these fees at several borders.

In addition to direct administrative costs, delays are also a serious concern in many parts of Africa. Customs procedures at the Central African Republic-Cameroon border can take as long as 2 weeks, with goods often waiting at the border for the requisite information to be sent from Bangui (Evlo, 1995).⁸ The full journey between the port of Doala and Bangui generally takes from 3 weeks to 1 month. An average rail freight trip between Kampala (Uganda) and Mombasa (Kenya), which is a route used by Uganda, Rwanda and Burundi, is reported to take anywhere between 14 and 21 days on average (Freight, 2000). The unreliability of the rail arrivals often make it impossible to book ships ahead of time at the port of Mombasa, causing further delays. Delays at the port of Abidjan, used by Burkina Faso, have been reported to often take up to 10 days (Evlo, 1995). Waits at the port of Douala, used by the Central African Republic and Chad, have been known to extend to 30 days.⁹ In addition, the two main transit routes for Burkina Faso have customs escorts only three times a week so there are often significant delays in waiting for an escort (UNCTAD, 1999b).¹⁰

Although such delays have varied causes, many stem from a lack of coordination between the landlocked and transit countries. In Burkina Faso, for example, there exists a special anti-competitive provision to protect Burkinabe truck companies, reserving two-thirds of transit freight for carriage by Burkinabe trucks. Thus, there are often goods at maritime ports waiting for the arrival of vehicles from landlocked countries despite the presence at the port of vehicles from maritime countries that would be willing to transport the goods inland (UNCTAD, 1999b).

While the absolute levels of fees and administrative burdens are not as high in central Asia as in Africa, the burdens are increasing in this region, largely due to the souring of cross-border relations. During the Soviet era, transport across the neighbouring countries of Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan was largely free of administrative burdens. A 72-hour visa-free system was introduced in the late 1990s to allow transit through countries without the need for a visa, but it is no longer in effect due to poor and worsening relations between countries in the region (Dion, 2000; Mayhew, 2002).¹¹ Corruption has also imposed significant costs on trade in central Asia and the South Caucasus.

Least affected areas The most notable exception to the administrative burdens of transit is found in Bhutan. All Bhutanese transit trade through India is handled by Bhutan's own customs agency. Hence, administratively Bhutan can trade as if it were not landlocked. This is largely a result of strong Bhutanese-Indian relations and the minimal amount of Bhutanese transit trade.

In other instances, efforts to reduce administrative charges and delays have taken place at the regional level. The countries of SADC and the Common Market for Eastern and Southern Africa (COMESA), for example, have introduced common licenses and third-party insurance guarantees across countries, significantly reducing transit costs (see more details in the Appendix). Similar efforts are being made in South America through the regional trade institutions to simplify transit procedures.

Summary measures of landlockedness

To summarize some of the different aspects of landlockedness, Table 5 presents some quantitative measures across countries, highlighting indicators both for landlocked countries themselves and for the same countries' respective transit neighbours. Administrative challenges are not included in this table due to a lack of comparable data. With the exception of distance to the nearest port, the other variables have been normalized to a 0-1 scale to facilitate comparison across countries.

Policy implications

To address the challenges that limit landlocked countries' potential gains from trade and hence limit the resource base for investing in human development, several key policy priorities can be stressed.

First, landlocked developing countries need to place particular emphasis on developing their internal transportation infrastructure. Trade is significantly affected by transportation costs, so investments in railways and roads — both construction and maintenance — are crucial for keeping these costs down.

Second, regional infrastructure integration strategies are needed to develop active trade routes and to expand market access for landlocked countries. Small economies such as Burundi and Rwanda face tremendous constraints in trying to trade internationally due to the weak road and rail infrastructure in Eastern Africa. Internal infrastructure investments in Burundi and Rwanda will yield limited returns if not accompanied by similar investments in Kenya, Tanzania and Uganda. Similarly, infrastructure integration requires investments in building and maintaining efficient maritime ports to serve entire regions.

Third, and closely linked to the previous point, regional integration strategies need to focus on administrative coordination. Members of COMESA and SADC have made significant advances in this regard, but many other regions still require investments to standardize border procedures and reduce

Table 5. Dimensions of landlockedness

Country	Normalized measures of trade		Measure of distance	Normalized measures of infrastructure quality			
	Freight costs (index)	Export volume (index)	Distance to port (km)	Proportion of paved roads (index)	TCs proportion of paved roads (index)	Paved road quality (index)	TCs paved road quality (index)
Afghanistan	0.38	—	1960	—	—	—	0.01
Armenia	0.51	0.08	693	—	0.36	—	—
Azerbaijan	0.92	0.15	870	—	—	—	—
Bhutan	—	—	775	—	—	—	—
Bolivia	0.64	0.16	414	0.07	0.22	0.44	0.16
Botswana	0.75	1.00	905	1.00	1.00	1.00	—
Burkina Faso	0.54	0.01	1154	0.41	0.68	0.48	0.12
Burundi	0.47	0.00	1254	0.37	0.16	0.72	0.49
Central African Republic	0.55	0.03	1518	0.01	0.00	0.53	0.27
Chad	0.08	0.02	1669	0.00	0.00	0.00	0.27
Ethiopia	0.50	0.00	781	0.33	0.36	0.69	0.74
Kazakhstan	0.96	0.47	3750	—	0.61	—	0.07
Kyrgyzstan	0.81	0.10	3600	—	0.61	—	0.07
Laos	0.89	0.07	620	—	0.63	—	0.61
Lesotho	0.81	0.10	575	0.36	1.00	0.72	—
Malawi	0.00	0.03	803	0.40	0.21	0.76	0.34
Mali	0.38	0.04	1225	0.36	0.41	0.81	0.47
Moldova	0.86	0.15	170	—	—	—	1.00
Mongolia	0.75	0.22	1693	0.45	0.61	—	0.07
Nepal	0.95	0.04	1160	0.95	—	0.58	0.00
Niger	0.52	0.02	1057	0.52	0.84	0.73	0.37
Paraguay	0.73	0.34	1022	—	0.30	0.87	0.16
Rwanda	0.08	0.00	1867	0.11	0.26	0.62	0.23

Table 5. Continued

Country	Normalized measures of trade		Measure of distance	Normalized measures of infrastructure quality			
	Freight costs (index)	Export volume (index)	Distance to port (km)	Proportion of paved roads (index)	TCs proportion of paved roads (index)	Paved road quality (index)	TCs paved road quality (index)
Swaziland	1.00	0.89	193	0.65	0.51	0.52	0.19
Tajikistan	—	0.09	3100	—	0.61	—	0.07
Turkmenistan	0.77	0.27	1700	—	—	—	—
Uganda	0.39	0.02	1187	0.34	0.16	0.40	0.47
Uzbekistan	—	0.12	2950	—	—	—	—
Zambia	0.72	0.07	1975	0.40	0.47	0.55	0.91
Zimbabwe	0.76	0.20	464	0.36	0.72	0.86	0.82

Freight costs: (Transportation + Insurance Costs)/Exports of Goods & Services.

Export volume: Exports of goods and services (mean over 1997-2000) (1995 USD)

Proportion of paved roads: Paved roads (km)/Total roads (km)

TC's proportion of paved roads: Simple average of transit neighbours' proportion of paved roads.

Paved road quality: = 1 – (proportion low quality) – 0.5*(proportion fair quality).

TCs paved road quality: = 1 – (proportion low quality) – 0.5*(proportion fair quality).

Sources: Transport & insurance data from IMF BOPS (2001); Exports data from WDI (2002); Roads data from Camming (World Bank) (1998).

Source: Trade data: International Monetary Fund (2001), World Development Indicators (2002); Distance data: various; Infrastructure data: Canning (World Bank) (2002), Conflict Data: International Peace Research Institute (2002).

Note: TC = Transit Country; - indicates no data available.

transport costs incurred due to time inefficiencies. Many countries could still benefit from such administrative streamlining, as well as real guarantees for landlocked countries' permanent access to transit routes.

Fourth, landlocked countries need to invest, where possible, in developing industries less affected by transport costs. This includes shifting away from primary commodities, which are subject to major price fluctuations and low value to weight ratios, toward those with higher value or lower transport costs relative to value of goods. Strategies could include the development of service industries or the development of manufacturing sectors for export.

In order to invest in all four of the areas outlined, official development assistance to developing countries should give special attention to the unique needs of those that are landlocked. In particular, official development assistance strategies should recognize low-income landlocked countries' large infrastructure needs and the requirement for increases in direct assistance to support large-scale investments in roads and railways. Such investments need to include not only the up-front improvements of the transport infrastructure, but also operations and maintenance. Since the landlocked developing countries typically suffer from a general lack of resources and under-funded social sectors due to their inherent structural barriers in trading with the international economy, they will typically require even greater external resource support than their low-income maritime neighbours, which also need to be a priority for official development assistance flows.

Conclusion

This paper has presented a simple descriptive framework of the challenges facing landlocked developing countries. For the most part, these countries have lower levels of human development and external trade compared with their maritime neighbours. In explaining the reasons for these lower outcomes on average, we stressed the nature of dependence on transit neighbours for trade and how this dependence can fall under four categories: dependence on infrastructure, dependence on sound political relations, dependence on neighbours' peace and stability, and dependence on administrative practices. These factors yield a different set of challenges and priorities for each landlocked country. Policies focusing on mitigating the effects of landlockedness need to address country-specific obstacles to accessing global markets and region-specific challenges to market integration.

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Notes

- 1 The European landlocked countries consist of Austria, Andorra, Belarus, Czech Republic, Holy See, Hungary, Liechtenstein, Luxembourg, San Marino, Slovakia, Macedonia, Moldova and Switzerland. Moldova is the only European landlocked country with a HDI score of less than 0.76.
- 2 We exclude high HDI landlocked countries from our analysis, all of which are situated in Europe.
- 3 We recognize that some of the regional groupings in this paper are atypical. They were defined based on the most sensible grouping for assessing regional issues of landlockedness. Thus, for instance, we include a very large range of countries in our category of Eastern Europe and Central Asia.
- 4 Botswana would count as another exceptional success but export data for the country are not included in International Monetary Fund (2002).
- 5 This article states that: 'The terms and modalities for exercising freedom of transit shall be agreed between the land-locked States and transit States concerned through bilateral, sub regional or regional agreements'. Furthermore, 'Transit States, in the exercise of their full sovereignty over their territory, shall have the right to take all measures necessary to ensure that the rights and facilities provided for in this Part for land-locked States shall in no way infringe their legitimate interests'.
- 6 Transit through China is effectively impossible due to the Himalayan Ranges.
- 7 Some of the transit and customs charges include transit goods licenses, border fees, temporary road licenses, foreign vehicle permits, toll charges, foreign commercial licenses, cost of customs verification of containers, posting of security bonds, involvement with police and escort convoys and cancellation of bonds. The cost of bribes needed *en route*, while considered to be significant, is beyond the scope of this report.
- 8 Although somewhat dated, these are the most recent figures we were able to identify.
- 9 Ibid.
- 10 Vehicles waiting for a convoy to form wait on the side of the road, not only hindering normal road traffic, but also contributing to road damage.
- 11 Kazakhstan and Uzbekistan are involved in a border dispute, Tajikistan has been in a civil war and claims Uzbekistan is abusing its border closure powers for political purposes, and Kazakhstan fears the Islamic threat of militant Islam and terrorism from Tajikistan. Kyrgyzstan is reacting to the incursion of Tajik rebels (Dion, 2000).
- 12 The only two countries not to have been involved in a significant civil conflict are Cameroon and Benin. Cameroon is characterized by very poor levels of infrastructure — unpaved roads susceptible to flooding form much of the transit route from Chad and the Central African Republic through Cameroon. Benin's port at Cotonou is considered to be one of the least well equipped in the region.

References

- Anyango, G. (1997) 'Comparative transportation cost analysis in East Africa', *Technical Paper 22*, Office of Sustainable Development Bureau for Africa, Nairobi, Kenya.
- Cabanius, P. and Bouaphanh, K. (2001) *Review of Progress in the Developments of Transit Transport Systems in South-East Asia*, UNCTAD/LDC/110, UNCTAD, Geneva.

- Canning, D. (1998) *A Database of World Infrastructure Stocks, 1950-95*, World Bank, Washington, DC.
- Castellón, R.P. (2001) *Review of Recent Progress in the Development of Transit Transport Systems in Latin America*, UNCTAD/LDC/113, UNCTAD, Geneva.
- Dion, R. (2000) 'The decline of Central Asian integration', Central Asia Caucasus Analyst Biweekly Briefing, John Hopkins University, Baltimore, MD.
- Economist Intelligence Unit (2002) *Country Profiles*, Economist Intelligence Unit, London.
- ESRI (1993) *Digital Chart of the World (DCW)*, Pennsylvania State Libraries.
- Evlo, K. (1995) *Transit Transport Systems in West and Central Africa*, UNCTAD/LDC/94, UNCTAD, Geneva.
- Freight* (2000) Block Trains to Boost Transit Cargo Traffic, Nairobi, Kenya.
- Giorgis, T.W. (1995) 'Transit transport systems for Ethiopia', United Nations Conference on Trade and Development (UNCTAD), UNCTAD/LDC/96.
- Glassner, M.I. (1970) *Access to the Sea for Developing Land-Locked States*, Martinus Nijhoff, The Hague.
- Glassner, M.I. (1980) *Systematic Political Geography*, John Wiley & Sons, New York.
- Glassner, M.I. (1995) *Bibliography on land locked states*, Martinus Nijhoff, Dordrecht.
- InfraAfrica (2001) *Review of Progress in the Development of Transit Transport Systems in Eastern and Southern Africa*, UNCTAD/LDC/115, UNCTAD Trade and Development Board.
- International Monetary Fund (2001) *Balance of Payment Statistics Yearbook*, International Monetary Fund, Washington, DC.
- International Monetary Fund (2002) *Direction of Trade Statistics Yearbook*, International Monetary Fund, Washington, DC.
- Limao, N. and Venables, A.J. (1999) 'Infrastructure, geographical disadvantage and transport costs', World Bank Working Paper No. 2257, World Bank, Washington, DC.
- MacKellar, L., Wörgötter, A. and Wörz, J. (2000) 'Economic development problems of landlocked countries', *Transition Economics Series*, 14.
- Mayhew, B. (2002) 'Upgrades: Central Asia 2', Lonely Planet, <http://www.lonelyplanet.com/upgrades/pdf/central-asia.pdf>.
- Organisation for Economic Co-operation and Development/African Development Bank (2002) *African Economic Outlook 2002/03 — Country Studies: Burkina Faso*.
- Pechata, V. (1973) 'The right of access to the sea', Land-locked Countries of Africa, Z. Cervenka, Scandinavian Institute of African Studies, Uppsala.
- Pod, J. (1998) 'Kenya: neglected Nairobi-Mombasa road', ANB-BIA Supplement, Kenya.
- Radelet, S. and Sachs, J. (1998) 'Shipping costs, manufactured exports, and economic growth', presented at the American Economics Association annual meeting, January.
- Smith, A. (1796) *An Inquiry into the Nature and Causes of the Wealth of Nations*, 2 vols. Edited by Edwin Caanan. University of Chicago, Chicago, IL.
- Southern African Development Community (2003) *SADC Food Security Network Ministerial Brief*.
- Stone, J.I. (2001) *Infrastructure Development in Landlocked and Transit Developing Countries: Foreign Aid, Private Investment and the Transport Cost Burden of Landlocked Developing Countries*, UNCTAD/LDC/112, UNCTAD, Geneva.
- Synowitz, R. (1998) 'Armenia/Kazakhstan: aviation a priority in Armenia; transport deteriorating in Kazakhstan', *Radio Free Europe*.
- Tavitian, N. (2001) *The Blockade of Armenia by Turkey: None of your Business?*, Forum of Armenian Associations of Europe, Geneva.
- UNCTAD (1999a) *Policies and Actions Taken by Individual Countries, and by International Organisations to Improve Transit Transport Systems*, TD/B/LDC/AC.1/14/Add.1, UNCTAD, New York.
- UNCTAD (1999b) *Improvement of Transit Transport Systems in Landlocked and Transit Developing Countries: Issues for Consideration*, TD/B/LDC/AC.1/13, UNCTAD, New York.
- UNCTAD (2001a) *Transit Systems of Landlocked and Transit Developing Countries: Recent Developments and Proposals for Future Action*, TD/B/LDC/AC.1/17, UNCTAD, New York.
- UNCTAD (2001b) *Report of the Fifth Meeting of Governmental Experts from Land-locked and Transit Developing Countries and Representatives of Donor Countries and Financial and Development Institutions*, TD/B/LDC/AC.1/18, UNCTAD, New York.

Challenges Facing Landlocked Developing Countries

- UNESCAP (2001a) *Review of Developments in Transport and Communication in the ESCAP region 1996–2001: Asia and the Pacific*, ST/ESCAP/2157, United Nations Economic and Social Commission for Asia and the Pacific.
- UNESCAP (2001b) *Asian Highway: Roads Connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean Peninsula*, ST/ESCAP/2173, United Nations Economic and Social Commission for Asia and the Pacific.
- United Nations (1982) United Nations Convention on the Law of the Sea (UNCLOS), 10 December 1982.
- United Nations Development Programme (2002) *Human Development Report*, United Nations Development Programme, New York.
- United Nations Development Programme (2003) *Human Development Report*, United Nations Development Programme, New York.
- United Nations General Assembly (2000) *Transit Environment in the Landlocked States in Central Asia and Their Transit Developing, A/55/150 Neighbours*, United Nations, New York.
- World Development Indicators (2002) *World Development Indicators*, World Bank, Washington, DC.
- World Bank (1995) 'Staff appraisal report: the Republic of Malawi railways restructuring project', Report No. 13491-MAI, World Bank, Washington, DC.
- World Bank (2001) 'Azerbaijan: World Bank supports silk route revival', News Release No. 2001/17/ECA, World Bank, Washington, DC.

Appendix: regional overviews

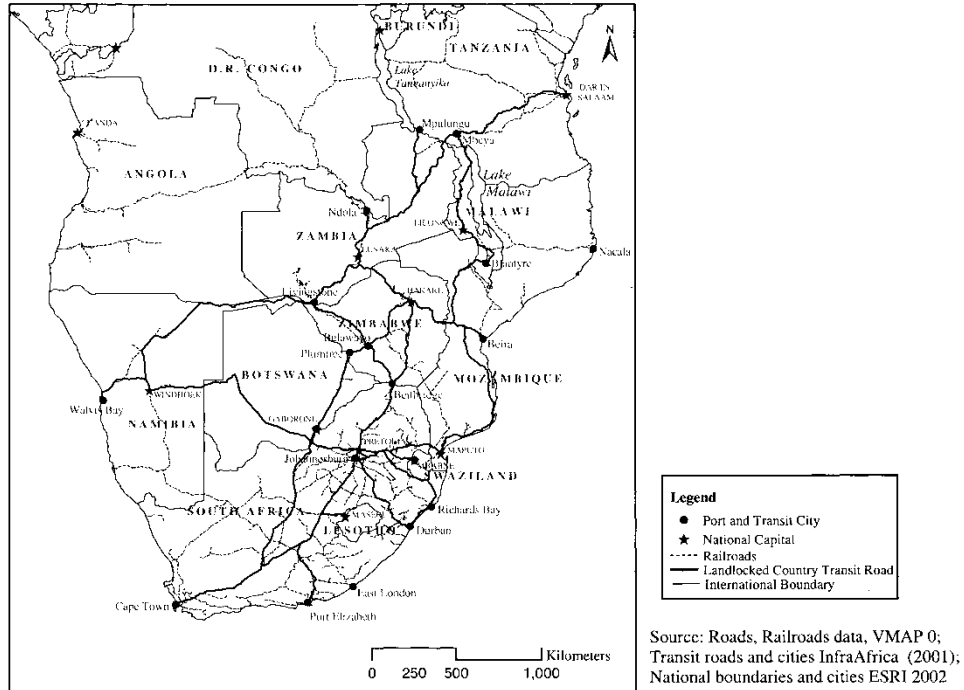
This paper has outlined the need to consider geographic, political and administrative dimensions in order to understand the nature of a country's challenges due to landlockedness. In this appendix, we present a brief description of the main aspects of landlockedness faced by countries in each region. We also include reference maps, by region, of the landlocked developing countries, with emphasis on the main transit routes.

Africa — Southern

As indicated in Table 2, the landlocked southern African countries of Botswana, Lesotho, Malawi, Swaziland, Zambia, and Zimbabwe have a higher average level of human development than their maritime neighbours. This is unique among our sample of landlocked developing countries and has been partially driven by the persistent civil conflict in Angola and Mozambique. It also reflects the landlocked countries' relatively high degree of regional transit integration, strong domestic infrastructure, relative domestic stability (with clear exceptions; for instance, in Zimbabwe) and the exceptional performance of Botswana with its significant and carefully managed diamond resources.

Internal transport networks in the southern African landlocked countries generally surpass those of their war-torn neighbours Angola and Mozambique. Unlike the landlocked countries of, say, eastern Africa, the southern African countries have several routing options available to them, including the well-developed South African corridors.

Yet, despite these relatively high infrastructure levels, significant regional



MAP A1. Transit routes of Southern Africa

transport connections remain imperfect. The Interconnected Regional Rail Network, for example, does not reach the Mozambique port of Nacala or any of the Angolan ports.

The landlocked countries of southern Africa also benefit from relatively strong relations with their maritime neighbours and ongoing efforts to promote regional cooperation. While most of southern Africa's exports are sold to the European Union, serious efforts are underway to promote intra-regional trade through SADC, South African Customs Union and COMESA. Through these organizations, countries are working to upgrade regional transportation networks. For example, the SADC has instituted the Southern African Transport and Communications Commission to integrate transport policy, freedom of transit, and regional infrastructure. COMESA has created the Yellow Card initiative, which guarantees third-party insurance across signatory states, removing the need to acquire additional insurance coverage for each country. Other important agreements include: (1) the legally binding SADC Protocol on Transport, Communications and Meteorology, which incorporates the SADC Regional Trunk Route Network; (2) the SADC Protocol on Trade; (3) bilateral agreements including Corridor Planning Committees; (4) the COMESA Carriers license; (5) the SADC driver's license; and (6) the Spatial Development Initiatives.

Amidst these commitments to promoting integration and harmonization, problems of implementation and issues of national sovereignty have hindered

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progress in some instances. For example, while Zambia and Zimbabwe both agreed to the COMESA free-trade zone, Zambia recently banned fourteen Zimbabwean products (Southern African Development Community, 2003)

Moreover, border delays continue to be a significant problem. It is estimated that delays at the major border posts in the SADC region have cost US\$48 million annually and often exceed 24 hours (InfraAfrica, 2001). Reflecting these challenges, the overall cost of freight and insurance for the SADC landlocked counties (14.8% of export values) is still higher than that for Angola and Mozambique (8.9% of exports) (International Monetary Fund, 2001).

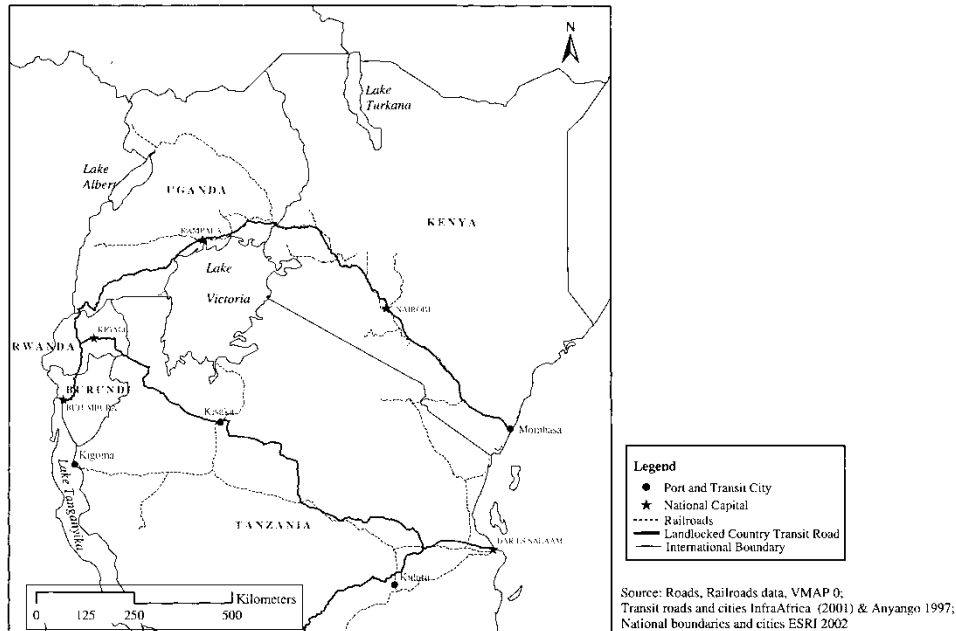
The landlocked countries of southern Africa, with the exception of Zimbabwe, have benefited from relative domestic stability. Civil conflicts in the maritime transit neighbours Angola and Mozambique, however, have led to a direct increase in trade costs and have limited potential transit options. During Mozambique's civil war, for example, Malawi was forced to reroute its trade. While this vital corridor has been reopened, infrastructural damage has thus far limited its use.

Africa — Eastern

Burundi, Rwanda, and Uganda The landlocked countries of eastern Africa, Uganda, Rwanda, and Burundi, are intimately linked by the region's 'umbilical cord', the Northern transit corridor from Kenya through Uganda and Rwanda to Burundi that serves as a primary transit route for all three countries. The Central corridor to the port of Dar es Salaam provides an alternate route to the Indian Ocean. The exclusive dependence on these corridors, and primarily the Northern Corridor, by Uganda, Rwanda, and Burundi makes this region particularly interesting in the study of landlocked countries. Although a central message of this paper is that distance to port is just one component of landlockedness, in this region distance inland is a useful summary measure since infrastructural and political challenges faced in transit are cumulative. Those faced by Uganda or Rwanda will most likely be faced by Burundi as well. Export to GDP ratios reflect the progression of challenges countries face along the Northern Corridor: for Burundi, 6%; for Rwanda, 9%; for Uganda, 12%; and for Kenya, 26% (United Nations Development Programme, 2003).

Recent civil wars and regional tensions have highlighted the interconnectedness of these countries and have severely weakened their transit systems. Rwanda's recent brutal civil war, for example, rendered the country's infrastructure virtually impassable not only for Rwandan transit, but for Burundian transit as well. Similarly, tensions between Uganda and Rwanda over the ongoing conflict in the Democratic Republic of the Congo, and the corresponding increased vulnerability of the border, have not only hindered Rwanda-Uganda trade, but also Burundian trade.

Such political tensions have traditionally hindered efforts at regional market integration. Recent improvements in the political situation, however, have been accompanied by renewed efforts at such integration. The East African Community (EAC), comprising Kenya, Tanzania and Uganda, was reintroduced



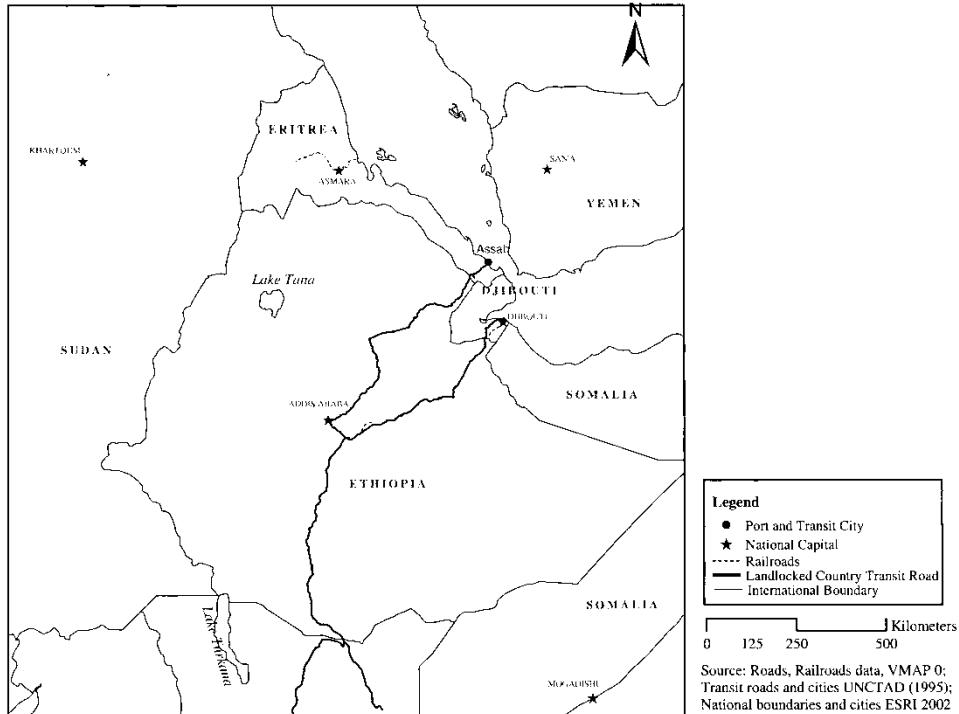
MAP A2. Transit routes of Burundi, Rwanda, and Uganda

in 2001 to foster regional cooperation, placing an early emphasis on developing primary transit corridors. Burundi and Rwanda have thus far not been invited to join the EAC. The recent formation of COMESA, the successor organization to the regional Preferential Trading Area, has meanwhile been accompanied by implementation difficulties. In fact, Tanzania has withdrawn from the organization to focus on its membership in the SADC.

In addition to problems of distance, civil conflict and cross-border tensions, the east African landlocked countries face the additional challenge of being surrounded by worse transport infrastructure than their domestic systems. Unlike other focus regions such as southern Africa, the east African maritime transit countries (Kenya and Tanzania) are plagued by poor transport infrastructure, not owing to war, but rather inadequate investment and maintenance. The section of the primary Northern Corridor road passing through Kenya is in such poor state that a heavily-laden truck is estimated to take 3 days to travel the 500 km from Mombasa to Nairobi (Pod, 1998). Traversing such poor infrastructure is complicated by regional geographic conditions, which include a severe rainy season often responsible for flooding the main corridors.

The absence of functioning rail corridors has presented further challenges. Burundi and Rwanda have no rail systems, and Uganda's railways have fallen into a serious state of disrepair. The absence of a reliable rail corridor not only limits the competition faced by the road sector, but also places an increased burden on its physical structure and leads to quicker deterioration. A reliable rail corridor extending from Mombasa through

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MAP A3. Transit routes of Ethiopia.

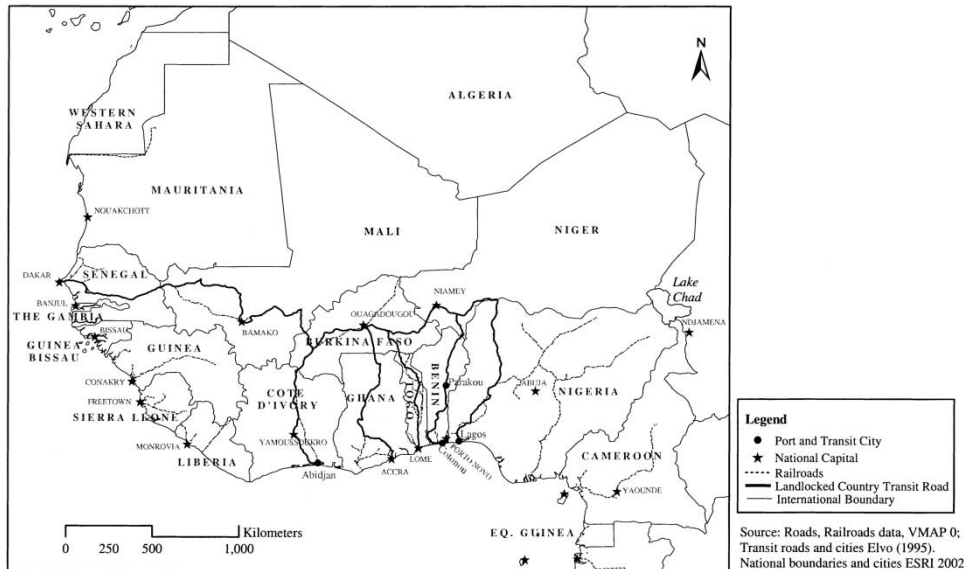
Uganda and Rwanda to Burundi would significantly reduce the cost of trade for these landlocked countries.

Ethiopia The final landlocked country in this region, Ethiopia, does not use this Northern corridor and faces a distinct set of challenges from the other eastern Africa landlocked countries. Once a maritime country, Ethiopia now faces difficult political challenges in accessing the sea. After losing its coastline to Eritrea in 1991, Ethiopia continued to depend on the Eritrean port of Assab for its international trade. The recent border conflict with Eritrea, which began in 1998 and led to border closures, dramatically reduced the viability of this port. This has resulted in a major shift of trading routes used by Ethiopia from Assab to the port of Djibouti, which now handles the large majority of Ethiopian trade. The Djibouti corridor, however, is hampered by both an unreliable and poorly functioning railroad and limited port facilities. Ethiopia's other potential transit corridor, through Somalia, is not used due to tense political relations, extremely poor infrastructure and the Somali civil war. In addition to these political challenges, Ethiopia is challenged by a weak rail system and an inadequate internal transportation network.

Africa — Western

Among the landlocked countries of the world, those of western Africa have the lowest levels of human development both on average and in relation to

their maritime neighbours. These countries have suffered from widespread internal strife and surrounding civil wars that have rendered most transit corridors impassable at least once over the past decade. Of the eight transit countries in the region, six have been involved in at least one civil conflict severe enough to have blocked transit trade in the past 10 years.¹⁰



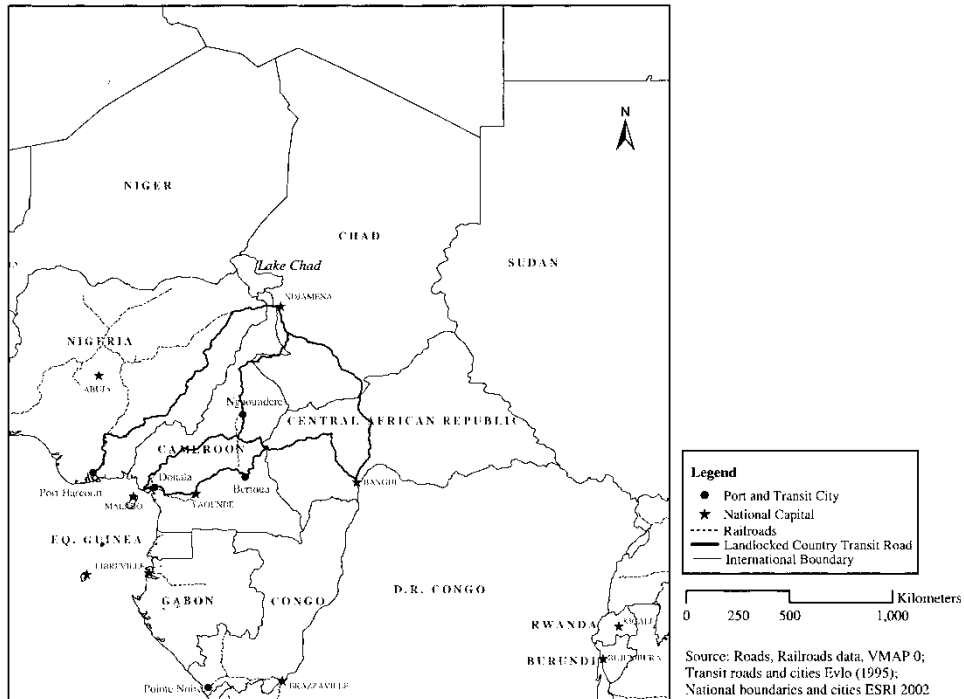
MAP A4. Transit routes of Burkina Faso, Mali and Niger.

Because many of the landlocked countries of this region depend on a small number of transit corridors, such civil conflicts have had severe effects on trade. Burkina Faso, for example, has been forced to redirect a significant portion of its transit trade twice in the past decade. In 1990–1993, as a result of the crisis in Togo, the volume of Burkina Faso’s transit trade through the port of Lomé fell. Similarly, the crises in Côte d’Ivoire (previously the transit route for more than 80% of Burkinabe trade) have significantly restricted transit movement, causing Burkina Faso to attempt to open up a new route to the Gulf of Guinea in Ghana (Organisation for Economic Co-operation and Development/African Development Bank, 2002). These conflicts not only impose significant direct costs through the need to use alternative ports, but also hinder long-term foreign investment because of the associated uncertainty.

Civil conflicts in western Africa have been closely linked to tense regional relations. During the recent political crisis in the DRC, for example, the DRC closed its border with the Central African Republic (CAR) to prevent the cross-border flow of arms and limit the CAR’s involvement in the war. The DRC had previously not only provided one of CAR’s major transit routes (the Oubangui River), but had also been one of the CAR’s major export destinations in Africa (International Monetary Fund, 2002).

Attempts to ease such transit challenges through regional integration

Challenges Facing Landlocked Developing Countries



MAP A5. Transit routes of Central African Republic and Chad.

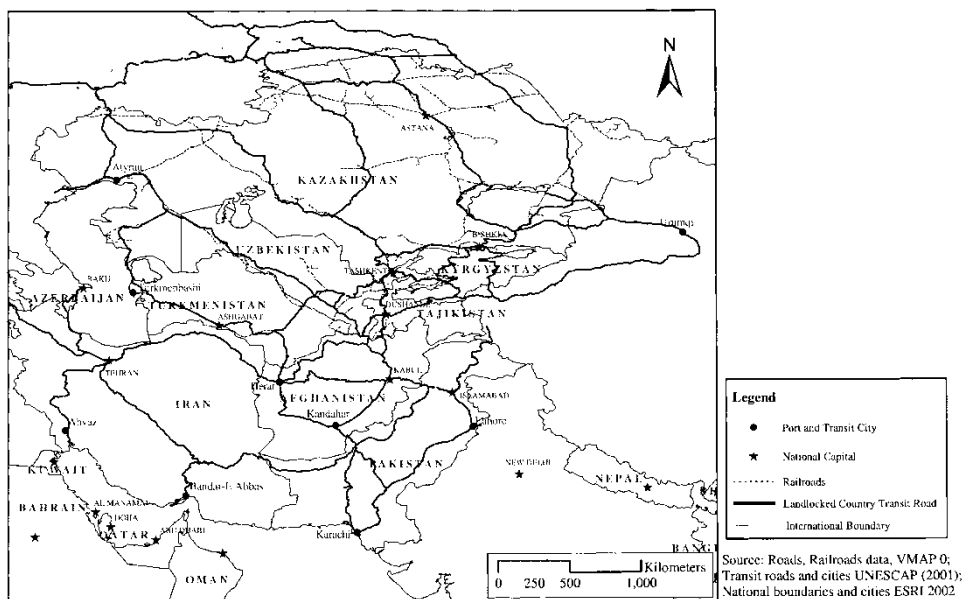
have thus far been unsuccessful, largely because of the continuing political instability. Reflecting such instability, severe corruption and bureaucratic inefficiencies persist. As a result of these bureaucratic hindrances, the trip from Doala, Cameroon to Bangui, CAR is reported to take 3 weeks to 1 month. Border customs procedures themselves can take as long as 2 weeks.

The political challenges of this region are exacerbated by the extremely poor transport infrastructure, both in the landlocked countries and their transit neighbours. Contributing to such poor infrastructure are the difficult geographic conditions particularly the heavy rainy seasons. These rains can often leave the main roads flooded for months at a time and have devastating effects on the rural feeder roads. Prolonged dry seasons, on the other hand, often render the region's rivers impassable. In the case of the Central African Republic, one of the two primary transit corridors is impassable during the wet season and the other, the Oubangui River, is impassable during the dry season. Consequently, the Central African Republic does not have a dependable all weather transport corridor to the coast. The rainy season has particularly acute effects for the large countries Niger, Mali and Chad, where access to significant areas of land is often limited for much of the year.

Asia — Central

As part of the Soviet Union, the Eastern European and Central Asian republics were integrated into the centralized Soviet command economy. Their role in

this system was primarily to provide natural resources (in particular, petroleum and metals) and agricultural products (namely, cotton and grain) to the processing industries and principal markets located in today's Russia and Ukraine. Accordingly, transport corridors were developed during the Soviet era mainly to connect the individual republics with Russia and Ukraine, rather than with their neighbours. As a result of this, the Eastern European and Central Asian landlocked countries face three main transit problems in the aftermath of the collapse of the Soviet Union. First, such corridors were built well before today's international borders were drawn. Important domestic transport arteries now often pass through neighbouring countries, which can result in long delays and additional costs. Some countries are now building costly alternative routes to mitigate this problem. Second, connections through China, Iran, and Afghanistan are limited and poorly developed. The consequent dependence on Russian and Ukrainian transport links is said to be used by Russia and Ukraine for political leverage, seriously constraining landlocked countries' ability to increase their oil and gas exports. Third, the Soviet command economy's allocation of specific economic roles to each region led to poor diversification of exports for a number of these countries.

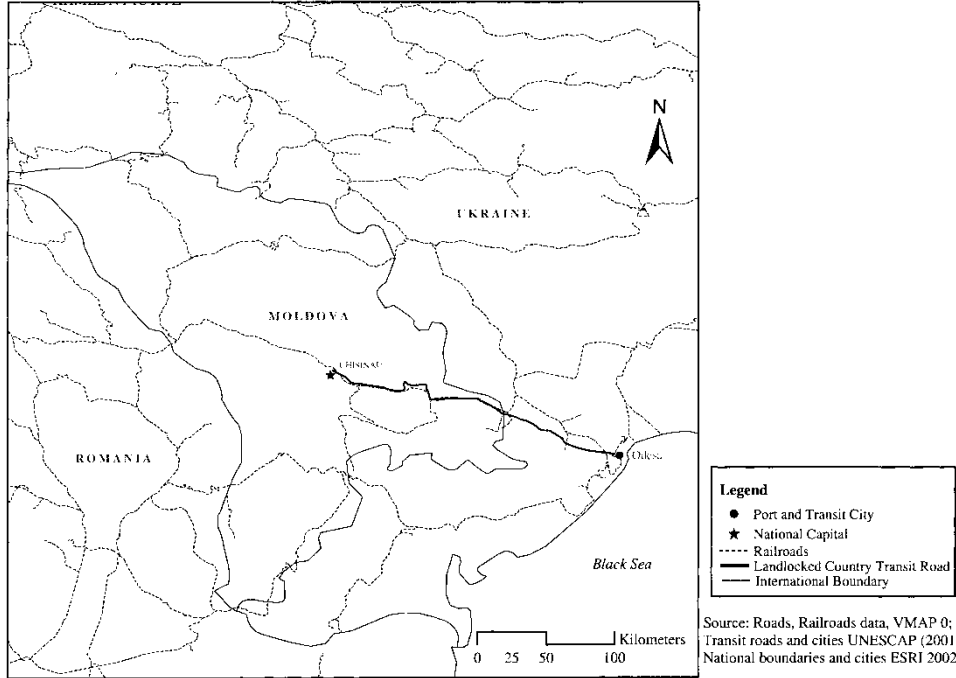


MAP A6. Transit routes of Eastern Europe and Central Asia.

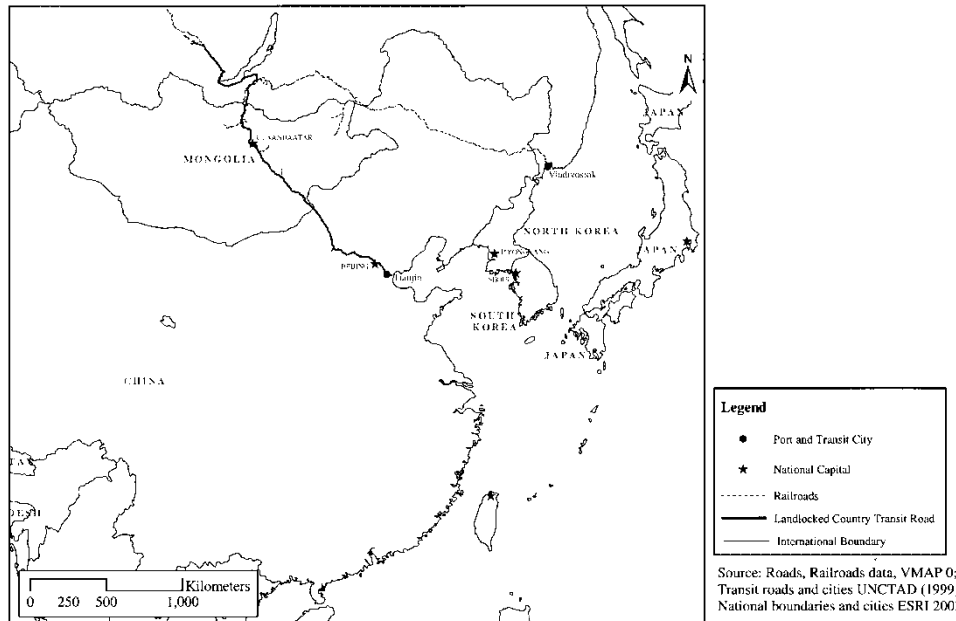
While the Soviet Union initially invested heavily in this infrastructure, much of it has recently fallen into a state of decline. These transport challenges are aggravated by the remoteness of many of the landlocked countries: several of the former Soviet states are over 3000 km from the nearest port.

Ongoing regional tensions further hinder trade routes. Poorly defined borders that may not reflect ethnic or political differences can fuel domestic

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MAP A7. Transit routes of Moldova.



MAP A8. Transit routes of Mongolia.

and regional crises. Such tensions have precluded any regional cooperation and have contributed to severe corruption. Problems of international cooperation have limited the potential of this region to serve as a regional crossroads.

Although Moldova is geographically removed from the former Soviet economies of Central Asia, it faces similar issues. It is only 170 km from the Black Sea — the shortest transport distance of all landlocked countries in our study — but also struggles with domestic and external tensions. Not only is Moldova caught in the middle of political tensions between Romania and the Ukraine, but, with the eastern part of the country controlled by ethnic Russians and Ukrainians, and the west by ethnic Rumanians, Moldova also suffers from internal tensions regarding the separatist Transdnestr region. Moldova's infrastructure is furthermore still based on the former Soviet networks to Russia, thereby limiting other trade routes.

Unlike Moldova and the former Soviet republics, Mongolia does not face severe ethnic and cross-border tensions. It does, however, share the challenge of remoteness with the capital city, Ulaanbaatar, lying nearly 1700 km from the nearest port. Mongolia also still grapples with its extremely low population density — the second lowest of all countries in our study — which further complicates transport. The country has only one main highway and relies primarily on rail for shipping. Railway infrastructure is in fair condition but problematic for trading with neighbouring China, the world's fastest growing economy, since the two countries use different rail gauges and shipments need to be unloaded and reloaded at Zamyn Uud.

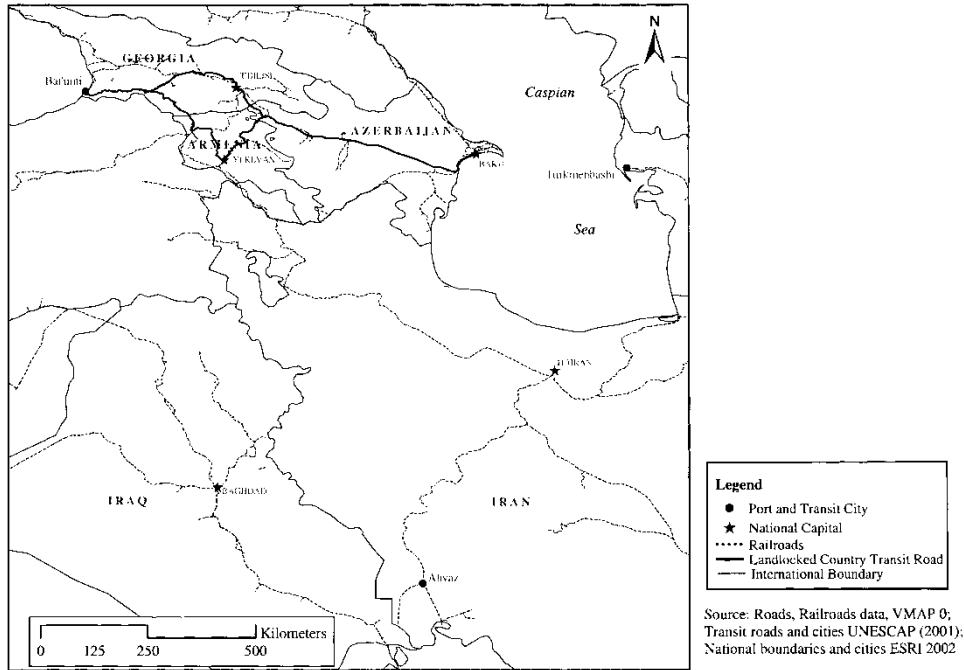
South Caucasus

The location of the South Caucasus landlocked countries, Armenia and Azerbaijan, at the bridge of the traditional east-west Silk Route connecting East Asia to Europe, holds large potential benefits for both countries. The planned revival of the Silk Route as a network of major transport corridors could potentially help these countries become vital transit links between East and West. Yet, in their current state, both Armenia and Azerbaijan suffer extensively as landlocked countries. Regional tensions, including boundary disputes over the Caspian Sea, ethnic disputes and steadfast Russian alliances, have hindered any serious attempts at regional integration. In fact, the dispute between Armenia and Azerbaijan over the Nagorno Karabakh region, a principal cause of the regional tensions, has resulted in the closure of both the Armenia–Azerbaijan and Armenia–Turkey borders.

Armenia and Azerbaijan have also suffered from surrounding civil conflicts that have limited the use of potential corridors. The Georgian civil war began in 1992, hindering the use of the Georgian corridor and resulting in severely dilapidated infrastructure on the route. Similarly, the Chechen war has limited trade to the north and weakened Azerbaijan's relations with Russia.

Reflecting the weak political institutions of the region, corruption is reported to be widespread and has become a serious concern for Armenia

Challenges Facing Landlocked Developing Countries



MAP A9. Transit routes of the South Caucasus.

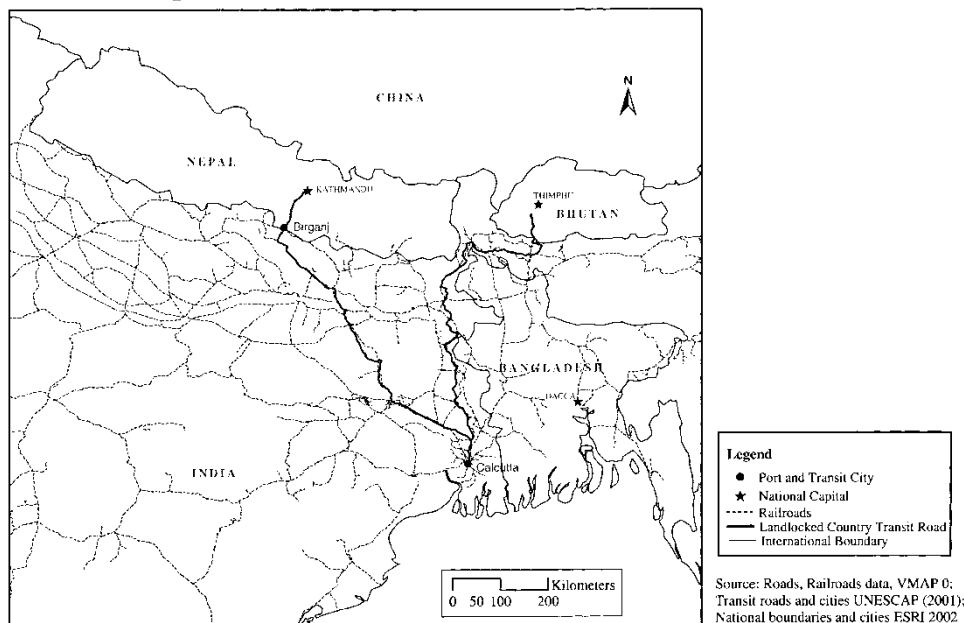
and Azerbaijan. Needing to transport their goods across international borders where bribe paying is particularly persistent, these landlocked economies suffer two-fold from internal corruption and from the corruption of their neighbours.

Further complicating the situation, the ongoing conflicts and political instability of the region have left the transport infrastructure in a severe state of dilapidation. The European Bank for Reconstruction and Development estimated that nearly 40% of Armenian roads were in need of immediate repair in 1998, while 56% of Azerbaijan's main road network has been described as being in a poor state of repair (Synowitz, 1998; World Bank, 2001). The infrastructure in neighbouring Georgia is alleged to be in even worse condition. Significant investment is required to restore the regional transit system.

Asia — South & South-East

With the exception of western Africa, the south and southeast Asian landlocked countries of Nepal, Bhutan and Laos are performing worse relative to their neighbours in human development than the landlocked countries of any other region. Yet, the region is the only one where the landlocked countries have a lower ratio of transportation and insurance costs to value of exports than their maritime neighbours. This discrepancy seems to be

accounted for by the fact that all three of these countries trade predominantly with their immediate neighbours. For both Bhutan and Nepal, India is the main trading partner, while for Laos it is Thailand and Viet Nam.



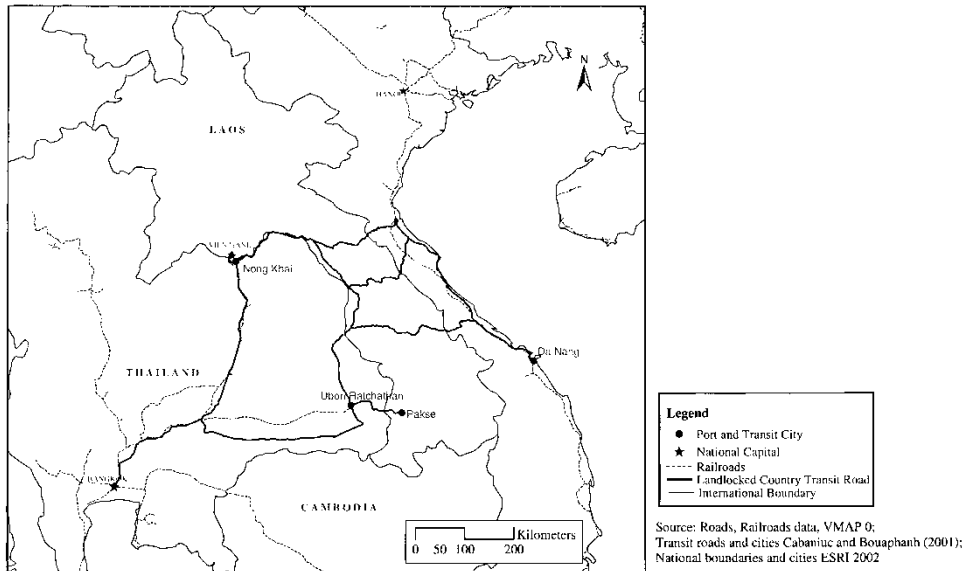
MAP A10. Transit routes of Bhutan and Nepal.

The minimal transoceanic trade of these countries appears to result from the limited number of transit corridors. With the exception of Lesotho, the countries of Nepal and Bhutan are unique in the fact that they have only one transit neighbour, India. This implies complete dependence on India for access to the coast, giving India enormous negotiating power. Interestingly, each has a very different political relationship with India. Bhutan has enjoyed a very close working relationship with its southern neighbour, and as a result has been granted liberal access to transit. In fact, India allows Bhutanese transit trade to be conducted under the supervision of Bhutanese customs, yielding little administrative hassle. In contrast, Nepal's relations with India have frequently been strained, with India often seen to have more influence in the negotiation of treaties and disputes.

Relatively poor domestic infrastructure has further complicated transit for the south and southeastern Asian landlocked countries and has precluded them from taking full advantage of the better surrounding infrastructure. Transit trade entering Laos on the Thai rail system, for example, must currently be unloaded and placed on trucks since Laos has not yet developed a rail system.

South America

Both South American landlocked countries, Bolivia and Paraguay, suffer from poor domestic infrastructure, and unlike most African landlocked countries

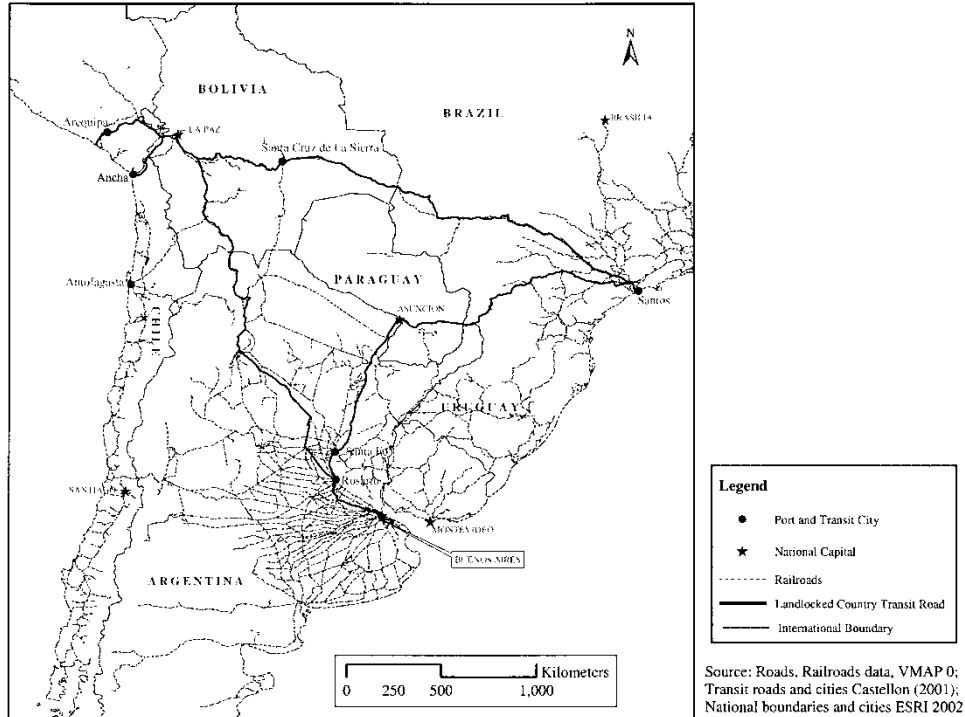


MAP A11. Transit routes of Laos.

are surrounded by relatively extensive and well-maintained transport corridors. The poor state of maintenance and operation of domestic corridors, however, have prevented these countries from benefiting from such strong external transit corridors. Paraguay's railroad, for example, links to the railways of Argentina, Uruguay and Brazil, and could serve a primary role in international transport, but has fallen into a state of disuse.

Bolivia and Paraguay also both face political challenges to transit trade. While not subject to the same level of domestic or surrounding strife of the countries of Africa, nor the frequent border closures of Eastern Europe and Central Asia, the South American landlocked countries have suffered from political tensions with their transit neighbours. Most recently, for example, an ambitious Bolivian plan that could double exports by exporting natural gas via Chilean ports has been delayed by ongoing domestic protest in Bolivia against the use of Chilean corridors. Such protest is largely a product of the ongoing and century-old tensions between the two countries, which originated in the war of 1878–1883 when Bolivia lost control of the coastal province of Atacama.

On the positive side, Bolivia and Paraguay also have similar opportunities: both are advantageously located in the heart of South America, potentially allowing them to serve as the South American trade cross-roads, between MERCOSUR and the Andean Community. This central location could allow them to serve as regional hubs for new technologies less dependent on transport costs, such as telecommunications. Bolivia and Paraguay also hold the potential to be major regional energy hubs since they both possess



MAP A12. Transit routes of South America.

significant reserves. Bolivia recently discovered expansive reserves of natural gas and oil, and Paraguay has the potential to be a major exporter of hydroelectric power. Since these sectors are not primarily dependent on road and rail infrastructure, it will be possible to develop and benefit from them even before domestic transport infrastructure is improved to a significantly higher level.