

**SUSTAINABLE MINERAL-DRIVEN
DEVELOPMENT IN TURKMENISTAN**

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ABSTRACT

The newly-independent government of Turkmenistan embarked in 1993 upon a development strategy which relied on the expansion of natural gas exports to support a gradualist reform programme. However, although the deposits of natural gas are vast, they are remote from markets and construction of transport links is impeded by a landlocked location. Plans to reach markets in East and South Asia seem speculative but a route to Turkey via Iran, with a prospective link to the EU, is a viable medium-term prospect. Even so, the transportation costs will squeeze the potential rents on the gas down to one-sixth to one-twelfth of the revenue. Huge export volumes will therefore be required to transform Turkmenistan into a 'second Kuwait'. Meanwhile, payments arrears in CIS gas markets make it necessary for the Turkmenistan government to revise its development strategy and focus upon agriculture which has the potential to respond more rapidly than the mining sector over the medium-term. Agriculture is generally marked by the absence of economies of scale, so that privatization of farms into family units is a priority, a fact acknowledged in the December 1996 reforms. Even so, shortages of foreign exchange may yet force the government to seek external assistance at which point gradual reform may cease to be an option, whatever its merits.

1. INTRODUCTION

This paper examines the development potential of Turkmenistan in light of its natural resource endowment and social capital. It proceeds by summarising the natural resource endowment and then evaluates the post-Soviet development strategy, noting the consequences of an unexpected deterioration in gas markets. Finally, a revised development strategy is outlined in the context of the on-going debate concerning the desirable pace of reform in the transition economies. The paper assumes, in line with neo-liberal economic theory, that the optimal development strategy requires Turkmenistan to realise its comparative advantage as an exporter of a range of primary products to both the western Asian region (notably Turkey) and also to adjacent global markets in Western Europe, South Asia and East Asia.

2. THE NATURAL RESOURCE ENDOWMENT

Classifications of countries by their natural resource endowment have used different criteria, including: land area (Wood and Berge 1994); export orientation and population size (Syrquin and Chenery 1989); and per capita cropland and domestic market size (Auty 1994). This paper opts for domestic market size and per capita cropland because these two factors, suitably adjusted to accommodate variations in per capita income and mineral resources, respectively, define the critical constraints on both manufacturing and export opportunities. By these criteria, Turkmenistan is a small, resource-rich country. It has deficiencies in social capital arising from the legacy of the restrictions on the effective trading and exchange of goods under the Soviet system.

More specifically, Turkmenistan is a landlocked country which, despite its large geographical area of 488,000 km², is only moderately land-rich, with 0.38 hectares of cropland per capita (WRI 1996). Cropland extends over barely 2 percent of the land surface and meadows and pasture occupy 69 percent of the land surface. However, the country has large reserves of hydrocarbons, especially natural gas. Gas processing offers a route to industrialization which is in addition to those of import substitution and crop processing for export. However, the small domestic population of barely 4.5 million with its \$500 per capita income affords a very small market for import substitution, while the landlocked location reinforces distance from major markets to weaken prospects for industrial exports. Consequently, the production and export of primary products is likely to form the basis of the country's economic development through the next generation at least. It should be noted, however, that this development strategy has been highly successful in countries as culturally varied as New Zealand, Australia, Canada, Chile, and Botswana.

The economic links with the Soviet Union extracted cotton and hydrocarbons from Turkmenistan in exchange for manufactured goods. These links left agriculture responsible for almost 50 percent of GDP and two fifths of employment in the early 1990s (US Department of State 1994). Somewhat surprisingly, however, the cropped area had contracted through the 1980s, so that at independence, the total area under cultivation was 1.48 million hectares compared to 2.1 million hectares in 1983 (WRI 1996). This decline in cropland was accompanied by the concentration of crop production on irrigated land whose share of the total cropped land consequently rose from 48 percent to 91 percent over that same period.

Like many low-income countries, agricultural production in Turkmenistan is relatively undiversified and heavily dependent on a single product, in this case, cotton. In the early-1990s, 1.3 million tonnes of cotton were produced from 45 percent of the arable land: it generated 56 percent of farm output and 16 percent of total exports. Wheat, the next most important crop, occupied one eighth of the cropped area in 1993 and yielded 374,000 tonnes. However, yields were low, and the collective farms were highly mechanised, despite the low cost of rural labour. For example, the wheat yield, although twice that of Kazakstan to the north, averaged only 2 tonnes per hectare, which was barely two fifths of industrialized country levels (WRI 1996). Domestic grain production needed supplementation by imports, in part because animal feed absorbed two fifths of Turkmenistan's grain demand (WRI 1996). Livestock accounted for 22 percent of agricultural

output, but less than one twelfth of exports, and was based upon a cattle herd estimated at 960,000 in 1992-94 and a combined sheep and goat herd of 6 million animals.

Despite its dominance of production and exports, the farm sector generated only 23 percent of total exports, of which cotton alone accounted for two thirds. This is because natural gas production and processing earned 70 percent of the country's foreign exchange in 1993 and oil exports accounted for an additional 7 percent of exports. Natural gas also generated 70 percent of Turkmenistan's industrial output. Recent estimates by BP (1996) suggest the country's natural gas reserves are 101 trillion ft³ (which is 2.9 trillion m³ and equivalent to 2.6 billion tonnes of oil--or 19 billion barrels). The reserves comprise 2 percent of total global gas reserves and are the eleventh largest in the world. However, if *possible* reserves are also considered, then the total natural gas reserves may be five times this level. As it is, the proven reserves alone can support over thirty years of production at the 1993 rate of extraction of 65 billion m³ (22 million tonnes of oil equivalent (IMF 1997)).

The oil reserves of Turkmenistan are believed to be much smaller than the natural gas reserves: the proven oil reserves are 190 million tonnes, or 1.4 billion barrels. However, exploration and production were both neglected after the 1960s. Annual oil production fell from 300,000 barrels per day (bpd) in the 1970s to 85,000 bpd in the early 1990s. In 1993, domestic consumption was 4.3 million m³. Refined products were produced in two unsophisticated oil refineries, each with a capacity of around 120,000 bpd, with some exports by rail and small tankers. Other minerals, in addition to natural gas and oil resources, include 800 million tonnes of coal reserves that could substitute for annual coal imports that were 110,000 tonnes in the mid-1990s. There are also commercial reserves of precious metals, including silver, gold, and platinum.

Faced with this resource endowment and an economy and society in need of thorough reform, the newly independent Turkmenistan government opted for a strategy of gas-driven development in 1993. The government hoped that expanded natural gas production together with diversification into new markets would generate sufficient additional revenues that investment could be boosted to sustain rapidly-rising incomes, while the extra foreign exchange from gas exports would ease the import constraint on economic development. It was expected that the additional rents from natural gas would allow the country to reduce its heavy dependence on imports and permit a high degree of economic autonomy in regard to both food and industrial production. In addition, the natural gas rents would permit the pace of social change to proceed slowly: a "big bang" reform was ruled out in favour of a more gradualist approach.

3. THE GAS-BASED DEVELOPMENT STRATEGY 1993-97

3.1 The Initial Hydrocarbon Export Plan

The Turkmenistan government launched an ambitious ten-year development plan in 1993 which was designed to achieve the country's potential as a "second Kuwait" as quickly as possible. The plan was expected to double per capita income to almost \$6,000 in purchasing power parity terms by 2002 (Financial Times 1997). It was launched upon a base of healthy financial reserves and good prospects for expanding gas capacity and markets. The backbone of the development plan called for natural gas production to reach 130 billion m³ by the year 2000, and 230 billion by 2010 (Sagers 1993). It also aimed to double oil production by 1996 (RPI 1996), and thereafter to lift it to 560,000 bpd (204 million barrels per year) by the year 2000, and to 1.5 million bpd by 2010 (Sagers 1994). It should be noted, however, that these ambitious plans are based on estimated oil reserves of 46 billion barrels of oil, a figure considered to be highly optimistic by external observers (Sagers 1994). Finally, the development plan also called for cotton production to expand by one-third, to 2 million tonnes, and for greater industrial production through boosting value-added on the country's primary products, notably cotton.

Initial priority in the plan was given to the attraction of foreign investment to expand gas production, rather than to improvements in social welfare. The first stage of the development plan called for an investment of \$5.5 billion to be made by 1996. Government planners projected that such a level of investment would earn profits of \$2.2 billion by the year 2000 and thereby become self-financing (Sagers 1994). In order to attract investment in gas production, attention was given to the basic infrastructure. A national airline was set up and a new airport was built in the mid-1990s along with new roads, hotels, and government buildings in the capital city. Once these projects were well underway, the emphasis shifted to the construction of new pipelines in order to avoid dependence upon the Russian gas network, and to diversify export markets.

3.2 The Transportation Constraint on Natural Gas Rents

Despite considerable setbacks, the Turkmen government still believed in 1997 that by the year 2000 it was technically possible to export up to 100 billion m³ of natural gas to the traditional CIS markets, an additional 30 billion m³ of gas from fields in eastern Turkmenistan to South Asia, and a similar volume from the western part of the country to Iran and Turkey.¹ This would lift total gas production towards 160 billion m³. The potential rents this would engender can be calculated by deducting, from the delivered price of gas, the cost of extraction and the cost of transport. The cost of gas extraction in Turkmenistan is estimated by the World Bank to be 50-55¢/ thousand ft³ (mcf), or some \$16-20 per thousand cubic metres (mm³). Delivered prices of natural gas range from \$2.25/ mcf (around \$80/ mm³) in the western FSU to \$2.50-3.00/ mcf (\$89-107/ mm³) on world markets.

The above figures imply that transport costs must not exceed \$1.75/ mcf (\$62/ mm³) on CIS sales and \$2.50/ mcf (\$89/ mm³) on world markets in order to generate even the smallest rent. A rule-of-thumb transport cost through the existing FSU network is 40¢/ mcf per 1000 kms (\$15 per mm³). Gas exports into Russia would incur total costs of \$1.80/ mcf using the existing network, or \$2.05/ mcf for a new pipeline. These prices would generate from 45¢/mcf to 20¢/mcf in rent. However, the Russian gas monopoly, Gazprom, shut Turkmenistan out of routes into southern Russia in 1993, despite the Turkmenistan claim to own 12 percent of the shared pipeline network. Worse, payment delays emerged within the reforming economies elsewhere within the CIS. These unforeseen developments led to the collapse of traditional gas export markets through the mid-1990s and intensified the need to build new pipeline capacity.

Five natural gas pipeline routes were actively considered (Table 1), but their viability and their capacity to generate rents varies. The first new pipeline to be targeted was a modest 150-km link into Iran. Sales to Iran might reach 2.5 billion m³ and, by displacing domestic Iranian fuel oil consumption, free that oil for export. This is very advantageous for Iran because liquid hydro-carbons have significantly lower transportation costs per unit heat value than natural gas.

However, Turkmenistan can reap greater benefits from a subsequent agreement, signed in 1997, to extend the Iranian gas pipeline westwards into Turkey. This line would initially add an extra 8 billion m³ in volume. However, the additional distance would push total transport costs to \$2.25 /mcf, leaving only a modest rent of 25¢/ mcf or less. More long-term, the western pipeline can be extended into Germany and, although the delivered cost would rise above \$3/ mcf, that figure might be reduced in two ways. First, the extended pipeline might be financed by export credits bearing only 7-8 percent interest rather than the private return on capital of 15 percent, a key consideration for a project whose costs are dominated by capital charges. Second, a contract for large sales volumes would capture the economies of scale. Unit rents would still remain

¹ Turkey is anxious to reduce its dependence on Russia for natural gas imports, and the Turkmenistan link opens up the possibility of Turkey securing gas from that country rather than from Iran (Economist 1997b). The alternative sources for Turkey are Algerian LNG (\$3.50 per mcf) and Egypt exports via an Israeli pipeline (for slightly less), but both these options carry significant political risk.

minimal, however, in the absence of real increases in long-term energy prices (a development considered unlikely (World Bank 1997)).

Potentially higher rents could be secured from a 1,600 km pipeline from the large Dauletabad field through Afghanistan to link into the Sui gas field in Baluchistan and on to Karachi (Table 1). This pipeline is being actively investigated by Unocal and the governments of Pakistan and Afghanistan. In this case, the economics of transportation are feasible, but it may not be possible to secure the financing, given political instability in Afghanistan. Meanwhile, a proposed eastern pipeline through China does not appear to be viable because it cannot compete with either LNG shipped from southeast Asia or natural gas piped from eastern Russia.

These gas transportation costs illustrate an important weakness in the gas-based development strategy that arises out of a critical distinction between the cost of transporting oil and the cost of transporting natural gas. The cost of transporting natural gas is much higher, per unit of heat value, than the cost of transporting oil (Stauffer 1975). It follows that the potential rents per unit heat value on natural gas are lower than the potential rents on oil. More specifically, the costs of transporting natural gas by pipeline from Turkmenistan over the most favourable routes seem likely to absorb at least two thirds of the total revenue. The costs of gas extraction will absorb a further one-sixth, leaving no more than one sixth of the revenue as rent. In contrast, the cost of oil transportation is unlikely to exceed one fifth of the revenue, while extraction costs under typical Middle Eastern conditions would absorb less than one fifth. This leaves more than three fifths of the oil revenue as rent. Basically, the potential rent per unit of natural gas is likely to be less than one-fifth that of oil *under the most favourable of gas transport routes* open to Turkmenistan.

3.3 The Scale of the Potential Natural Gas Rents

Nevertheless, given the small size of the Turkmen population and the low level of per capita income, the expansion of natural gas production could still generate revenues on a scale sufficient to impact strongly the country's early stages of development. Table 2 estimates the potential rent stream from natural gas, which might have been secured by the late 1990s had the gas-based development strategy encountered fewer obstacles. First, the alignment of domestic energy prices with international levels would generate around \$800 million in rents on the 10 billion m³ consumed within Turkmenistan. But, more importantly, it would also provide strong incentives towards the more efficient use of energy within the domestic economy. In addition, the restoration of pre-reform sales to the neighbouring CIS countries at international prices would generate rents of around \$1.6 billion. Finally, a relatively modest build-up of exports to 30 billion m³ in new markets south and west of Turkmenistan could add almost \$300 million more in rent.

It is difficult to demonstrate the potential importance of such a rent stream for the Turkmen economy, given the complexities involved in making a meaningful estimate of its GDP during the transition to a market economy. But a rough indication can be gained if a number of simplifying assumptions are made, and the potential viability of the ten-year development plan can then be assessed. If it is assumed that economic output had held up during the initial years of the plan and that the country's per capita income reached \$1,500, the total GDP would be around \$7 billion, of which non-mining GDP would be around \$4.3 billion. The application of the user-cost method of accounting for natural capital depletion, when applied to those GDP estimates (under cautious assumptions about the gas reserves and interest rates), would allocate 36 percent of the natural gas rent to saving/investment and the remainder as true income (El Serafy 1989). This would boost the ratio of saving/investment to 22 percent of non-mining GDP, compared with an estimated investment level of 17 percent of GDP in 1996 (the latter is based upon 10 percent of GDP in public investment and around 7 percent private investment). The rent stream would also boost domestic consumption by the equivalent of almost two fifths of GDP. Such figures are highly speculative, but they do suggest that a stream of rents, on the scale envisaged by the ten-year development plan, might indeed have supported the gradualist reform policy that was intended.

3.4 The Slow Pace of Reform Under the Development Plan

Certainly, the first five years of the ten-year development plan have been associated with tardy reform. Turkmenistan is one of the slowest reformers among the central Asian components of the former Soviet Union, which are themselves a lagging group of countries. Privatization was pursued slowly in order to avoid both off-loading state assets at minimal prices, and also the corruption associated with rapid privatization in, for example, Russia. The development plan envisaged that most of the agricultural and mining sectors (comprising together some 80 percent of economic activity) would remain in state hands until at least 1995. By 1995, the government claimed that, if “home” industry and petty trading were taken into account, there were 21,000 private enterprises and 18 percent of GDP was in the private sector. The EBRD (1996), however, estimated that 91 percent of GDP remained in state hands: even commercial activity in the capital city had not been privatised. A bankruptcy law, introduced in 1992, had been little used and a competition policy had yet to be developed.

Between 1993 and 1996, only 1,800 small state-owned enterprise (SOE) units (defined as employing less than 20 persons on average) were privatized; 40 percent by auction to private owners and the rest in the form of co-operatives. These small former SOEs comprised mostly of services such as laundries and hairdressing, while food shops remained firmly under state control. As to the large SOEs (100 to 500 employees) which have caused such problems for another gradual reformer, China (Economist 1997a), only four out of the 600 which were targeted in 1996 for privatization were actually launched. Elsewhere, six departments within the Ministry of Agriculture were to be sold off, but the terms reserved at least 51 percent state ownership. In rural areas, only small amounts of farmland were leased to private individuals prior to 1997, and although land ownership was legalised, a 15-hectare ceiling was set upon plot size (EBRD 1996).

Turning to public finance, central government expenditure had averaged 41 percent of GDP in 1990-92, but that level halved in 1993, and halved again thereafter (although these figures exclude the activity of some ministries), before recovering back to 16 percent of GDP in 1996 (EBRD 1997). Turkmenistan ran budget surpluses during the early 1990s, thanks to a boost in receipts from natural gas exports. Two fifths of the revenues came from taxes (including those from natural gas exports that accounted for 85 percent of non-farm foreign exchange earnings). The Turkmen government prudently accumulated foreign reserves which had reached \$1.17 billion by 1996, around one half of nominal GDP. Taxes were reformed in 1992-93, cutting the profits tax from 45 percent to 25 percent; introducing a VAT at 20 percent (with some concessionary rates at half that level); setting the income tax at a flat rate of 8 percent; and abolishing export taxes (EBRD 1996).

Monetary policy was effectively determined by the cabinet, given the country’s rudimentary financial system, although control of credit officially functioned through bank reserve requirements and refinancing arrangements. The state bank became the central bank in 1993 with the launch of the national currency, the manat, and the remaining five largest state banks became creditors to fifteen commercial banks, some of which are owned by SOEs. Lax monetary policy caused the rate of inflation to accelerate sharply and average 1,600 percent over the three years 1992-94. A stabilization programme was then introduced. Inflation was expected to average 250 percent in 1996 on a declining trend, but this did not occur (EBRD 1996). Rather, the inflation rate remained just below 1,000 percent, and further acceleration seemed likely as a result of the reintroduction of directed credit in late 1996 (EBRD 1997). Interest rates were negative, and remained so, even after sharp rises in 1995. By 1996, Turkmenistan was the only reforming country that had still not brought the rate of inflation back to double digits (EBRD 1997).

In trade, the exchange rate was pegged to the dollar in 1993, but the government was forced to make periodic adjustments. The government decided to distribute foreign exchange through weekly auctions and placed trade restrictions on some imports. The tight restrictions on hard currency transfers repressed imports, and impeded inward investment, even though the government was seeking to attract foreign investment in order

to expand the production of natural resources. By 1995, import repression was adversely affecting production. Meanwhile, an export tax was replaced by a foreign exchange tax for the state sector which required that, from 1995, 50 percent of hard currency from state exports would be transferred to the central government (rising to 70 percent in the case of oil and gas). Increasing recourse was made to barter trade as economic conditions in the country's principal trading partners deteriorated, but this was banned in 1996 with the notable exception of natural gas (EBRD 1996). Severe import repression persisted, however, with increasingly adverse consequences for domestic production through 1996.

Labour reform proceeded slowly and labour markets remained far from flexible. Within the dominant state sector wage rates were set by the government, and were raised in a uniform way across all enterprises, despite wide variations in skill shortages. A minimum wage, introduced in 1992, was quickly eroded by inflation. For example, when the rate was raised in 1996 it stood at only \$10 per month (EBRD 1996). Although official unemployment was estimated at barely 1.2 percent in 1993, production and employment (as well as exports from the energy sector) were subsidised. The transfers to SOEs took the form of bank credits, but in 1996 a change in policy occurred which sharply reduced this practice (EBRD 1996). Social security was funded, in part, by a 20 percent levy on wages and salaries. The labour force had few rights: work conditions in factories and on farms were often dangerous and unhealthy, and environmental damage has been substantial whether in irrigated rural regions or industrial areas. Carbon emissions were 1.55 tonnes per capita in 1992 and total national emissions were 5.9 million tonnes (WRI 1996).

The net effect of the gradual reforms begun in the early 1990s has been to free up some prices, privatize a small part of the economy, and attract a modest amount of foreign investment. But stabilization has not been achieved, the financial sector is weak, and state direction remains pervasive. The slow pace of reform was designed to cushion the populace from the upheavals of the transition to a market economy, but it did not prevent the per capita income from falling in 1996 to 57 percent of what it had been in 1989.

4. THE NEED TO RETHINK THE DEVELOPMENT STRATEGY

4.1 The Unravelling of the Hydrocarbon Export Plan

An initial upward adjustment of export prices in the early 1990s outstripped the adjustment of domestic prices, so that the ratio of exports to GDP jumped sharply from less than 10 percent to more than 50 percent (EBRD 1996, 207). This produced a strong positive trade balance that yielded sizeable foreign exchange reserves, and formed the basis upon which the ten-year development plan was drafted. However, contrary to the expectations of the planners, the trade balance narrowed after 1993 and was barely positive by 1996 according to estimates (EBRD 1997). This deterioration reflected a decline in exports as the nominal receipts on natural gas fell from \$1.8 billion in 1993 to \$1.02 billion in 1996. In fact, the actual revenues from natural gas were much lower than that by then. The government responded by repressing imports in order to conserve foreign exchange. GDP declined by almost half while the pursuit of a loose monetary policy triggered inflation.

The development plan was undermined by a combination of the loss of established gas export markets, and the slow speed with which the external investment emerged to fund new pipelines. Far from expanding, the installed gas delivery capacity of around 80 billion m³ per annum was not fully used. Actual gas deliveries dropped to one quarter of existing capacity by 1994 as Gazprom denied Turkmenistan gas access to the European pipeline and payment arrears accumulated on sales to the Ukraine, Georgia, Azerbaijan, and

Armenia.² By 1996, some 53 percent of gas payments to Turkmenistan were in the form of barter goods, much of which proved of shoddy quality, and were therefore unmarketable. Meanwhile, of the 47 percent in cash payments, less than half was actually received and payments arrears reached \$1.4 billion.

As for pipeline construction, the early foreign investors in Turkmenistan's hydrocarbon sector were discouraged. The two most important early foreign investors were Bidas (Argentina) and Larmag (the Netherlands). Bidas alone invested \$400 million 1991-96, and planned to increase that sum seven-fold. However, both early entrants experienced problems with transportation that prevented them from expanding exports. Their problems intensified after the appointment of Ishanov as Minister of Oil and Gas in 1994 due to periodic cancellation of their export licences. Clauses were then introduced into their contracts which allowed the government to divert oil from export markets at prices set by government officials (RPI 1996). Such arbitrary discrimination by the new minister was discouraging to investors. However, it was targeted at the smaller companies with limited financial muscle: more appreciation was shown to larger oil companies such as Amoco and Unocal.

The slow expansion of investment, coupled with the deterioration in gas export revenues, prompted the Turkmen government to suspend gas deliveries in March 1997. But the importers responded by drawing down their gas reserves and turning to Russia for new deliveries. Fortunately for Turkmenistan, the IMF requirement that its CIS clients must not accumulate further debt by adding to their debt arrears ensured an annual stream of \$200 million to Turkmenistan from its indebted customer countries. Even so, the loss of gas revenue after March 1997 was equivalent to a negative shock of around 10 percent of GDP for that year alone. This shock occurred on top of the decline in real payments for gas and per capita incomes described earlier.

Meanwhile, government measures to boost food self-sufficiency, and to construct factories in order to enhance the value-added from cotton, backfired. In 1992 the country had imported all of its sugar, almost three quarters of its potatoes, 45 percent of its milk, and one third of its grain. The growing shortages of foreign exchange, together with shortages of transportation and the disruption of shipping routes in 1993, encouraged the self-sufficiency strategy. While the reasons for pursuing food self-sufficiency are understandable on strategic grounds, such a strategy deflects farming capital and labour from their optimum allocation. Moreover, the transformation of most state farms and collectives into peasant associations in 1995 still provided insufficient incentives to elicit higher efficiency.

The results of these autarkic policies were far from successful. For example, the wheat area was expanded three-fold, but this entailed the use of marginal land while fertilizer inputs slumped. Meanwhile, the labour which was required per tonne of production increased and, since real wages simultaneously fell, farmers had a reduced incentive to exert themselves. Grain yields halved from 1.9 tonnes per hectare to only 0.9 tonne. Cotton production also fell sharply, to 430,000 tonnes in 1996 (one third the 1992-94 level), because of pests and shortages of fertilizer, water, and labour. Moreover, despite a rise in the procurement price for cotton, it was still barely 15 percent of the world price of \$1,300/tonne (IMF 1997). Elsewhere, state instructions to increase the domestic cattle herd led to shortages of beef as farmers reduced the annual cull. The net effect of these unfavourable trends in farming seems likely to intensify the negative shock arising out of the cessation of natural gas exports to around 20 percent of GDP in 1997 alone. Such counterproductive policies make a clear case for price reform and reduced state intervention; in other words, a clear case for faster reform.

² Gazprom is believed to wish to cut the border price demanded by the government of Turkmenistan from \$42/mm³ down to \$28. This would allow southern Russian markets to receive gas at a delivered price of \$60. Gazprom would then be able to substitute its own gas for Turkmenistan gas in the Ukraine market where it could realise a price of \$80.

The deterioration in both production and exports turned the initial public sector surplus into a deficit which averaged 1.1 percent of GDP 1993-96. The government responded by accelerating the pace of reform towards the close of 1996. It introduced a land reform in December, but once again the change was cautious: private land rights were extended to collective farmers only, although other private citizens could lease land or be granted ownership at the government's discretion. However, land could not be sold, and this sharply restricted the use of land for collateral. Nevertheless, those farmers who could demonstrate their capacity to manage farms satisfactorily over two years would be allowed to own their land and bequeath it to their offspring. In addition, farmers would be free to dispose of their entire production at market prices following plans to phase out state orders by the year 2000. At the same time, a further 2,000 SOEs in public catering and trade were to be auctioned off, but the state continued to specify profit margins in privatized firms (EBRD 1997).

Price controls were also reigned back so that those commodities with controlled prices and/or rationing declined from over 400 to around 50. But the latter still included basic food items, heating, and housing, and rations of gas, electricity, and water continued to be provided free. The official price for bread was barely one quarter of the black-market rate, while meat was traded in free markets at thirty times prices in the rationed sector (EBRD 1997). But the ratio of prices on commodities that were controlled was subsequently allowed to rise sharply towards the average price level.

4.2 Restructuring the Development Plan

The deterioration in the markets for Turkmen gas means that the government has failed to realise the potential of its resource endowment under the ten-year development plan. The country's per capita income was only \$980 in 1993, but it fell to \$530 by 1996 (EBRD 1997). However, it should be noted that a combination of price repression and cheap labour means that this low per capita income translates into \$2,500 in purchasing power parity terms (Financial Times 1997). Nevertheless, a change of development strategy is clearly required, and agriculture appears to offer the best immediate prospect for resuming economic growth. The adverse impact on the economy of a very poor harvest in 1996 underscores the need to secure the potential benefits of a more dynamic performance from this sector. In contrast to farming, the contribution of the mineral sector should be expected to strengthen through the long term, because mineral-driven development is capital-intensive and its investment has long lead-times. The delayed impact is likely to be compounded in the case of gas-based development by the fact that pipeline construction is difficult and uncertain in a politically fragile region.

There is strong evidence that an efficient agricultural sector plays a crucial role in the early stages of economic development (Mellor 1995, Tomich et al. 1995). The sector initially acts as an important source of foreign exchange and taxation and it also provides inputs for "early industry such as food processing and textile production. The agricultural sector also provides an important cushion against unemployment by absorbing surplus labour until such times as the emergence of labour shortages in the economy stimulates increased farm productivity (Auty 1994). However, in many resource-rich countries, the potential of agriculture has been damaged either by neglect of the needs of potentially efficient small farmers or by the introduction of crop marketing boards and price controls which squeeze margins and eliminate production incentives.

A prerequisite for the revival of the agricultural sector is to permit specialization in the production of crops which provide the highest returns. This calls for the breakup of collective and state farms into smaller units and for the abandonment of food self-sufficiency. This is because there are few economies of scale in agriculture, with the exception of some agribusiness operations concerned with fresh produce, and also those crops where immediate processing is required in scale-sensitive plants. Even where centralised processing equipment and research facilities are required it is invariably more efficient to split the crop production unit (the farm) from the processing unit (the factory), a system known as the "nucleus plantation", which

Malaysia has adopted with success (Graham and Floering 1984). Elsewhere, Binswanger and Deininger (1993) and also Deininger and Binswanger (1995) argue persuasively that countries which have historically suppressed yeoman farming systems in favour of larger “junkier” estates or collective holdings have been obliged to provide significant subsidies to compensate for the resulting inefficiencies.

If agricultural production is to be improved, more efficient use must also be made of water. Historically, the water resources of Turkmenistan have been badly managed. By 1989, Turkmenistan consumed 6,400 m³ of water per capita in 1989, 50 percent more than the next highest user in the CIS, four times North American levels, and ten times EU levels (EBRD 1996). The wasteful use of water resources was caused in part by the country’s excessive preoccupation with cotton production. The rapid construction of the 1,000 km Karakorum canal, which brings water from the Syr Darya River, neglected to line the canal bed. As a result, the rate of water losses due to seepage and evaporation combined is estimated at 70 percent. Meanwhile, the careless application by farmers of water, which is provided free of charge, has led to problems of salinization. A rational pricing system is therefore required in order to allocate water supplies to sectors giving the highest return, encourage thrifty use, and generate revenues to improve the water distribution system. Applications of fertilizer and pesticides have been similarly excessive due to the absence of sound pricing policies.

Government efforts to force the pace of industrialization during the ten-year development plan have been counterproductive. Some 74 medium- and large-scale textile enterprises were established, employing 18,000 workers in the production of fabrics and clothes. Although the factories were expected to boost the value added per kilogram of cotton by three times in the case of fabrics and six times in the case of clothes, reports suggest that the plants are not efficient. In fact, it is likely that the expanding private sector offers better long-term prospects for industrial growth than the state sector does. Even so, manufacturing in Turkmenistan is initially constrained by a lack not only of the required skills, but also of good access to a large market as well as imported inputs. The latter problem may be best resolved by establishing an Export Processing Zone (EPZ). Yet, the landlocked location of Turkmenistan does afford some “natural protection for domestic manufacturers, as well as scope within the group of “early industries” such as food processing and textiles for local production. Construction materials, cement, and petrochemicals should also prosper through the medium-term.

An attractive medium-term prospect for the Turkmenistan hydrocarbon sector is to boost exports of oil. One reason for this is that, as noted earlier, oil has much lower transport costs per unit of heat value than natural gas, and therefore yields higher rents. For example, even oil barged across the Caspian Sea (and therefore securing few benefits from the economies of scale) could earn a rent of about \$9 per barrel (some two fifths of the revenue). In line with this more attractive hydrocarbon option Mobil has begun investing, with Monument of the UK, in oil fields in the western part of the country. Mobil plans to boost oil output by 200,000 bpd in order to justify the construction of new oil pipelines via Iran, Kazakhstan, or the Caspian Sea (Financial Times 1997). Elsewhere, Amoco has replaced Bidas in some oil fields while the Argentinean company pursues legal battles over its initial contracts in the international courts. Meanwhile, the Turkmenbashi refinery is being upgraded with a \$580 million investment.

The government of Turkmenistan remains committed to a process of gradual reform, and China may offer an appropriate model. This is because of the dominance of agriculture in both countries on the eve of reform and the speed with which output in that sector can respond to policy shifts. Moreover, much of Turkmen industry is likely to be unattractive to either foreign or domestic investors, so that progress in both the mining and the manufacturing sectors is likely to depend on new greenfield investment which will take some time to build up. This would suggest that there is a strong case for setting up an EPZ, in which the geographical concentration of sound infrastructure, and the minimisation of red tape, can speed up the provision of attractive conditions for new domestic investment. Such a concentration of new investment would have the added advantage of facilitating the monitoring and control of pollution emissions.

The most critical determinant of the pace of reform is, however, likely to be the degree to which the accumulated foreign exchange reserves, estimated at \$1.17 billion in 1996, will allow the government to continue funding those less dynamic sectors of the economy, which it has sought to insulate from change. If the demands of the sheltered sectors prove too large, and the country is forced to seek external financial assistance, then slow reform may cease to be an option. Foreign debt had already reached \$680 million in 1996, some 30 percent of GDP, and debt service was estimated to absorb 18 percent of the country's export earnings. It is therefore difficult to see how present conditions can be sustained in the absence of a rapid reversal of the decline in export earnings, principally from natural gas. Current IMF proposals for a significant expansion of special drawing rights may prove timely for the besieged Turkmen economy.

5. CONCLUSION

The government of Turkmenistan opted to use the country's vast natural gas deposits to permit a gradualist approach to social and economic reform. But the country lacks access to markets and its landlocked location combines with the potential hostility of neighbouring countries to render the construction of transport links risky as well as expensive. Although plans to reach markets in East Asia and South Asia seem unlikely to come to fruition in the near future, a route via Iran to Turkey and beyond to the EU offers medium-term prospects for expansion. Even then, the high costs of transporting natural gas will absorb the bulk of the revenues, leaving a relatively low fraction of the revenues as rent. The rent is likely to be less than one sixth of the gas price compared with around three fifths of the price on more easily transportable oil. Worse, the collapse of traditional gas markets has inflicted a sharp negative shock on Turkmen GDP, which fell by 43 percent 1989-96, and seems likely to decline by a further one-fifth in 1997.

The pursuit of a strategy that seeks to use the country's large natural gas deposits in order to transform Turkmenistan into a second Kuwait is no longer practical. But the slow pace of economic reform stifles the potential contribution of the agricultural sector to improved productivity and rising incomes. The development of the agricultural sector calls for an acceleration of privatization, something that the government began in December 1996. The new strategy will also require the maintenance of incentives to farmers, while realigning the prices of both farm products and farm inputs (notably water) in line with their relative scarcity. In the absence, for some years, of either new emigration opportunities or the achievement of a sustained rapid rate of labour-intensive economic growth, the expanding workforce will exert downward pressure on wage rates, and thereby heighten income inequality in any reformed and flexible labour market. This is because the workforce is expanding at almost 3 percent per year, despite a deceleration in the rate of population growth to 2.3 percent per annum 1990-95 (WRI 1996).

By late 1997, the sizeable foreign exchange reserves, which the Turkmen government had accumulated from the early 1990s, assumed critical importance. The reserves can help adjust to the large negative shock, which the economy experienced in 1997. But in the absence of a strong rebound from agriculture and gas exports, it is likely that the country will need to request external assistance. At that point, slow reform may cease to be a practical option, whatever its merits.

TABLES

Table 1 Turkmenistan's Proposed Oil and Gas Pipelines

Destination	Route	Length (kms)	Size (b m³)	Estimated Cost (\$b)
Turkey	Iran	1400	15-28	3.7-5.0
Turkey	Azerbaijan, Georgia	1300	2- 7	1.5 _a
Pakistan	Afghanistan	1500	20	2.5-3.0
Japan	China	6100	28	12.0-16.0
Europe	Iran, Turkey	4084	n.a.	11.0 _a

Sources: IMF (1997), except a: Sagers (1994), 52

Table 2 Prospective Rents From Turkmen Natural Gas, Late-1990s

Market	Volume (b m³)	Cost (\$/MCF)	Unit Rent (\$/mcf)	Total Rent (\$ million)
Domestic	10	0.75	2.25	800
CIS	70	2.35	0.65	1610
Iran/ Turkey	30	2.75	0.25	270
Total				2680

Source: Industry estimates (1997)

REFERENCES

- Auty, R.M. (1990) *Resource-Based Industrialization: Sowing the oil in Eight Exporting Countries*, Clarendon Press, Oxford.
- Auty, R.M. (1994) Industrial policy reform in six large newly industrializing countries: The resource curse, *World Development*, 22, 11-26.
- Binswanger, H.P. and Deininger, K. (1993) South African land policy: The legacy of history and current options, *World Development* 21, 1451-75.
- BP (1996) *BP Statistical Review of World Energy 1996*, British Petroleum plc, London.
- Deininger, K. and Binswanger, H.P. (1995) Rent-seeking and the development of large-scale agriculture in Kenya, South Africa and Zimbabwe, *Economic Development and Cultural Change* 43, 493-522.
- EBRD (1996) *Transition Report 1996*, European Bank for Reconstruction and Development, London.
- EBRD (1997) *Transition Report Update 1996*, European Bank for reconstruction and Development, London.
- Economist (1997a) The long march to capitalism, *The Economist*, September 13, 23-26.
- Economist (1997b) Turkey and Iran, *The Economist*, August 2, 46.
- El Serafy, S. (1989) The proper calculation of income from depletable natural resources, In: Ahmad, Y.J. El-Serafy, S. and Lutz, E. (Eds.) *Environmental Accounting for Sustainable Development*, World Bank, Washington DC, 10-18.
- Financial Times (1997) Turkmenistan belatedly joins the queue for oil and gas investment, *Financial Times*, February 14.
- Graham, E. and Floering, I. (1984) *The Modern Planation in the Third World*, Croom Helm, Beckenham.
- IMF (1997) *Turkmenistan: Recent Economic Developments*, IMF Washington DC.
- Mellor, J. (1995) *Agriculture on the Road to Industrialization*, Johns Hopkins University Press, Baltimore MA.
- RPI (1996) Duke of oil, *Russian Petroleum Investor*, August 6, 38-42 and 53.
- Sagers, M.J. (1994) Long-Term program for Turkmenistan's Oil and Gas Sector, *Post-Soviet Geography*, 35 (1), 50-62.
- Stauffer, T. (1975) The prospects of energy-intensive industry in the Persian/Arabian Gulf, Mimeo, Centre for Middle Eastern Studies, Harvard University, Cambridge MA.
- Tomich, T.P., Kilby, P. and Johnston, B.F. (1995) *Transforming Agrarian Economies: Opportunities Seized, Opportunities Missed*, Cornell University Press, London.
- US Department of State (1994) *Turkmenistan Economic Policy and Trade Practices*, US State Department, Washington DC.

Wood, A. and Berge, K. (1994) Exporting manufactures: trade policy or human resources?, *IDS Working Paper 4*, Institute of Development Studies, University of Sussex, Brighton.

World Bank (1996) *World Development Report 1997*, World Bank, Washington DC.

World Bank (1997) *Commodity Markets and the Developing Countries*, 4 (2), 37-38.

WRI (1996) *World Resources 1996-97*, World Resources Institute/ Oxford University Press, Oxford.