NEW DEMOGRAPHIC SCENARIOS

IN THE MEDITERRANEAN REGION

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Introduction

Two ideas came out of the United Nations Population Conference held in Cairo in 1994: that demographic transition was an irreversible process, and that there was no halting the trend towards the stationary population state. But that is a general view, which disregards the situation of many problem countries or regions, foremost among them the southern shore of the Mediterranean, long characterized by extremely high population growth. But growing evidence that this growth is beginning to slacken means that we must examine the implications should this decrease prove to be a long-term decline, or alternatively, simply a dip. Population growth remains a focus of concern for various governments in the region. The school enrolment, labour market, rampant urbanization, environmental damage and other problems it causes are a recurrent theme of development plans.

Everywhere from Morocco to Turkey, and in non-Mediterranean countries whose future directly affects it (the Arabian peninsula, Iran, Jordan,..), demographic transition is underway but not without discontinuity in various countries. In Egypt, notwithstanding its birth control policy, but also in Syria, Jordan, the Palestinian communities of the West Bank and Gaza Strip, as well at those of Galilee in Israel, fertility has stopped declining, and in some cases has even begun to rise again. Some countries - Tunisia, Lebanon, Turkey... - are within percentage points of replacement level, others not far behind. But reversals in these trends - as happened in Egypt post-1970 - cannot be ruled out.

In more than one instance, the population picture of this region does not square with the transition paradigm which has become the standard explanation for population dynamics. The standard population forecasts accepted its conceptual framework. Modernization in its various forms - rising living standards, access to education, urban facilities,... - would necessarily speed up demographic transition; countries with the most propitious social and economic profiles would achieve transition earlier, and vice versa. These exercises were gainsaid by a long series of incorrectly identified factors which halted this supposedly normal transition pattern.

Whence the need to revisit the forecast assumptions and focus more on the political and ideological factors and the economic systems - free enterprise or state intervention - which can also influence fertility patterns. Obviously, political and economic data cannot be incorporated directly by quantity or momentum equations. But they can still serve as background, as implicit in population dynamics.

Some political or institutional set-ups are specifically connected to patterns of demographic transition. Political tensions - between Israel, its neighbours and Palestinians, between Turkey and Greece, Iran and the Arab world or Europe, within the

Arabian peninsula... - the choice of a planned economy, opting for a closed society, tradition - particularly religious, preferences - may go in hand with a resurgence in values harking back to early marriage, a renunciation of birth control, a slowing rate of fertility decline, if not an upturn. Conversely, peace, outward-looking economic and political systems, the choice of a more secular society less conditioned by traditional values, could be conducive to a more rapid decline.

Could does not mean will. Population dynamics are unpredictable and not infrequently buck the predestinate trend. Different demographic patterns are possible within a single social context. Accordingly, this study considers two potential scenarios stemming from these two types of political and economic environment. One is a rapid fertility decline scenario, the other a slower decrease.

Also, notwithstanding that computer technology now allows forecast scales to be pushed back to the furthest limits, these scenarios cover only the first quarter of the 21st century, because nearly 70% of future populations will be born within the next thirty years; precise estimates of these are dependent on that of fertility, the most important and least predictable component of the exercise.

The accuracy of fertility forecasts could be enhanced by factoring in related socio-economic determinants: female educational attainment, place of residence, female labour force participation. These variables correlate very closely. That said, female educational level is the only parameter for which the countries in the region have clearly opted. Their attitude to urbanization and women in the workplace is more equivocal. On a technical level, most surveys report total fertility rates by educational level, while censuses provide detailed breakdowns of the childbearing age population by age group, sex and educational level.

CHAPTER 1

Existing population forecasts must be reconsidered

This study looks at twenty two countries: the Mediterranean countries between Turkey and Morocco, but also the non-Mediterranean Arab countries and Iran which are virtually inseparable from the southern shore of the Mediterranean. It is first and foremost and educational exercise to provide insights into the reality of population issues and present the most realistic picture of the future of the populations in the region. This task is given added urgency by the fact that the two forecasts recently published by the UN and the IIASA do not fully account for the accelerated pace of the demographic and more general social and economic transitions.

1.The United Nations population forecasts.
From the 1994 to the 2000 revisions

The United Nations Population Division publishes world population forecasts in alternate years[1]. Using these, population changes in the Mediterranean basin and neighbouring countries can be measured. The UN population prospects are often taken as definitive. However, an analysis of the hypotheses and outcomes regarding this problem area, not least due to its proximity to Europe, reveals a view of population momentum which requires clarification.

The UN's most recent population forecasts are compared in Table 1. They cannot go without comment:

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[1] United Nations, *World Population Prospects. The 1996 Revision*, New York, 1996 and United Nations, *World Population Prospects. The 1998 Revision. Volume I, Comprehensive Tables*, New York 1998, United Nations, *World Population Prospects The 2000 Revision – Highlights*, New York, 2001.

Table 1 – United Nations Population Forecasts Up To 2025 In The Mediterranean Region And Neighboring Countries (Medium Variant, In Thousands)

Country	Forecast year				Relative difference
	1994	1996	1998	2000	1998/2000 (%)
Algeria	45475	47322	46611	42738	-9,1
Morocco	40650	39925	38676	42002	7,9
Tunisia	13290	13524	12843	12343	-4,1
Libya	12885	12885	8647	7972	-8,5
Mauritania	4443	4443	4766	5351	10,9
Union of the Arab Maghreb	116743	118099	111543	110406	-1,0
Egypt	97301	95766	95615	94777	-0,9
Sudan	58388	46850	46264	49556	6,6
Nile Basin	155689	142616	141879	144333	1,7
Iraq	42656	41600	41014	40298	-1,8
Syria	33505	26303	26292	27410	4,1
Lebanon	4424	4424	4400	4581	4,0
Jordan	12039	11894	12063	8666	6,5
Israel	7808	7977	8277	8486	2,5
Palestine*	1405	2485	2782	7145	*
Northern Middle East	101837	94683	94828	96586	1,8
Saudi Arabia	42651	42363	39965	40473	1,3
Yemen	33676	39589	38985	48206	19,1
Oman	6094	6538	5352	5411	1,1
United Arab Emirates	2958	3297	3284	3468	5,3
Kuwait	2805	2904	2974	3219	7,6
Bahrain	922	863	858	887	3,3
Qatar	799	782	779	754	-3,3
Arabian Peninsula	89905	96336	92197	102418	10,0
Turkey	90937	85791	87869	86611	-1,5
Iran	123549	128251	94463	99343	4,9
ALL	678660	665776	622779	639697	2,6

* Until 1998, Gaza strip only.

Source: United Nations, World Population Prospects - The 1994, 1996, 1998 and 2000 Revisions, New York, 1994 to 2001.

1. In the two years from 1994 to 1996, the UN's view of population trends in the region as a whole changed little: 666 million people predicted by 2025 in 1996, compared to 679 million in 1994 - a difference of 13 million or under 2%. On the other hand, the overall population lost in the forecasts to 2025 between 1996 and 1998 was 43 million inhabitants, i.e., -6.4%. This is a significant difference between the two series, in accordance with the fact that demographic transition in the region is moving at a faster speed than what was expected. Therefore the 2000 UN revision comes as a big surprise. Instead of confirming that demographic transformations are now deeply rooted in the south of the Mediterrenean, this revision is a denial of this fact. The year 2000 revision yields a total of 640 millions at horizon 2025, instead of 623 in the 1998 revision.

2. For three-quarters of the countries – Morocco, Mauritania, Sudan, Syria, Lebanon, Israel, Jordan, Palestine, Saudi Arabia, Yemen, Oman, UAE, Kuwait, Bahrain and Iran - the 2000 forecast give population sizes higher than those of the 1998 forecast. For seven others – Algeria, Tunisia, Libya, Egypt, Iraq, Qatar and Turkey – new set of forecasts gives lower population forecasts.

3. In the Maghreb, the pace of Algeria's fertility transition was revised radically, which is an important although belated recognition of the buildup of evidence for a slowdown observed over several years. But what is the rationale behind the very strange revision for Morocco? Oddly enough, the 2000 forecasts predict a higher population for Mauritania by 2025 than the 1998 ones. Together with Algeria, but for unknown reasons, Libya continue to record drops: down to 8 million in the 2000 forecasts from 8.6 million in those of 1998.

4. In the Nile Valley, Egypt, with a widely differing estimated base date population - 61.5 million according to ESCWA 1996[2] , 66.0 million according to the Population Division in 1998, and ... under 59 million recorded by the 1996 census - changes relatively little between the two sets of forecasts. This is not the case for Sudan, where a gigantic upwards revision pushes its population from 46.3 to 49.6 in 2025.

5. In the Middle East, the spectacular revision of the UN figures for Syria between 1994 and 1996 which was sound, is replaced by an upward revision between 1998 and 2000. The same is pretty much true of Lebanon, Jordan, Palestine and Israel. One important achievement of these forecasts is that the population of the West Bank is no more included with Jordan. There is now a new category called the "Occupied Palestinian Territory", whose population in year 2000 : 3191 thousands includes the West Bank (and East Jerusalem) and the Gaza strip. Consequently, Israel's official population size has been adjusted to take account of the annexed Palestinian and Syrian populations of East Jerusalem and the Golan Heights. Since the 1993 Oslo/Washington Accords between Israel and the Palestine Liberation Organization (PLO), the population of the Palestinian entity - the West Bank, Gaza Strip and East Jerusalem, the regions open to negotiation under these Accords - must be estimated and projected.

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[2] United Nations, *Demographic and Related Socio_economic Data Sheets for Countries of the Economic and Social Commission for Western Asia as Assessed in 1996*, Amman, 1997.

6. In the Arabian Peninsula, Yemen is predicted to win about 10 million inhabitants by 2025, in this new set of forecasts, although the most recent data and surveys have revealed a fertility transition at an unexpected pace. Elsewhere in this sub-region, recent surveys reported a more rapid transition than had been thought, even in Saudi Arabia. But this is not taken into account but the UN (except for Qatar). Finally, the UN forecasts for this subregion do not distinguish between nationals and immigrant communities, which is vital element countries of high immigration.

7. Iran's population   forecasts - over-estimated in 1994, and then again in 1996 - were spectacularly revised downwards in 1998. But the last revision of 2000, has returned to the more conservative assumptions of 1994 and 1996.

The UN forecasts are a vital means of measuring population change for large aggregates: world, continent, etc. The UN's main - and quite legitimate - concern is to track population trends in world regions. But its forecasts are of less value where national entities are concerned, since they do not always accommodate national particularities. They are devised physically distant from the Mediterranean region, and so may have overlooked more recent estimates[3]. But omitting an influence on population change over the period to 2025 will have significant consequences.

2. The IIASA population forecasts for North Africa, 1996

European population forecasts for the Mediterranean basin were published in 1996[4] by the Laxenburg-based (Austria) International Institute for Applied System Analysis (IIASA). The foreword to the study contains the remark:

"One key innovation of this study is to expressly include the educational level of the population in these forecasts ... using a method mainly developed by the IIASA". (free translation)

In fact, the method had previously been used and produced what seem to be overstated results. The IIASA did not present the aggregate results of its forecast in five year time groups but only for the reference year (varying from 2032 to 2037, according to the country). Table 2 compares the results with those of the UN 1996 forecast (which, as stated above, itself overestimates the region's future population).

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[3] These are the main methodological arguments developed for a previous population forecast study, see Youssef Courbage & Philippe Fargues, *L'avenir démographique de la rive sud de la Méditerranée _ Algérie, Egypte, Maroc, Syrie, Turquie, Tunisie, Forecasts de la Population et de l'emploi et réflexions sur la migration* (Working Paper) INED Paris and Blue Plan Sophia Antipolis, 1992, p 2; see also, Youssef Courbage, *Méthodes d'estimation du niveau futur de la fécondité à partir du nombre d'enfants désirés et des facteurs socio_économiques en Haïti*, World Fertility Survey, Scientific Reports 66, 1984.

[4] Hassan Yousif, Anne Goujon and Wolfgang Lutz, *Future Population and Education Trends in the Countries of North Africa*, IIASA, Laxenburg, 1996 pp.89.

**Table 2 - The IIASA Forecasts For The Mediterranean Region.
Central Scenario (Population In Thousands)**

Country Forecast	Year	IIASA	UN 1996	Absolute difference	Relative difference (%)
Algeria	2037	74128	53726	20402	27.5
Morocco	2032	61113	42458	18655	30.5
Tunisia	2034	15536	14566	970	6.2
Libya	2034	12649	15227	-2578	-20.4
Egypt	2036	125613	105453	20160	16.0
Sudan	2033	60412	51164	9248	15.3
All		349451	282594	66857	19.1

Source: Hassan Yousif, Anne Goujon and Wolfgang Lutz, op. cit., p. 66

The IIASA over-estimates future populations to an even greater extent than the UN - an over-estimate of 67 million people by the forecast date for the entire North African region, nearly a fifth high than the United Nations. The orders of magnitude of future population sizes come close only for Tunisia. Elsewhere, they are over-estimated by between 15 to 31%. The IIASA's figure for Libya is lower than the UN's, but this is partly due to its under-estimating of the base year population: 3 231 000 inhabitants in 1984 (against the UN's 3 624 000).

A more recent version[5], though not for an identical array of countries, gives more realistic results for a forecast to 2044-5. They are compared below with the most recent United Nations revision (Table 3):

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[5] Anne Goujon, "Population and education prospects in the Arab Mediterranean region", *Conference on Population Challenges in the Middle East and North Africa : Towards the end of the Twenty First Century*, Economic Research Forum, Cairo, November 1998.

Table 3. - Recent IIASA Forecasts Compared With The United Nations Medium Variant (1998)

Country	IIASA Forecast (central scenario)	UN 1998 forecast (medium variant)	Difference	%
Egypt	127 130	111 428	15 701	+ 14.1
Morocco	48 972	45 868	3 104	+ 6.8
Sudan	57 062	56 902	160	+ 0.3
Jordan	12 194	11 288	906	+ 8.0
Lebanon	6 007	5 049	959	+ 19.0
Syria	39 088	32 734	6 354	+ 19.4
Palestine	10 146	8 300	1 846	+ 22.2
Subtotal	300 599	271 569	29 030	+ 10.7

The data have been updated and the variances with the 1998 UN forecasts reduced.

3. Methodological approach:

The United Nations Population Division makes population forecasts for around two hundred countries every other year. Its approach is perforce global, therefore. More specifically, the assumption is that each country's fertility and mortality will follow a uniform trend. This approach in no way invalidates the forecasts of mortality, whose population effects are very much less than those of fertility. By contrast, disregarding within-country fertility differentials will result in an under-estimation of behavioural changes, and hence the pace of transition[6].

Each population is comprised of groups and categories with differential demographic behaviour, notwithstanding the odd points of convergence. Criteria for differentiation abound. Female labour force participation influences fertility decisions through the opportunity cost of a birth, resulting in temporary or even permanent withdrawal from the labour market, and both the husband and wife's occupation - related to educational level - are key determinants of reproductive behaviour. Ethnic group or religion, urban or rural residence, and position as the majority or minority population, respectively, may have differential fertility effects. Other still more complex criteria may enter into the equation. Family or household structure has an impact on reproductive behaviour: more so in composite households than nuclear families, reproductive decisions and decisions to expand family size often depend as much on other people living with or near the family as on the actual biological parents. The wife's mother-in-law, in particular, often plays a barely-concealed role in family decisions[7]. Also, an extended family cushions the impact of one reason for low fertility - access to work for the woman - by enabling her to reproduce with the assurance of free, family-provided child-care and -rearing services. The abundance of domestic staff - home-grown in the Maghreb, often Asian in Middle Eastern countries - also enables women to combine tertiary education, work outside the home, and high fertility.

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[6] For a more general critique of the United Nations population forecasts, see, Nico Keilman, « Data quality and accuracy of United Nations Population Forecasts », Population Studies, N°2, July 2000, see also John Bongaarts and Rodolfo Bulatao (ed.), *Beyond Six Billion : Forecasting the World's Population*, National Academy Press, Washington, 2000.
[7] Cf, Akile Gürsoy, "Infant mortality: A Turkish puzzle", *Health Transition Review*, 2/2, 1992.

In theory, forecasts of all or most of these explanatory variables ought to have to be combined to project future fertility. In fact, it remains in the realms of speculation, because these determinants are dictated by economic and social circumstances which cannot be forecast over this time frame. Female labour force participation depends both on the economic situation and society's attitude. The growth of the nuclear family is connected with a measure of economic affluence and a waning of social traditions. The number of households with domestic staff simply cannot be estimated. Data on ethnic background and religion may seem more certain, but changes of ethnic group or religion are possible, and data are not usually kept. Even residence, ostensibly a more stable criterion and better reported in censuses and surveys, raises issues of measurement and forecasting[8]. An interaction may exist between the fertility of a population sub-group and a propensity to emigrate. Also, urban-rural boundaries are often unclear, while the intermediate suburban category is growing. Finally, comparisons between actual population and projected population show that what fits the macro national picture conceals marked differences at the more micro scales[9]. In Morocco, for example, urban population forecasts over-estimated large cities to the detriment of medium-sized and small towns. Area management and development plans may often provide for future urban and rural population distributions guided more by wishful thinking than the constraints of modernization: a preference for the countryside, or small and medium-sized towns, even though in both cases, it may be no more than economic pie in the sky...

4. The fertility effects of education

Education is the socio-economic factor with the most differential effect on fertility, as is amply confirmed by the literature. It is the main catalyst of modernization, and a vehicle for the rapid spread of innovation. The difficulty of collecting data on income, occupation, standing and social status make education a key marker for the attributes attached to different social classes. Education, especially female education, impacts on fertility through its direct determinants. While it is true to say that educated women breast-feed for less time - which, all other things being equal, leads to shorter birth intervals and higher fertility - this effect is offset by that of the marriage and contraception rates, which are the most effective direct determinants of reduced fertility. Educated women marry later, reducing their pregnancy risk exposure time. They are more prone to use contraception (and voluntary termination) than illiterate women.

There is a solid body of literature on the fertility impacts of education. Recent reviews based on developing country fertility surveys give an exhaustive overview of the question[10]. The intermediate links which partly explain the close, continuous relationship between these two phenomena include:

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[8] A difficulty encountered by the author in projecting Haitian fertility using the urban population "desired" by the Planning Department for the forecast date, see Youssef Courbage, *Méthodes d'estimation... op. cit.*

[9] For Morocco, see, e.g., Youssef Courbage, "Nouvelles données sur la population marocaine: les non_surprises du recensement de septembre 1994", *Population*, 4_5, 1995, pp. 1218_1228.

[10] Recent works and articles include: Shireen Jejeebhoy, *Women's Education, Autonomy, and Reproductive Behaviour : Experience from Developing Countries*, Clarendon Press, Oxford, 1995; United

1. Educated women are more likely to buck the trend in societies where early marriage is still the general rule. Median age at first marriage in the Mediterranean region is generally near or below 20 among uneducated women. But with 2 to 3 years of primary schooling, that rises significantly - from 18.7 years to 21.9 years in Morocco, for example. After 10 years of education - i.e., approximately secondary school leaving age - the median age at first marriage is 26.1 years. Educated women are more demanding in their choice of husband, which impacts fertility through the combined effect of both spouses' education: educated husbands also often opt for a small family.

2. The children of educated women have much lower levels of infant and child mortality than those born to uneducated women. Infant mortality in the Mediterranean region declines by a third - and child mortality by a fifth - with rising educational attainment. Education is a better guarantee of child survival. By retirement age, a six-parity parent will have only 4 survivors - i.e., two males - to tend to them in old age. The situation is different again where child mortality is low, as for educated parents, where there will be 5.5 survivors from 6 children. All other things being equal, the declining child mortality which is bound up with rising female educational levels is in itself an effective means of reducing desired family size, if only because of the lowered probability of infant mortality.

3. Her family and social circle take more account of an educated woman's personality. Education empowers women more in decision making. In societies where extended family - especially in-law - interference is common, educated women are more able to stand up for their own rights, especially their reproductive choices. Educated women have more of a say than others in decisions affecting the disposal of household income, decisions about the number and value of children, adoption and the choice of family planning methods.

4. Educators, who are usually opinion-formers, tend to practise family limitation. This holds equally true in the southern Mediterranean region, where teachers' fertility is 60% below the national average. The educated population may emulate these pioneers, and model its fertility behaviour on theirs. The content and form of education helps change attitudes and behaviours which lead on to marriage and reproduction to encourage a lower desired family size[11]. In this region, younger educated women have ideal family sizes equal or close to replacement level. But convincing research suggests that desired fertility influences effective fertility far more than the availability of contraception, for instance[12].

5. Formal education improves women's abilities to enforce their desired family size; childbearing is no longer seen as an inevitability. While there is no conclusive evidence

Nations, *Women's Education and Fertility Behaviour : Recent Evidence from Demographic Health Surveys*, New York, 1995; Teresa Castro Martin, "Women's Education and Fertility: Results from 26 Demographic and Health Surveys", *Studies in Family Planning*, 4, 1995.

[11] Jack Caldwell has developed a theory of the modernizing effects of education on fertility behaviour. See in particular, Jack Caldwell, "Mass education as a determinant of the timing of fertility decline", *Population and Development Review*, 6, 1980.

[12] See on this Lant Pritchett's article "Desired Fertility and the Impact of Population Policies", *Population and Development Review*, 1, 1994.

on the matter, education is likely to induce a more secular attitude to life; the child is less a matter of the will of God than that of its parents.

6. Educated women have a greater awareness of health and family planning issues even where they are not taught in the classroom. This promotes increased contraception use and longer birth timing. While all uneducated and educated women now know about contraception, and are almost identically informed about all methods except perhaps for the most recent ones like Norplant, the use of modern or traditional methods of contraception varies widely with education. Contraceptive prevalence is one and a half to three times greater among secondary-educated than illiterate Mediterranean women. On the other hand, it is not necessarily a fact that educated women always use the more effective modern technology like the pill and IUD. Illiterate women who have recently discovered birth control may be more open to modern family planning methods than their educated sisters.

7. The spread of the Western small family model, sometimes in the face of a society's pronatalist traditions, may lead educated women who are by definition more outward-looking to espouse its cultural values and start to want fewer children. They are also better equipped to adjust their lifetime fertility to their desired family size.

8. Education gives women a better understanding of the outside world and more confidence to leave the family home and take a paid job. Education also impacts women's fertility through the opportunities it offers for paid work outside the home. Outside work and fertility are at odds, as the opportunity costs of children lead them to lower their desired family size. Also, economic necessity or recession has made work outside the home - once the preserve of unmarried, widowed and divorced women - a fact of life for married women in need of a second income to run the home.

9. The wider availability of modern consumer goods creates conflict between having access to them and having a large family. In purely economic terms, children are also consumer goods and desired fertility could be expected to rise with the wife's extra earned income. In fact, however, children are a special type of "consumer good", demand for which is income-inelastic or even income- negative. But mass education acts more generally to reverse the perception of children through inter-generational wealth flows: in pre-transitional societies, these are from children to parents, whence the interest in the largest possible family size, whereas in transitional societies, the flows are reversed chiefly due to the demand for education. It then becomes in the parents' interest to limit their family size.

10. Children born to educated women will inevitably receive schooling. Even where education is free, the attendant items - like textbooks, school stationery, travel,... - are a substantial extra outgoing and an added incentive to limit family size. Also, there is a growing desire in the region for children to go on to higher education. Rightly or wrongly, local universities - generally free - are deprecated and so specialized training abroad is increasingly a part of the strategies of educated families; this entails not only planning a smaller family, but also longer birth spacing intervals to avoid the financial drain of having two children being educated abroad at the same time.

11. Finally, educated women in paid employment in the formal sector will rely more on their pensions than their children to provide for their old age. One motivation for high fertility - having sufficient children (preferably sons) to look after their ageing parents - has become irrelevant to whole swathes of educated society in paid employment covered by a pension system.

There is between-country variability in the relation between educational level and fertility, however. Broadly, it takes the shape of an inverted U-shaped curve: the effect of female education is low in poor, high-illiteracy societies; high in economic and demographic transition societies; and low again in societies which have achieved their fertility transition. In most cases, fertility among even minimally educated women will always be lower than that of illiterate women. However, where the effect of shorter breast-feeding by educated women is not counterbalanced by later marriage and greater contraceptive use, fertility may rise.

By improving diet, education may also contribute to increased fertility, reduced foetal mortality and shorter postpartum amenorrhoea, all factors which contribute to increased fertility. But this is a fairly low and generally time-limited effect.

The fertility effects of education are always demonstrable in Arab countries, however. Even so, there is high variability in the education elasticity of fertility. In some countries, changes in fertility behaviour are seen only after complete primary, or even primary extension or secondary education. In others, the main change occurs in early primary education. In this region, secondary-educated women in some countries have higher fertility than illiterate women in other countries. The explanation for these ostensible anomalies can only be sought in the specific country context, which means seeking out less immediately obvious political or ideological explanations.

5. The education-fertility linkage in the Mediterranean region is unclear

The first thing to say is that while the fertility effects of female educational attainment are paradigmatic for most demographers, they may well be challenged in other fields. The anthropologist W. Handwerker[13], for example, has disproved the existence of an automatic link between mass education and fertility decline. Mass education would elicit a demographic response only when accompanied by real changes in job opportunities offering rewards commensurate with the skills acquired.

The education-fertility linkage is not entirely clear in the Mediterranean region, especially in the Arab countries. The point-in-time relationship in each country is beyond doubt. With some between-country and between-survey variations, more or less close linkages and earlier or later changes according to years of attendance, the inescapable general conclusion and universal truth is that fertility declines as educational levels rise.

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[13] W. Handwerker, "Culture and Reproduction : Exploring micro_macro linkages", in *Culture and Reproduction _ An Anthropological Critique of Demographic Transition Theory*, WestView Press, 1986.

Leaving aside for the moment the countries dealt with individually here, consider only the example of Palestine (comprising the West Bank, Gaza Strip and East Jerusalem). Major political and ideological factors - occupation of the territory and fertility used as a response - and economic factors - UNRWA's[14] funding of the costs of children and education services in particular - have neutralized the relationship between education and fertility. Whereas educated, more politically motivated women could have contributed to the national cause by marrying as early and having as many children as illiterate women, despite this atypical situation, there is a negative correlation - less pronounced than elsewhere - between education and fertility. In 1995-1996, average parity among Palestinian women was 6.24 children. Maximum fertility was found among women with no secondary education (6.62 children), those with completed secondary education had one child less (5.57) while fertility was lower still among the university educated (4.72)[15].

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[14] Specialized UN agency set up to provide relief for the Palestinian refugees after the 1948 Arab-Israeli war.

[15] Palestinian Central Bureau of Statistics, *The Demographic Survey in the West Bank and Gaza Strip _ Preliminary Report*, Ramallah, 1996, see also Youssef Courbage, "La fécondité palestinienne des lendemains d'Intifada", *Population*, 1, 1997.

Total fertility rates in Palestine and Morocco by level of education
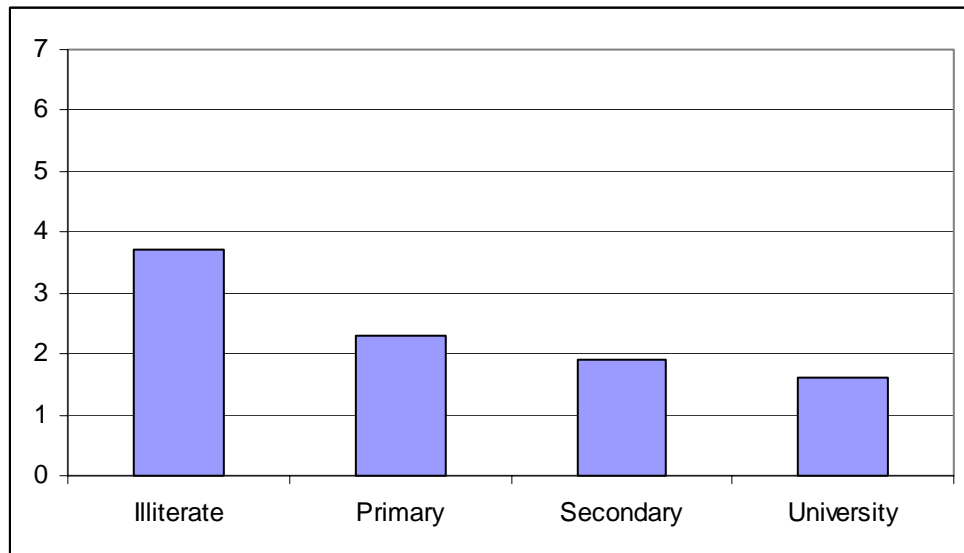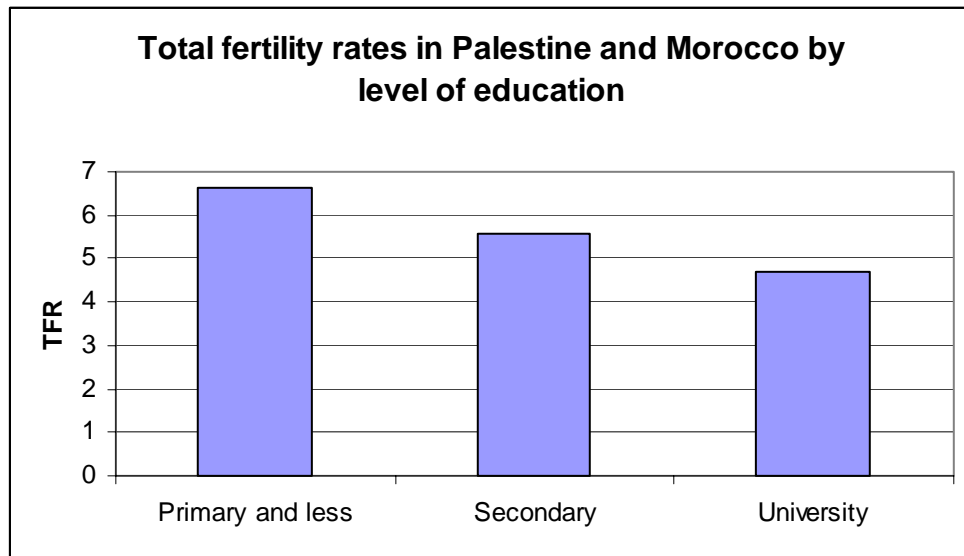
The education-related decrease in fertility (-29%) may be lower than that prevailing elsewhere in countries further from the epicentre of the Israeli-Arab conflict like Morocco : 1.6 among university educated females against 3.7 among illiterates , or - 57%, but is no less real and significant.

By contrast, the time trend of the education-fertility linkage casts some doubt on the demographic effectiveness of education. To illustrate how fertility behaviour is unaffected by ongoing changes in education:

• Between 1960 and 1985, Syria's birth rate remained at a very high and virtually unchanged level of 44 to 50 per 1000; its world record fertility of 7.7 to 8 children per woman overtook that of the most fertile African countries, despite far-reaching political and cultural changes and increased prosperity. The most puzzling occurrence is that illiteracy among women of childbearing age (15-49) had meanwhile more than halved.

• In Egypt, President Nasser had been deeply concerned by population issues. Following his death in 1970, the birth rate which had dropped significantly during his time in power levelled off until 1988, with the period fertility rate varying between a high level of 5.5 to 6.0 children per woman.

• In Kuwait, the deep inroads made by female education - 9% of women educated in 1960, 64% in 1987 - did not curb its high fertility, with an average parity of 7.1 to 7.5 children.

The detailed study of the time trend of women's fertility behaviour by educational level has brought to light some puzzling phenomena[16]. Nationally, fertility often remained constant in times of falling illiteracy and longer female school attendance. In Syria, for example, between 1970 and 1981, the proportion of illiterate women fell from 76% to 56%, while female enrolments rose - from 10.9 to 14.6% for incomplete primary education, from 7.6 to 14.4% for complete primary education, from 3.3 to 8% for middle school, from 1.5% to 4.2% for secondary school and finally from 0.3 to 0.8% for university education. But there was no corresponding change in national fertility, which remained unaffected despite the shrinking numbers of uneducated - i.e., high fertility - women and growing numbers of better-educated, lower-fertility women. Put differently, this means that some groups increased their fertility over time. This is precisely what did occur between 1971 and 1981. The period fertility rate increased for all women, regardless of educational level: by 3.4% for illiterate women, 8% for semi-educated women, by 15% for those with complete primary education, by 12% for those with middle school education and those with a higher education background. Education actually tended to lessen rather than widen education-related fertility differentials. The fertility of women with incomplete primary education was 19% less than that of illiterate women in 1970, but only 16% in 1981. Complete primary education was associated with a 35% fertility decline in 1970, but only 29% in 1981. Equally high slippages in the fertility-reducing effects of education are recorded for post-primary education.

But Syria, which remains a pronatalist regime, does not stand alone in this. Egypt, ever a regional leader (with Tunisia) in birth control and reducing population growth, experienced similar slippages. Between 1976 and 1986, marital fertility declined only among limited categories of women - among urban women, only illiterates and educational drop-outs with incomplete primary education. For all others, with complete primary education and incomplete secondary or higher education, fertility is rising. Among rural women, the fertility behaviour of illiterate women - the great majority of the female population (more than 8 women in 10 in 1986) - hardly changed. Educated rural women mirrored their urban counterparts - their fertility rose rather than fell. There is a paradox here in that the relative modernization of reproductive behaviour came from where it was least expected - groups of illiterate or semi-literate rather than educated women.

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[16] See Youssef Courbage, "Evolution démographique et attitudes politiques en Syrie", *Population*, 3, 1994, "L'imprévisible fécondité égyptienne", *Population*, 1, 1994 and "Péninsule Arabique : les surprises de la démographie", *Maghreb_Machrek*, 144, Avril_Juin 1994.

For Kuwait, period fertility data by mother's age and educational level are provided by two censuses of 1975 and 1980, plus the 1987 survey. They show higher fertility among all women, regardless of educational level. In the 25-29 age group, for example, fertility increased by 1.9% a year among illiterate and semi-educated women, 2% among those with complete primary and middle-school education, and, more puzzling still, 3.7% among those with secondary education and university qualifications.

Are these special cases? These countries are representative of the region as a whole. Kuwait, like Saudi Arabia, the United Arab Emirates and Iraq, is a rent-seeking economy[17] with a small national population and theoretically inexhaustible oil wealth. This being so, its populationist and pronatalist policy may have influenced public attitudes, encouraging even educated women not to limit their fertility, especially after the fourfold rise in oil prices in 1973. Syria and Egypt are clearly less rent-seeking economies than Kuwait. Syria is officially populationist and has had an uneasy relationship with neighbouring Israel since 1948. Egypt, by contrast, is the region's longest-established family planning proponent and signed a peace treaty with Israel at Camp David in 1978. And yet in both cases, the fertility-reducing effects of education have dwindled greatly over the period under review.

In fact, these observations could be taken further and applied across the board to all the countries studied. In all but a very few cases, up to the second half of the 1980s, the countries or sub-populations in the region experienced either no fertility transition (Libya, Sudan, Iraq, Syria, Jordan, Palestine, Saudi Arabia, Yemen, Oman, United Arab Emirates, Kuwait and Iran), a faltering transition (Egypt, Israeli Arabs), or so feeble a transition as to be virtually non-existent (Algeria, Mauritania, Bahrain, Qatar). Only Morocco, Tunisia, Lebanon, and Turkey bucked this trend. But all, without exception, had undergone increased modernization of their economic and social infrastructures. Illiteracy fell everywhere, while female enrolment ratios rose and school attendance lengthened. It is as if the entire region, and not just the three countries looked at above, had put the modernising effect of education aside.

Education systems have failed to keep pace with rising enrolments and maintain quality standards. No tried and tested indicators are available to measure the quality of education, but per capita pupil expenditure may give a rough guide. In Syria, for example, deflated per capita spending halved between the start of the Seventies and the Eighties. This was mirrored by trends in the other non-oil-producing Arab countries. Teachers lost out from the decline of the State: little increase in education spending, mass recruitment of teachers to cope with rapidly rising school populations increasing in line with previous high fertility, real wages irrevocably falling.

Schoolteachers with salaries constantly eroded by inflation, often take a second and sometimes third job - taxi driver, market or other porter... - to make ends meet. Nowadays, they are less sought after as intellectual guides in societies where money counts for more than other values[18]. Plunging salaries erodes teachers' social status. No longer looked up to as in the past, either by their pupils or their broader social circle, it

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[17] "Rent-seeking economies" are states who derive most of their wealth from the exploitation of a single - usually mineral (oil, phosphates) - resource.

[18] Neatly expressed by the Egyptian saying: "With a penny in your pocket, you are worth a penny".

becomes increasingly harder to put over the modernizing message of education - on reproduction in particular. Swamped by the weight of numbers, and the quickening pace of the educational process - delivering education to the population as a whole in fifty years where Europe took two centuries - education systems now provide only learning on the cheap. The mass influx of each year's cohorts of children to be educated come what may, lower educational standards. They can undermine the learning of writing skills, much more fundamental than reading to children for active self-expression[19]. The influence of traditionalist - and pronatalist - cultures has thus perpetuated itself despite education, whose influence has barely penetrated the surface.

Education is meant to increase women's employment opportunities, with a causal effect on fertility. The outcomes in the Arab world, especially in Iran though somewhat less in Turkey, fall far short of expectations as can be seen from a comparison between the total number of educated women and their counterparts in the labour force. There is a striking educational system-labour market mismatch. In Syria (but the example can easily be transposed anywhere else in the region apart from two Maghreb countries - Morocco and Tunisia[20]), one in five educated women was economically active during the Eighties. There is significant attrition on the lower rungs of the school ladder: incomplete primary education (10% of economically active women), complete primary education (15%), middle school (24%), or secondary (31%). Only university (79%) and vocational (95%) education, affecting a very few women, guarantee significant labour force attachment. Fertility also appeared to be more influenced by changes in the female working population than by education: a shift from economically inactive to manual work (highly uneducated) caused a drop of 32%, while a shift from illiteracy to primary education produced a 25% decrease.

6. The underlying assumptions of fertility decline scenarios

Since the oil price slump of 1986, the fertility effects of education have been restored to their full time-dependent force, i.e., fertility is decreasing not just transversely across all educational levels, but also over time. Women in a given educational sub-group have lower fertility today than a few years ago. Syrian fertility - outstanding for being wholly untouched by educational progress - exemplifies this: the period fertility rate dropped between 28 and 33% according to educational level between the mid-Eighties and the turn of the Nineties,. Illiterate women, wanting a better life for their children, are following the trend and limiting their fertility even more than others - down by 38%. All told, Syrian fertility has virtually halved, from nearly 8 to just 4.2 children.

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[19] "Sans l'écriture on ne change rien aux contraintes exercées par le groupe sur chacun de ses membres à travers la tradition orale" ("Without writing you can change none of the peer constraints exerted through the oral tradition"), write F. Furet & J. Ozouf in *Lire et écrire _ L'alphabétisation des Français de Calvin à Jules Ferry*, Les Editions de Minuit, Paris, 1977.

[20] Also Kuwait and Bahrain, although both are sparsely-populated and relatively atypical in demographic terms.

The Syrian example of fertility decline led by rising educational levels (structure effect) and fertility decline among each population sub-group (trickle-down effect) provides the first fertility trend scenario, which I call the rapid decline scenario. This is currently the general situation in all the Arab countries, Turkey and Iran. An opposing second scenario is that of fertility decline slackening or levelling-off at current levels, while national fertility may continue to decrease as a result of radical changes in society generally, and the female population, by educational levels. Fertility decline has, in fact, come to a halt in some very few Mediterranean region countries or population groups- occupied Palestinian territory or Israeli Palestinians. But does this rule out all possibility of a return to the situation of the last three decades where national fertility remained impervious to rising educational levels?

Implicit in the rapid decline scenario is that education will act predictably as a factor for modernizing rather than re-traditionalizing society. This predicates an enhancement of the status of teachers, those agents of modernization whose role had been undermined in preceding decades. Modernization is also predicated on the educational sector withstanding pressures from fundamentalist movements intent on getting back to the basic family values of early marriage, large families, disempowering women compared to their husband and parents, and their withdrawal from working life. Education is also seen as an essential attribute for access - by women in particular - to paid employment in the modern sectors of the economy. Conversely, the slow decline scenario posits education as a factor of conservatism and a return to tradition.

The rapid decline scenario predicates that economies in the region will become more outward-looking, which involves societies marching in step, especially in their family and demographic behaviour. But the economy as such may have no effect on future population dynamics. It is easy to visualize a fertility transition led by modernization of the economy, women's access to the modern labour market, aspirations to remain in education longer and at greater cost, or conversely, a poverty- led transition. A rising mean age at marriage - very pronounced in some countries hardest hit by the economic crisis (Lebanon, Morocco) and contraception- or possibly abortion-effected birth control would reflect families' economic inability to cope with a large family's needs.

The rapid decline scenario predicates that this notoriously unstable region experiences no major political upsets. The link between conflict and fertility is not clear. Conflict may produce high fertility as a result of demographic competition between opponents. It may have no effect, or contribute to fertility decline if the economic cost is such as to impoverish families to the point where they must reduce their desired family size. Conflicts in the region have tended to favour increased fertility, but not in every case: in Morocco, for example, the economic effects of the Saharan War sparked off by the November 1975 Green March contributed to the sharp fertility decline. Potential trouble spots abound: Algeria-Morocco on the Sahara issue, Libya-Chad on the Aouzou Strip, Egypt-Sudan over Islamic fundamentalism and control of the Nile, Israel- Palestine over Jewish settlers in the West Bank, Gaza Strip and East Jerusalem among other things, and more generally Israel and its neighbours Syria, Lebanon, and Jordan; Iran-Iraq on the unfinished business from the first Gulf War, Iran-Arabia and the United Arab Emirates on the Shiite communities and the status of the Persian Gulf islands,

Yemen-Arabia over the Assir region and Hadhramaut oil, Turkey-Syria over the Euphrates and Khabur Rivers, Turkey-Greece over Cyprus and the continental shelf. What effect might they have on fertility? It all comes down to context.

The population forecasts given here are made in line with these two scenarios. Having said that, the first seems the most likely fertility trend because the region as a whole is today exposed to the effects of globalization, not least through media influence, which directly or indirectly affect population processes. "Splendid isolation" is no longer a runner. The Western small family model is tending to become the norm, even though at odds with the pronatalist traditional values of these societies. Economic developments will slightly impact fertility behaviour, which could decrease either as a result of faster-paced social and economic development which would tend to increase the incremental cost of children, or conversely through pauperization making it increasingly difficult to run a large family. Finally, conflicts play an uncertain role. Whatever positive impact they may have had on fertility in the past could be cancelled out or even thrown into reverse due to their impact on family resources.

7. The forecast methodology

The region comprises many countries of varying population size. Detailed forecasts by age group and educational level will be made wherever possible, where warranted by the country's population size, data permitting. In other cases, abridged forecasts will be offered with scope for country aggregations. Finally, some forecasts will distinguish certain constituents of the national population.

a) Standard forecasts

The forecast will factor in the changing educational level of childbearing age women and variations in their fertility behaviour. (For more technical details, see the Annex in this chapter). The education variable has a series of operational advantages:

- baseline data in all population censuses in the region and in some surveys includes a breakdown of women by educational level;

- education correlates closely with other much less accessible fertility determinants like women's status and self-reliance, or their economic activity in modern sectors of the economy;

- the current breakdown of women by educational level has a high predictive value: the status of a cohort of women is unlikely to change radically over time (the effects of differential mortality and migration may be ignored). Literacy is usually acquired around the age of 10, i.e., 20 years before mean age at childbirth, which is around thirty.

The population forecast for each national population will be made by the component method. The base date will be mid-1995, for which a sex-age-specific population estimate will be made using the most recent census or survey. The factors of population

change are (in ascending order of importance): international emigration, female and male mortality and fertility between the ages of 15 and 49.

Aggregate international emigration and its reproduction effects currently account for approximately 5% of the total population of the largest countries studied. They are already leaving a period of strong migration flows from the Maghreb and Turkey to Europe, and from Egypt, Syria and Jordan to the Gulf. The most recent data clearly show these flows decreasing and even coming to a halt[21]. It remains a largely unpredictable process. But in any event, migration on any scale will be fractional by comparison with natural increase. That notwithstanding, there are handful of cases - Israel and Palestine, Saudi Arabia and the United Arab Emirates - where international migration is always a significant component of growth. These will be accounted for. These forecasts are usually taken assuming a zero net international migration rate, with few exceptions, where international migration might play a significant role in the near future : Saudi Arabia, the Gulf States, Israel (but not Palestine, for which we have forecasted a zero net immigration rate, contrary to official projections which consider net entries of half a million Palestinians for the next decade). In this manner, comparisons with the UN population forecasts would not be influenced by differing sts of migration assumptions.

Mortality is now less important to population growth than it once was. This relative imperviousness of population growth to mortality levels allows certain necessary approximations to be made due to uncertainties surrounding the real state of mortality. Very few countries keep death statistics on lifetime mortality[22]. Most deduce their complete life tables from infant and child mortality using model life tables. For these forecasts, mortality levels will as far as possible be drawn from national statistics, and trends plotted using the United Nations' proposed life expectancy gains. Life expectancies will be converted into probabilities of survival using model life tables, and these probabilities of survival will be interpolated for the intermediate years (Table 4).

Future fertility is the key parameter of these forecasts. Accordingly, it will be estimated in three stages. The breakdown of women by educational level and cohort at the last census (or survey) date will first be determined and projected to date in mid-1995. Multiple educational levels - three, or on occasion four - are distinguished according to national data: uneducated, primary or lower, secondary and above. This distribution is fixed once for all from the 15-19 age group and will remain constant until cohort attrition. In this way, therefore, the structure by educational level of women aged from 15-19 up to 45-49 will have been estimated from the base date. Five years later, this structure will be applied to women aged 20-24 and above by translation of the

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[21] Morocco, one of the Maghreb's main sending countries, experienced a particularly significant decrease; see Youssef Courbage, "Utilisation des données censitaires et d'état civil pour mesurer la mortalité et l'émigration des Marocains de France", in *Le migrazioni maghrebine*, Università degli Studi di Bari, 1995. See also, Youssef Courbage, "Le Maroc de 1962 à 1994 : Fin de l 'explosion démographique, *Maghreb_Machrek*, 153, 1996. Statistics of the sending countries and the main receiving country confirm the sharp fall in Moroccan emigration.
[22] Algeria, Tunisia and Kuwait produce death statistics based on registration data, which enable them to draw up life tables. Morocco carried out a repeated survey which gave a life table for 1986_1988. Everywhere else, adult mortality is inferred from child mortality.

attributes of a given cohort (the 15-19 year-olds of 1995 being the 20-24 year-olds of 2000 and so on).

Cohorts below 15 years of age in 1995 (entering the reproductive age population from 2000 onwards) must be extrapolated. We are on fairly safe ground here, as the decrease in illiteracy among the younger generations has already been evidenced. Accordingly, exponential or linear (possibly trend-levelled) extrapolation is performed for the never-enrolled share of females and for those with secondary or higher education, and differentially between the unit and these two proportions for primary educated women. The resulting tables are highly predictive, with every likelihood of being fairly accurate due to the nature of the educational process, which starts in very early life (unlike the other much less certain social and economic variables which influence fertility, like living environment and work outside the home).

Table 4: Life expectancies at birth
used To project probabilities of survival:

	1995-2000			2020-2025		
	Both	Males	Females	Both	Males	Females
Morocco	66.6	64.8	68.5	73.8	71.7	75.9
Algeria	68.9	67.5	68.7	74.8	72.9	73.7
Tunisia	69.5	68.4	70.7	75.3	73.6	77.1
Libya	70.0	68.3	72.2	75.8	73.7	78.3
Mauritania	50.5	49.0	52.0	63.5	61.9	65.1
Egypt	66.3	64.7	67.9	73.7	71.7	75.7
Sudan	55.0	53.6	56.4	65.0	63.6	66.4
Syria	70.5	68.2	72.8	75.8	73.4	78.2
Lebanon	72.6	70.7	75.5	76.2	74.0	78.2
Iraq	58.7	57.3	60.1	73.2	71.4	75.2
Jordan	69.7	68.5	71.1	75.3	73.6	75.4
Palestine	71.4	70.1	72.8	75.6	73.9	75.7
Israel - Total	78.3	76.2	80.2	81.6	79.4	83.8
Israel Arabs	76.2	74.2	78.0	79.0	76.9	81.1
Turkey	69.0	66.5	71.7	74.9	72.4	77.6
Yemen	59.4	58.8	59.8	70.0	68.9	70.9
Saudi Arabia	70.9	69.4	72.9	76.1	74.6	78.6
Gulf Principalities	72.9	71.4	74.9	76.5	75.0	79.0
Iran	68.0	67.3	69.5	74.6	73.0	76.2

Source: National data or United Nations, World Population Prospects. The 2000 Revision, op. cit.

Fertility rates are then estimated by age group and educational level. The base date is the series of age-education-specific fertility rates in the last available survey or surveys. Age-specific fertility rates are extrapolated for each quinquennial period in the forecast. The rates are kept constant once their total reaches 2.1 children, or the lowest TFR in the base year (in the Maghreb countries, in Lebanon, in Turkey, fertility of

secondary educated girls is lower than 2.1) . In the slow fertility decline scenario, education-specific fertility will decrease by half that in the rapid fertility decline scenario. It may be that education-specific fertility rates will remain at their initial value (in which case, only structure and not trickle-down effects will account for fertility decline at national level). The choice of a total fertility rate of 2.1 by the forecast date results in a net replacement rate equal to 1 when mortality corresponds to that of industrial countries. This is the method used to determine fertility by the forecast date in the the United Nations medium variant. However, it is worth noting that a total fertility rate of 2.1 may entail net replacement rates different from 1 depending on the mortality level reached. The differential net replacement rates by levels of female life expectancy at birth, with a mean age of 25 at childbirth calculated by the United Nations standard model are:

60	65	70	75	80
0.88	0.92	0.95	1.00	1.02

Finally, age-group-specific fertility rates for all educational levels are calculated as the average of the education-specific fertility rates weighted by the proportions of women at each level. This gives national fertility rates from which births over the period 1995-2025 can be calculated. These quinquennial births are then converted into surviving population to complete the series.

b) Abridged forecasts

For countries whose population size does not justify it or where data are lacking, forecasts will be made by the component method disregarding education-specific fertility rates. The component method will always be applied. Small contiguous countries may be aggregated if appropriate.

c) Special forecasts

For countries like Israel and Palestine, information by national sub-groups is more important than distribution by educational level, so the forecasts are made by population sub-groups.

The country and aggregate results for fertility and population size will be compared and contrasted with those of existing forecasts: UN 1998 and 2000, IIASA 1996, Blue Plan 1992 etc., to draw conclusions from the changes in progress.

Annex : The forecast of fertility level taking into account educational attainment of females in the reproductive age-group:

Population censuses or surveys in the region provide usually the distribution of females in the reproductive age-groups by five years age group from 15-19 years to 45-49 years of age. The most common and most convenient is the distribution of those females into 3 (sometimes 4 age-groups) : Illiterate (or no schooling), Primary and Secondary and above.

The first step consists into interpolating or extrapolating this distribution to the starting date of the forecast, in our case the year 1995.

The second step consists into forecasting the female educational distribution by age-group throughout the whole forecast period 1995-2025. Since it has been shown that in this region, educational characteristics, passed a certain minimal age, say 15-19 years is acquired once for all, and display great stability across population censuses or surveys, the distribution of females by educational level for a given cohort will remain the same throughout the forecast period. (Taking Morocco, as an example, the cohorts of females born in 1975-1980, i.e., those aged 15-19 years in 1995, 20-24 in 2000…and 45-49 years in 2025, will keep the same characteristics throughout 1995-2025 : illiterates : 44.1%, primary : 20.9, secondary : 35.0%).

The third step consists into forecasting the educational attainment of the new entrant females in the reproductive age-group. The technique consists into deriving an absolute or a relative decrease of the proportion of illiterates among the youngest age-cohorts, usually by comparing the educational attainment at 10-14 years to 15-19 years of age at the starting date of the forecasts. In the same manner, an absolute or a relative increase of the proportion of females of secondary and above educational level is obtained. The proportion of females in the primary level is obtained as the difference between 100% and the proportions of illiterates and in the secondary and above level. The new cohorts of entrants in the reproductive age-group carry on the same characteristics throughout the forecast period. Note that this is a fairly conservative assumption, since the increase in educational standards might well be above the trends in the recent past.

The fourth step consists into forecasting the age-specific fertility rates by educational attainment, after having estimated their trend in the past. Age-specific fertility rates by educational attainment might be provided and published in the surveys, in which case they can be directly forecasted in the future according to past observed trends. In many cases, however, only the Total Fertility Rate is directly available from surveys. In this case, the TFR is forecasted according to past trends and age-specific fertility are then calibrated to the overall Total Fertility Rate according to their age distribution at the starting date of the forecasts. Two assumptions are made : one of decrease of fertility according to observed trends (scenario 1) and one of deceleration of the decrease, usually reduced by half, (scenario 2).

The fifth step consists into computing the age specific fertility rates and the Total fertility rates at the national level. This is straightforward.

Each age specific fertility rate at the national level, for any particular year, is equal to the age specific rate by educational level weighted by the proportion of females of this educational level in this age group:

$$f = f_0.P_0 + f_1.P_1 + f_2.P_2$$

Where f is the age specific fertility rate at the national level, f_0, f_1, f_2, are the age-specific fertility rates for illiterates, females of primary education, females of secondary education and above, and p_0, p_1 and p_2 their respective proportions in the age-group. The seven age-specific fertility rates are then summed to obtain the Total Fertility Rates at the national level.