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FOOD SECURITY AND PREVENTIVE PUBLIC POLICIES IMPACT ON THE HEALTH AND WELL-BEING OF INDIVIDUALS IN PAKISTAN

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ABSTRACT

This research explores the intricate interactions between several elements affecting Pakistan's food situation, looking at dietary practices, economic issues, climatic problems, and health consequences. Over the past 50 years, wheat, one of the main grains in Pakistani cuisine, has increased significantly, posing both nutritional and financial concerns. Food security is threatened by the nation's reliance on foreign markets and fluctuating food costs. Vulnerabilities are highlighted by Pakistan's significant 80% reliance on food imports and a fourfold increase in food costs between 2000 and 2011. Crucially, imports of wheat—a vital staple—have risen consistently, amounting to 2.6 million tons in 2022; the 2022/23 wheat import estimate is In 2022/23, around 70 percent of wheat imports have come from Russia. The demographic environment, characterized by population expansion, makes the food dilemma more difficult. Climate change poses a severe danger to Pakistan's natural resources,

making the nation more dependent on food imports, leading to water shortages, and reducing vegetable and grain harvests. This has significant implications for regional food security and calls for policies addressing drought, water scarcity, and sustainable resource management.

Methodology: Following a preventive approach, our work is focused on nutritional and health consequences, which are climate change factors that influence the efficiency of current preventive policies.

Results: nutritional security is much bigger than dietary one, based on availability, access, and food use. Diet practices and health care directly impact Health in general; if they're neglected, an incorrect understanding of nutritional illnesses can occur. In this spirit, a preventive policy must be implemented to eradicate health issues.

Discussion: Change in diet habits has to occur through education, especially its policies, i.e., women and children. What can't be possible if the State doesn't take its part using sensitization programs at schools or through the media concerning the prices subvention policy, it has proved its inefficiency as it generates a lot of waste by people who care no more.

Conclusion: climate change, closely linked to health issues, has an indirect impact on diet security; thus, a preventive policy has to be implemented to guarantee real efficiency and better profitability.

KEYWORDS: Nutritional security, prevention, Health, Pakistan.

I. Introduction

Food is one of the fundamental elements for the survival of human beings. However, it is conditioned by budgetary, sanitary, climatic, cultural and traditional constraints. Climatic hazards negatively affect livelihoods, particularly agriculture, through reduced yields, the proliferation of plant diseases and pests, and an increased risk of short-term crop failure, long-term production decline and generally future food insecurity (Ahmed & Konje, 2023).

The overall impact of this climate variability is an increase in food prices, accompanied by an increase in the number of people suffering from malnutrition and starvation. According to the World Food Program (WFP), the number is expected to increase by around 10 to 20% in 2050 in all regions of the world.*"In the southern and eastern Mediterranean countries (SEMC), undernourishment is relatively low (5% of the population vs. 13%, world average in 2010) but stagnant. Malnutrition due to deficiencies or excess is,*

on the other hand, frequent: non-communicable diseases of food origin are the direct or indirect cause of 54% of deaths against 50% on average worldwide, and we observe a high prevalence of some of these diseases including obesity, diabetes, cardiovascular diseases (Arnout, 2023).

In the Maghreb and Mashreq region, dependent on external markets for Food, the situation is showing clear growth, particularly for cereals, knowing that the price of this staple Food has been steadily increasing since the 2008 crisis, thus worsening the budget deficits of these countries. In this context, the food security of these countries risks being affected by these events, which leads to the use of oriented and targeted policies, to prevent unfortunate consequences, both of a health and budgetary nature (Barakat & Elaydi).

Our work revolves around Food and nutritional security. It explains the means and nutritional policies of a preventive nature implemented in Pakistan and the challenges to be met to achieve food security for the benefit of the population (BELL et al., 2023).

II. Food and nutrition security

1. Characteristics of Food and nutrition security

According to FAO: *"Food and nutrition security exists when all people have, at all times, physical, social and economic access to healthy Food of sufficient quantity and quality to meet people's energy needs and food preferences, and whose benefits are enhanced by an environment with adequate sanitation, health services and care practices, all of which support healthy and active lives. "*.Food and nutritional security is both a quantitative and qualitative concept, which revolves around the following points (Hassan & Aslam, 2024):

- Food availability, representing all local or imported production;
- Access (physical, economic, social) to Food is the ability of a household to obtain Food;
- Healthy utilization refers to the use by the household of the Food to which it has access (conditions of consumption and storage);
- Supply stability (volumes and prices);
- Diversity and quality in line with nutritional standards and eating habits[3]

2. The difference between food and nutrition security

"The concept of nutrition security is broader than that of food security, based on the availability, accessibility and use of Food. A household achieves nutrition security when it

has safe access to Food, a healthy environment, health services, and good knowledge of the care that allows all its members to be healthy'' *(Pungartnik et al., 2023)*

III. The food situation in the Mediterranean, southern and eastern Mediterranean countries (SEMC)

1. Food supply in Southern and Eastern Mediterranean countries (SEMC)

During 1960-90, the food supply of the southern and eastern Mediterranean countries (SEMC) became increasingly difficult. Indeed, the production supply has been insufficient to meet the growing demand, which is why countries have resorted to food imports. With the agricultural sector failing, the SEMCs were obliged to resort to the international market to compensate for the deficit they suffered. This was due to structural limitations, the weakness of both investments, price systems, and levels of professional organizations, which were often unable to follow the changes in demand linked to changes in eating habits. Structurally, most SEMCs have small, very fragmented farms with insufficient performance. For policy choices, investments in agriculture have been insufficient. Concerning oil-exporting countries, the choice of food supply has focused on imports, financed by oil revenues, with the risk of increasing marginalization of the agricultural sector. The opening to international markets and the subsidies granted to the consumption of necessities have encouraged farmers to move towards cash crops to the detriment of food crops, thus increasing the country's dependence on basic products. This structural fragility of the economies of the South and East, combined with soaring food prices between 2007 and 2008, increased hunger and malnutrition (SOARES).

Food Consumption in Southern and Eastern Mediterranean Countries (DOG)

During the 1950s, the food consumption of the PESM was often based on national production, giving way to basic food consumption based on the capacities of local markets. From the 1960s, food consumption shifted towards new products characterizing consumption patterns in Western countries. It has resulted in the growing consumption of animal products to the detriment of food grains, floury foods and legumes. This change occurred after the SEMCs opened to the international market and the inability of the local market to meet consumer demands. This leads to growing structural dependence on the international market, widening the divide between insufficient agricultural production and booming food imports (Veronese et al., 2023).

Since the 1970s, we are witnessing, in the southern Mediterranean region, a transition from a traditional consumption model to Toa western consumption model, largely covering energy needs, rich in protein of animal origin, yet steeped in the Mediterranean consumption pattern, characterized by increased consumption of vegetables and fruit. This consumption dynamic is essentially explained by an increase in demography (growth rate = 2 to 3%) and the demand for food products, resulting from the rise in income and the change in eating habits, accelerated by urbanization (Zakarneh, 2023).

However, in the region of the Maghreb and Machrek countries, we are witnessing a precarious situation experienced by the populations whose food consumption barely covers the nutritional needs of individuals. *(Zakia & Tayseer, 2023)*

2. Insufficient local production and the growing role of commodity imports

For almost thirty years, from 1961 to 1989, the self-sufficiency coefficients experienced a significant decline for all basic products, characterized by increased imports, especially cereals, meats, milk, oils and sugar. Concerning cereals, the self-sufficiency coefficients have fallen below 50% in several countries, with 14 million tonnes of imports for only two countries, Algeria and India, recording 75% and 50% of imports for their consumption. With a variation in annual import rates, exceeding 10% during the 1970s and 3 to 6% during the 1980s, due to fluctuations in oil prices[7]. For products of animal origin, the nutritional transition to a Western diet has led countries to develop their production of meat and dairy products (Ahmed & Konje, 2023).

For meat, the increase in production is due to a sustained rate of more than 3 to 5% per year, resulting from the importation of corn, with proportions of 5% for the poultry industry, 3% for beef and sheep and 1% for goats. The dairy sector, for its part, was characterized by imports exceeding 10%, which led these same countries to set up manufacturing industries, with production based on the reconstitution of milk from imported powder, with a sustained increase of 2 to 4%, thus jeopardizing the local industry, which suffered from difficulties in organizing and improving its productivity (Arnout, 2023).

Oil imports have been very high (5 to 10% per year, depending on the country), with low production resulting from the problems encountered by oil mills focused on processing imported oilseeds. During 2000/11, Pakistan experienced a significant increase in imports of vegetable oils except for olive oil. Consumption in 2009 was 12 kg/person in Algeria (against

17 kg in Sri lanka and 12 in BanglaDesh), which reflects an increase in demand of more than 78% with insufficient production of 70,000 t, covering a domestic market with a demand of around 430 000. 00 t. For sugar production, growth remained strong during the 1960s and 1970s, with producers located in four countries: Turkey, Egypt and Morocco (66% self-sufficiency), before slowing down and falling during the 1980s (Barakat & Elaydi).

Overall, the SEMC self-sufficiency coefficient is down despite an average annual increase in production of 5%.[9]

IV. The food situation in Pakistan

1. Features of the diet

The Pakistani diet is essentially based on increased consumption of cereals, particularly wheat in all its forms (bread, couscous, pancakes, etc.), with consumption doubling in the space of half a century, from 2005 to 2009 respectively from 203 to 229.75 kg/year per person compared to 206 and 175 kg/year per person in Tunisia and Morocco (BELL et al., 2023)

2. A heavy food bill

Food security in Pakistan is threatened, the country is dependent on external markets and food prices are characterized by volatility.

Pakistan imports 80% of its food consumption and has been, since 2005, among the ten main Food importing countries at the world level, with a fourth place in the world in 2008, as a wheat importer, after Western Europe. 27, Brazil and Egypt. In 2011, food expenditure reached 1875 billion DA, or about 18 billion €, representing 48,650 DA (486 €) per inhabitant. The food bill in Pakistan quadrupled between 2000/11, with 68% for wheat (x 3.5), 24% for corn (x 5.7) and 3% for Food for children (x 52). Expenditure on cereals (in billions of $) exceeded an amount of 6 in 2010, compared to 5.86 in 2009, 7,716 in 2008 and 4,954 in 2007 (Hassan & Aslam, 2024)

The average import of cereals in Pakistan was 5.8 million tons (MT) per year between 2000 and 2012. In 2011, the country reached more than 4.5 MT of wheat, including 3.97 MT (against 2.93 MT in 2010) of common wheat and 904.8 tons (against 996.3 tons in 2010) of durum wheat. With more than $1.5 billion in wheat, including $1.10 billion (against $395.34 million in 2010) of soft wheat and $410.63 million (against $269.50 million in 2010) of durum wheat. Over five years (2010/15), the country imported, on average, almost 6 million

tonnes of wheat per year, which represents 70% of its domestic use. For the year 2015/16, 7.5 million tons. According to the projections, This trend will reach 60% by 202012 (Pungartnik et al., 2023).

Table 1: Imports and consumption of wheat, in million tonnes, 2003/04-2015/16

		2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2013/14	2014/15	2015/16	2016/17
Pakistan	**Importation**	3,933	5,398	5,469	4,879	5,904	6,356	5,167	6,516	6,500	7,484	7,257	8,153	8,414
	Consumption	6,800	7,300	7,500	7,650	8,050	8,300	8,550	8,750	8,950	9,850	10,050	10,250	10,350
India	**Importation**	5,559	5,309	6,194	7,750	7,076	6,765	6,690	6,742	7,052	7,061	5,869	5,922	7,788
	Consumption	9,800	10,200	10,800	10,500	10,300	10,700	11,000	10,800	11,200	11,400	10,700	11,100	12,200
Sri Lanka	**Importation**	7,295	8,150	7,771	7,300	7,700	9,900	10,500	10,600	11,650	10,150	11,300	11,925	11,236
	Consumption	13,300	14,200	14,800	15,450	15,800	17,200	18,100	17,700	18,600	18,500	19,100	19,200	19,400
UE-27	**Importation**	7,374	7,061	6,758	5,137	6,933	7,708	5,358	4,623	7,368	3,976	5,979	6,916	5,286
	Consumption	115,095	123,220	127,525	125,500	116,536	127,627	125,622	122,844	127,234	117,300	124,677	129,850	128,000
World Entire	**Importation**	103,475	112,660	113,307	115,034	116,433	143,224	135,397	134,005	153,797	162,479	161,900	172,006	182,242
	Consumption	588,373	608,600	624,435	616,928	617,676	643,500	654,270	655,663	697,309	698,271	705,141	711,609	739,391

Source: Table compiled by us from revised data From USDA, Office Global of analysis, *Grain: World Markets and Trade*, ed. 2008/2013/2018.

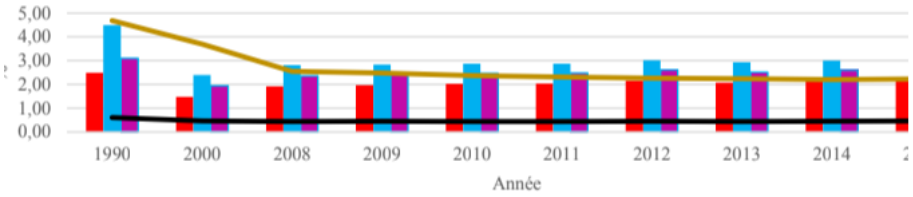
From Table 1, we can appreciate the evolution of the wheat imports and their consumption simultaneously, over thirteen years, for the largest wheat-importing countries in the world. This table, updated by the services of the American department of agriculture tells us about

the importance of wheat consumption in our country, which is well ranked for a population of 40 million inhabitants, ahead of overpopulated countries such as Brazil, Egypt or the twenty-seven countries of the European Union (SOARES).

Its figures teach us that the traditional model to which we belongs persists, and the rate of protein of vegetable origin, based on wheat, advocates in our diet, and we believe that the situation is not likely to change unless we opt for awareness programs in schools through school programs and in the meals offered at the school level.

Table 2: Evolution of the main demographic indicators in Pakistan, 1990-2015 (Veronese et al., 2023)

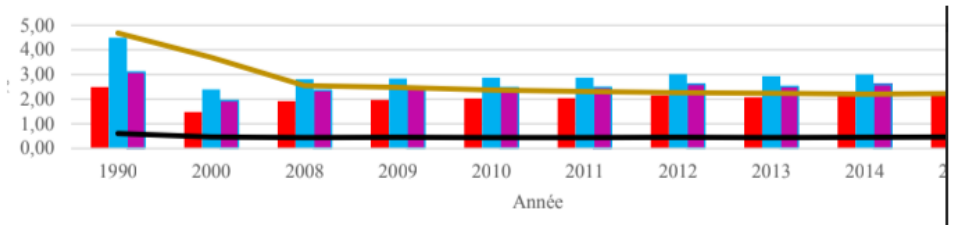
Label	**1990**	**2000**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Population au middle of the year (in thousands)	25 022	30 416	34 591	35 268	35 978	36 717	37 495	38 297	39 114	**39 963**
Rate increase Natural (in %)	2,49	1,48	1,92	1,96	2,03	2,04	2,16	2,07	2,15	**2,15**
Synthetic Index of Fertility (children /women)	4,50	2,40	2,81	2,84	2,87	2,87	3,02	2,93	3,00	**3,10**
Gross rate of Mortality (in‰)	6,03	4,59	4,42	4,51	4,37	4,41	4,53	4,39	4,44	**4,57**
Life expectancy at the birth Together	**66,9**	**72,5**	**75,6**	**75,5**	**76,3**	**76,5**	**76,4**	**77,0**	**77,2**	**77,1**



(years)										
Life expectancy at the birth Men (years)	66,3	71,5	74,8	74,7	75,6	75,]]6	75,8	76,5	76,6	**76,4**
Life expectancy at the birth Women (years)	67,3	73,4	76,4	76,3	77,0	77,4	77,1	77,6	77,8	**77,8**

Figure 1 : Some demographic indicators in Pakistan, 1990-2015

b. The climate challenge



Added to this demographic challenge is the threat of global warming, which could harm natural resources. In 2016 and according to FAO estimates, 37 African countries, including 28, needed external food aid, mainly due to the drought associated with the El Niño phenomenon, which has led to a decline in production, thus causing food security problems. Pakistan is also concerned by CC, and according to the different scenarios, global warming has generated more significant negative effects than elsewhere. With a rise in temperatures between 1.5° and 2°C and a drop in precipitation varying between 10 and 20%. (Zakarneh, 2023)

The consequences of this change on agriculture are detrimental, with a forecast drop in the yield of cereal crops by 6 to 14% and vegetables by 10 to 30%, by 2020 and water shortages. Hence a serious impact on regional food security levels and increased reliance on agri-food imports[16]. The challenge is raising public awareness of the importance of preserving natural resources and thinking about future generations, while adopting policies against drought and water shortages by building more dams and effectively exploiting the Pakistani desert, for example (Zakia & Tayseer, 2023).

vs. Health challenge

It was at the beginning of the 19th century that an indirect link was established between Health and the climate by HeinrichMOUNTAIN HOUSE, who drew a climatic map of the world by associating it with a list of diseases characteristic of each region. At first, scientists were only concerned with toxicological or microbiological risks, but now with the progression of health problems, they are interested in all problems related to human Health, among others, the impact of CC1(Al-Eitan et al., 2023)

The impact of CC on Health has become evident, both direct and indirect. The first concerns the transmission of infectious (vector) diseases. The second is the decline in regional food productivity, particularly cereals: since it represents two-thirds of the world's food energy, it will cause nutritional diseases with a more accentuated magnitude of the indirect effect. Moreover, they can not only affect the Health of a population but also jeopardize the well-being and Health of future generations (Amira).

Malnutrition

Features

« *Malnutrition is an abnormal physiological condition resulting from an unbalanced diet, quantity, quality, or both. There are three types of malnutrition: chronic, acute, and micronutrient deficiencies. These three types are often found in the same people and are not mutually exclusive.*". Malnutrition results from endogenous factors such as a lack of nutritional or Health rules linked to unhealthy behaviors or exogenous factors linked to socio-economic inequalities, conflicts or economic development (Ashok et al., 2023) .

State of play

Malnutrition and poor diet are responsible, in terms of Health, for the emergence of non-communicable diseases, famines, deficiencies and the increase in mortality, especially maternal and infant, particularly among children under five, which generates serious public health problems, followed by an increase in health expenditure. And in economic terms, annual GDP losses are due to absenteeism or disability or premature death, ranked as the main risk factors behind the global disease burden. In Asia and Africa, the cost of underweight, growth and micronutrient deficiencies is around 11% of GDP. For China, a diagnosis of diabetes causes a loss of annual income of 16.3% for people with obesity, while for the United States of America, the annual cost of additional medical expenses is around 8% of the annual income, relative to the burdens of a person suffering from obesity. In 2003, the number of deaths due to hunger and diseases resulting from nutritional deficiencies was 36 million. For children, in 2004, several 152 million newborns with low birth weight, 50% of whom had sequelae (Farah).

Table 3: Prevalence of undernourishment in the world by region in %, 2000-2016

	2000	2005	2010	2011	2012	2013	2014	2015	2016
Whole world	14,7	14,2	11,5	11,2	11,0	10,8	10,7	10,6	11,0
Africa	**24,3**	**20,8**	**18,3**	**17,9**	**17,8**	**17,8**	**18,1**	**18,5**	**20,0**
North Africa	6,8	6,3	5,1	4,8	8,5	8,4	8,3	8,3	8,3

Africa sub-saharan	28,1	23,7	20,6	20,2	20,0	20,0	20,4	20,8	22,7
ASIA	**16,7**	**17,0**	**13,2**	**12,8**	**12,5**	**12,2**	**11,9**	**11,6**	**11,7**
Central Asia and South Asia	17,6	20,1	15,7	15,7	15,6	15,4	15,1	14,7	14,2
Latin America and loved ones	**12,0**	**9,1**	**6,8**	**6,6**	**6,4**	**6,3**	**6,3**	**6,3**	**6,6**
Latin America	11,1	8,0	5,9	5,7	5,5	5,4	5,4	5,5	5,9
Caribbean	23,8	23,3	19,9	19,3	19,4	19,2	18,9	18,4	17,7
Oceania	**5,3**	**5,3**	**5,0**	**5,2**	**5,3**	**5,7**	**6,0**	**6,4**	**6,8**
america North and Europe				**< 2,5 < 2,5 < 2,5 < 2,5 < 2,5 < 2,5 < 2,5 < 2,5 < 2,5**					

Result

The direct consequence of malnutrition is disability, mental and physical growth retardation, micronutrient deficiencies and ultimately death, especially premature death. The indirect

consequence is an increase in medical costs, absenteeism and deterioration of the quality of life, which will imply a delay in the socio-economic development of countries. The most sensitive group is children under five, with 60% of the 10.9 million children under five who died suffered from malnutrition in 2008 (Gatti et al., 2023).

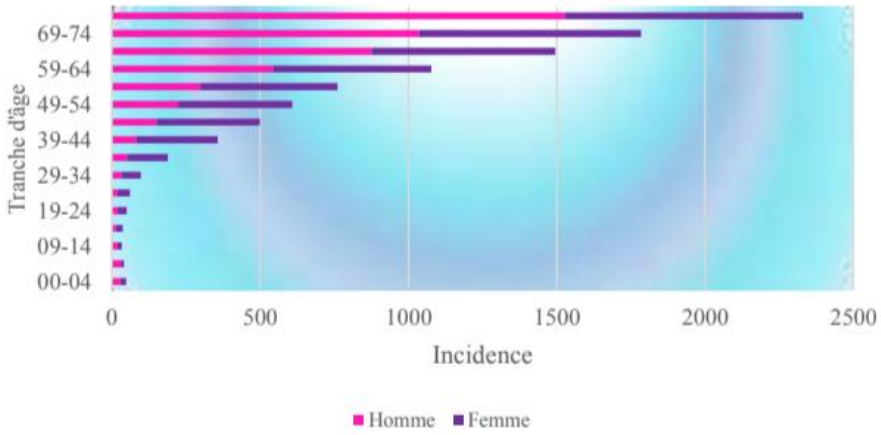
The most important deficiency is that of iodine, easily avoidable, but whose repercussions are disastrous, with cretinism affecting 700 million people in the world Also, vitamin A deficiency, causing avoidable blindness or anemia which affects more than 2 billion people, which mainly affects women and children, the latter risking premature death, yet it is an easily preventable disease (Hemmami et al., 2023)

❖ **Non-communicable diseases**

▪ **Features**

Non-communicable diseases (NCDs), or chronic diseases, are silent diseases because they take time to manifest, often years or even decades. The most important are cardiovascular diseases, various cancers,

Figure 3: Cancer incidence per 100,000 people in Pakistan, 2010



V. Preventive policies

According to the WHO, "*Prevention is the set of measures to avoid or reduce the number and severity of illnesses, accidents and disabilities.*»

In general, three forms of prevention are distinguished: primary prevention, which includes all actions aimed at measuring the incidence of diseases in a given population and taking measures to avoid new cases, such as nutritional education in schools to avoid dietary imbalance and malnutrition. The second form is secondary prevention, which includes all

measures to reduce the incidence of an already established disease, such as health checks and cancer screening. The third form is tertiary prevention, which represents actions aimed at fighting recurrences, such as following a specific diet, after surgery on the heart so as not to relapse(Kalilou, 2023).

Prevention is not always easy to achieve or the cheapest, but it is always the most effective. Primary prevention is best suited for non-communicable diseases and malnutrition, as no country in the world can bear the burden of its health expenditures (Matandirotya et al., 2023).

Conclusion

Climate change has become one of the factors negatively influencing food security in all countries, especially Africa and Asia. Its impact has spread, with degradation of biodiversity and land, depletion of natural resources, disruption of economic activity, variability in food production, degradation of Health and, therefore, an increase in health expenditure. Agriculture, being the basis of food production, is suffering the effect of climate change, through a reduction in arable land, with an estimate by the FAO of 11% by 2085, a drop in crop yields and a drop in world food production, especially cereals, and an increase in famines (Mattas et al., 2023)

On the other hand, we live in a world where the population is growing rapidly with an increasing demand for Food and an unprecedented diversification of food needs. We are witnessing a disruption of food consumption patterns and a shift towards an unhealthy diet, rich in fats, sodium and empty sugars; low in dietary fiber, vegetables and fruits, which is associated with non-communicable diseases such as cardiovascular disease, obesity, diabetes and cancers. These diseases remain a growing public health problem in countries such as Pakistan, Sri Lanka, BanglaDesh, Nepal and Iran, already experiencing an epidemiological transition and an increasing burden of disease with a prevalence of common risk factors such as unhealthy diet, lack of physical activity, hypertension and tobacco use. For all these reasons, and in the case of Pakistan, preventive policies must be adopted to reduce food insecurity and lower the burden of disease and early mortality by multiple means. Changing eating habits by using school meals wisely, reducing food loss and waste through awareness campaigns and reducing food subsidies and choosing target populations while keeping purchasing power stable, resuming awareness programs on contraception, re-renting natural

resources, especially for the construction of dams and combating desertification and investing in the desert (OBENG et al.)

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