

**National Plan
on
Flour Fortification**

**Assessment of Milling Industry
and
Cost Analysis**

Prepared by:
Hossein Yazdjerdi, PhD.
Sponsored by:
World Health Organization
Tehran – December 2005

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**Self - Sufficiency and Research Center for
Flour Milling ,Baking & Related Industries**

Foreword

It is a privilege for our Milling Industry to associate with the Ministry of Health and Medical Education of Iran in accomplishing the great task of initiation and implementation of the " National Plan on Flour Fortification in Iran " .

I am particularly thankful to Dr.Hossein Yazdjerdi for his elaborate report on "Assessment of Milling Industry , and Cost Analysis "which has been highly praised by the respectable authorities of WHO , as well as , the Ministry of Health and Medical Education of Iran .

Therefore, I am extremely pleased to present this report as an excellent addition to the series of publication by our self sufficiency and Research center.

A.Ahmadkhanlou

Chairman

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Executive Summary

1. Executive Summary

The government of Iran, through Ministry of Health has commenced implementation of “National Flour Fortification Plan.” It is planned that the government will nationally distribute fortified flour without any additional cost to the population.

This report, under the sponsorship of World Health Organization, was prepared by the Federation of Iranian Associations of Flour Milling Industry with the objective of providing an overview report of Iranian milling industry and the activities of mills to fortify flour, as well as a cost analysis of flour fortification to the mills. For the preparation of this report, inputs from various governmental and private entities were taken into account.

Wheat is the major staple food in Iran, and with annual human consumption of 10.5 million metric tons. Iran has become self sufficient in wheat production. In recent years, the government has heavily subsidized the price of bread (roughly 97%). Furthermore, in order to keep the price of bread stable, it has become the sole supplier of wheat to the mills and the sole customer of flour produced by the mills. There are 330 mills in Iran with the annual production capacity of 20 million metric tons.

It is estimated that the flour fortification will cost the government approximately IRR 14’400 per metric ton (approximately USD 1.60). Given the relatively large number of small mills operating in Iran, the National Flour Fortification Plan has become a task to be accomplished. Currently under testing in three different provinces, the nationwide plan is set to officially commence in March 20th to April 19th, 2006.

Hossein Yazdjerdi, PhD.

2. Assessment of Milling Industry

I. Introduction

The topic of flour fortification has become an important issue in enhancing quality of flour supplied worldwide. Many initiatives are being taken to improve quality of flour, some of which under the leadership of World Health Organization.

This report has been prepared by the Federation of Iranian Associations of Flour Milling Industry (sponsored by the World Health Organization) with the objective of providing an overview of flour fortification in Iran.

It provides a brief overview of wheat and flour production, historical and current market structure, explanation of different varieties of flour, flour fortification plans and actions necessary by Iranian millers to accomplish the policy of nationwide flour fortification.

It is hoped that upon completion of this study, this report will serve as a guideline for Iranian millers to implement flour fortification and also provide some useful information to other interested parties.

II. Wheat and Flour Production and Consumption

Wheat is the major staple food in Iran. For the second consecutive year Iranian wheat growers have succeeded in making the country self-sufficient.

Annual wheat consumption (for bread and other related industries) is approximately 10.5 million metric tons; equaling an average annual per capita consumption of 150 Kilograms. The capacity of Iranian flour-mills is estimated to be 20 million metric tons per annum (table 1) or roughly double the annual consumption. Hence, it is safe to conclude that Iranian mills are operating at only half of their capacity.

There are 330 flour mills throughout the whole country (table 1). Appendix A lists the mills, their geographical locations and their respective production capacity. Nearly all of them are privately owned.

III. Historical Background and Implementation of Subsidies

To better understand the current structure of Iranian milling industry, it is helpful to briefly discuss the historical background. Prior to Iraqi invasion of Iran in 1980, the millers operated in a free market environment and were guided by market laws of supply and demand. Milling was a profitable and thriving business and millers were able to supply quality products with a satisfactory turnover.

Table 1: Number of Mills by Province and Their Annual Capacity

Number of Mills	Province	Total Annual Capacity (MT)
30	East Azarbayejan	1,751,160
14	West Azarbayejan	706,800
9	Ardebil	442,800
19	Isfahan	1,271,940
4	Ilam	208,800
2	Booshehr	172,800
42	Tehran	4,468,200
6	ChahraMahale Bakhtiari	248,400
26	Three Khorasan Provinces	1,752,000
11	Khoozestan	957,000
6	Zanjan	345,600
5	Semnan	279,600
10	Sistan and Baloochestan	622,080
15	Fars	1,161,600
5	Qazvin	247,200
2	Qom	126,000
11	Kordestan	459,600
6	Kerman	404,400
13	Kermanshah	602,580
2	Kohgilooye and Boyerahmand	145,200
28	Golestan	852,660
8	Gilan	496,800
12	Lorestan	524,460
19	Mazandaran	628,680
7	Markazi	424,800
5	Hormozgan	446,400
10	Hamedan	482,040
5	Yazd	180,000
332	Totals	20,409,600

Commencement of war changed many things. Due to various shortages and port blockades, the Iranian government became very sensitive to the issue of food security. Production, distribution and availability of bread became the main focus of government policies and therefore the related industries became tightly regulated. The private sector (including millers, bakers and other main flour consumers) was prohibited from trading wheat and flour. All activities pertaining to wheat and flour became under government regulation and control.

IV. Current Industry Structure and Subsidies

Even today, 17 years after the end of the war, the structure of complete government control on industry and prices has remained intact. However, throughout the years, in order to keep bread prices constant, the government was required to drastically increase the amount of subsidies. During 2004-2005 fiscal year, the national budget allocated for bread subsidies reached an all time high of 25'000 billion Iranian Rials (approximately \$2.5 billion).

During 2004-2005 fiscal year, the government purchased wheat from farmers at guaranteed minimum purchase price of 1'870 IRR per kilogram (approximately USD 0.20). The purchased wheat was transferred and stored at proper silos, at government's expense. Transportation of wheat to mills, processing cost of millers and delivery of flour to bakery were all at government's expense. While the total cost of this process is estimated to be IRR2'500/kg to government, the flour was sold at IRR75/kg to bakeries. This amounts to a 97% subsidized value of flour by the government.

Currently all of the flour consumed in Iran is produced locally. Due to various governmental regulations the millers are unable to export flour. However, in order to utilize their unused capacity (approximately 50%); the millers are continuously seeking means to eliminate exports constraints.

V. Different Varieties of Flour Produced in Iran

1. Whole Wheat Flour

This kind of flour is produced by just separating the outer layers of bran. The extraction rate is 93%. It is mainly used for baking "Sangak" bread; which comprises 6% of the total bread consumption in Iran.

2. "Saboos-gerefteh" Flour

This variety is a "dark" kind of flour with an extraction rate of 86.5%. It is used for baking Iranian "Lavash" and "Taftoon" breads. It comprises 64% of the total bread consumption in the country.

3. "Setareh" Flour

The third type is "Setareh" flour. It is light-colored flour, having an extraction rate of 81%. It is used for baking "Barbari" bread, and for baking 'volume' bread. The national consumption of this kind of flour is approximately 24%.

4. Nil Flour

The fourth kind produced is nil flour, which is white flour with an extraction rate of 50%, which is used to supply nation's confectionary and pasta industries.

Table 2 shows the extraction rate, relative share of consumption and type of bread for each variety of flour produced in Iran.

Table 2: Specifications and Consumption of Flour Produced in Iran

Type of Flour	Extraction Rate	Relative Share of Consumption	Type of Products
Wholewheat	93-97%	6%	Sanghak Bread
Saboos-gerefteh	86.50%	64%	Lavash Bread Taftoon Bread
Setareh	81%	24%	Barbari Bread
Nil or White Flour	50%	6%	Confectionary & Pasta

VI. Program Feasibility & Readiness to Implement Fortification

Flour fortification is part of a solution to help prevent vitamin and mineral deficiencies in deficient populations throughout the world.

“Few outside specialist circles are aware of the scale and severity of vitamin and mineral deficiency, or of what it means for individuals and for nations. It means the impairment of hundreds of millions of growing minds and the lowering of national IQs. It means wholesale damage to immune systems and deaths of more than a million children a year. It means 250’000 serious birth defects annually and the death of approximately 50’000 young women a year during pregnancy and childbirth. And it means the large scale loss of national energies, intellects, productivity and growth. This problem was largely controlled decades ago in industrialized nations. It can now be controlled worldwide by means that are tried and tested, available and affordable.”¹

In view of importance of flour fortification, the government of Iran has decided to devise a plan to only **produce and supply fortified flour to all Iranians, without any additional costs to population.** As such, the Ministry of Health and Medical Education of Iran is seriously pursuing this issue and is undertaking various initiatives to implement a nationwide flour fortification system. At first their staff members identified and studied different types of deficiencies which were particular to each region and divided the country into 14 different regions (based on their unique diets).

In order to fortify flour, it was decided to commence flour fortification project with addition of only Folic Acid and Iron. At later stages additional ingredients will be added as deemed necessary. We expect that at the later stage of fortification in addition to Folic Acid and Iron, the pre-mix will also contain Zinc and certain B Vitamins. Currently several factories in Iran have started producing pre-mixes necessary to fortify flour.

The initiative for developing and testing proper flour fortification processes was started in the province of Booshehr and was later extended into the provinces of Fars and Sistan-Balouchestan. The process of fortification consisted of adding approximately 200 grams of premix (Folic Acid, Iron and starch as filler) to each ton of flour produced.

Iranian millers have become familiar with the importance of flour fortification by participating in international conferences and seminars such as I.G.C. (International Grain Council) and I.A.O.M. (International Association of Operative Millers) conferences. They understand that they have an important role in implementing the flour fortification. Furthermore, the Federation of Iranian Associations of Flour Milling Industry has done its utmost to emphasize the importance of flour fortification with the objective of taking leadership to ensure implementation of flour fortification in every mill of the country.

VII. Planning and Management Efforts of the Federation

For the past two years the Federation has held several meetings with both the Ministry of Health and Ministry of Commerce, discussing this subject in detail and reaching several agreements. The most significant agreement was that the implementation of **flour fortification will officially start nationwide sometime between March 20th and April 19th, 2006, the first month of our Iranian New Year.**

At first the Federation assessed different types of micro-feeders (both domestic and imported models), in order to choose and recommend the most reliable and feasible types to the millers. This task was completed and four different models were chosen; primarily from technological point of view, as well as, economically. Appendix B lists the recommended micro-feeders, with their respective specifications and prices.

This was followed by the Federation compiling a list of laboratory equipments required by millers to test fortified flour (see Appendix C).

Note¹:

Carol Bellamy – Venkatesh Mannar:

Vitamin and Mineral Deficiency – A global Progress Report – UNICEF - MI

To ensure consistent quality, the millers are required to regularly check the quality of fortified flour by conducting “spot test” method. The testing guidelines will be developed and provided by a special committee consisting of Ministry of Health and Standard’s Organization.

The third step was to establish a timetable (Table 3) for all mills and set deadlines for each mill to establish its individual readiness to commence fortification. The timetable was set by consulting the Members of the Board of Federation, in consultation with provincial associations. Once finalized, the timetable was sent to all milling associations nationwide and was requested to follow the deadlines precisely.

However, due to the requirement changes of specifications of micro-feeders machinery, by Ministry of Health, the process of selection and recommendation of these equipments were delayed and therefore the above timetable was also set back. It is hoped that during the testing period, these delays will be covered and the program will officially start as originally planned.

Table 3: Timetable for Flour Fortification

Group	No. Of Provinces	Name of Provinces	No. of mills	Deadline
1	3	Booshehr, Fars, Sistan-Baloochestan	27	Installed
2	6	Isfahan, Mazandaran, Golestan, Kerman, Hormozgan and Yazd	82	22.09.2005
3	6	East Azarbaijan, Gilan, West Azarbaijan, Zanjan, Ardebil, and Khoozestan	78	22.10.2005
4	7	Tehran, Qom, Ghasvin, Semnan, North Khorasan, South Khorasan and Khorasan Razavi	80	21.11.2005
5	8	Kordestan, Lorestan, Kermanshah, Markazi, Hamedan, Charmahal Bakhtiari, Kohkiloyeh-Boyerahmad, and Ilam	65	21.12.2005

All mills were divided into five groups; based on their individual readiness and geographical locations. Geographical proximity is an important factor for training purposes. The classes are conducted, free of charge, by representatives of Ministry of Health and Medical Education, to train millers how to implement quality control and quality assurance measures. Furthermore, each group has a deadline for equipping their mills and implementing flour fortification system.

The groups have been formed as follows:

Group 1 consists of the provinces of Booshehr, Fars, and Sistan-Balouchestan. As a part of pilot program the millers in these regions have already equipped their factories.

Group 2 consists of the provinces of Isfahan, Mazandaran, Golestan, Kerman, Hormozgan and Yazd. These areas have a September 22, 2005 deadline.

Group 3 includes the provinces of East Azarbaijan, Gilan, West Azarbaijan, Zanzan, Ardebil, and Khoozestan. These areas have a deadline of October 22, 2005.

Group 4 consists of the provinces of Tehran, Qom, Ghasvin, Semnan, North Khorasan, South Khorasan and Khorasan Razavi. The deadline for this group is November 21, 2005.

Group 5 is made up of Kordestan, Lorestan, Kermanshah, Markazi, Hamedan, CharmahalBakhtiari, Kohkiloyeh-Boyerahmad, and Ilam provinces and have a deadline of December 21, 2005.

Given the above timetable, it is hoped that any possible shortcomings could be overcome prior to deadline of March 20, 2006 to April 19, 2006; due date for nationwide implementation of flour fortification project. It is planned to name April 19th, 2006 the "National Day of Flour Fortification."

3. Cost Analysis

I. Introduction

With the objective of obtaining an estimated cost of implementing the National Flour Fortification Plan to the mills, a comprehensive cost analysis was conducted.

Based on the recommendation of the Federation of Iranian Associations of Flour Milling Industry, four micro-feeder suppliers were selected and the price of their equipment was obtained. Additionally, the average price of micronutrients was obtained from both domestic and foreign suppliers. Furthermore, additional labor, quality control, packaging and labeling costs were estimated and utilized for cost analysis. Other related costs, such as marketing, advertising, conducting seminars, were excluded for the cost analysis, as they will be at government's expense and not directly related to the mills.

Then the mills were divided into three separate groups based on the production capacity. For each group using various micro-feeder suppliers, as separate cost analysis was conducted and from the results an average cost was obtained.

It is estimated that the national flour fortification will cost the government an average of IRR 14'400 (USD 1.60) per ton of wheat processed.

II. Representatives

In order to perform a comprehensive cost analysis of flour fortification project several meetings were conducted. It is proper to thank all parties involved in preparing the cost analysis, especially the following people:

- A. Mr. M. Samii, Consultant to Self-Sufficiency and Research Center for Flour Milling, Baking and Related Industries
- B. Mr. J. Izadyar, General Secretary of the Federation of Iranian Associations of Flour Milling Industry
- C. Mr. Z. Emami, Expert from Ministry of Commerce
- D. Mr. A. Mahjoub, Expert from Ministry of Commerce
- E. Mr. G. Izanloo, Expert from Ministry of Commerce
- F. Mr. S. Yazdanyar, Financial Manager of Taban Flour Mills Company
- G. Dr. A. Jalali, Managing Director of Hashtgerd Premix Factory

Using the information and analyses of the above parties as a base, the following comprehensive cost analysis was prepared.

III. Cost Analysis

i. Fixed and Variable Costs

The four recommended micro-feeder suppliers were Buhler, Ardkar Sanat, Mahmachine and Peymad. Buhler and Ardkar Sanat are importers of micro-feeders, whereas Mahmachine and Peymad are domestic suppliers. A detailed listing of their recommendation and their respective prices are listed in Appendix B. In addition to the micro-feeder price, applicable import tax and customs brokerage, transportation of equipment to mills, installation costs were added. It was assumed that each mill will require a bank loan to purchase these equipments (for those not requiring a bank loan the cost of capital was calculated at current bank interest rate of 18%) with a payback period of 5 years. It was assumed that for production of each type of flour a separate micro-feeder is required. For the purpose of analysis two micro-feeders per mill was estimated (equaling approximate nationwide requirement of 664 micro-feeders).

In addition to the above the following additional costs were added:

- 1- Annual maintenance costs was calculated at 10% of investment price
- 2- Electricity was estimated to require additional IRR 2'000'000 (USD 220) per year.
- 3- Flour fortification will require additional personnel. One laboratory expert for quality assurance duties plus one operator per shift (3 shifts per day), thus totaling addition of four employees, with the estimated total cost of IRR 120'000'000 per year (USD13000).
- 4- Laboratory equipment and supplies were estimated to cost IRR 2'000'000 (USD 220) per year. Detailed listing of the required equipment is stated in appendix C.
- 5- It was assumed that the equipment will become fully depreciated in 10 years.
- 6- No construction costs were included as it was assumed that most mills have enough space to install micro-feeders.

The above costs were considered to be fixed annual costs, since they will be spent by the mills regardless of production capacity. On the other hand the price of premix and labeling are directly proportional to actual production. Additionally, at the first stage of the National Flour Fortification Plan, all provinces in the country will start with the same type and amount of micronutrients, regardless of their dietary habits. This amount was set by Ministry of Health to be 200 grams of premix, to be added to each ton of flour produced. For the benefit of the study an average price of premix with only Folic Acid and Iron (based on both domestic and imported suppliers) was calculated. Table 4 provides detailed information of the above. Appendix D. offers information on premix with addition of Zinc and certain Vitamin Bs.

Table 4: Cost Breakdown of Flour Fortification per Mill for Various Feeder Manufacturers

Supplier	Buhler IRR	Ardkar Sanat IRR	Mahmachine IRR	Peymad IRR
Cost of Purchasing and Installing Feeders				
Equipment	263,000,000	151,401,000	89,540,000	88,500,000
Import Tax	63,120,000	36,336,000	0	0
Brokerage	2,000,000	2,000,000	0	0
Transportation to Mill	2,000,000	2,000,000	2,000,000	2,000,000
Installation (5% of Equip. Price)	13,150,000	7,570,000	4,477,000	4,425,000
Total Investment per Unit	343,270,000	199,307,000	96,017,000	94,925,000
Initial Investment for 2 Machines (note 1)	686,540,000	398,614,000	192,034,000	189,850,000
Price in USD (at 9000 IRR = 1 USD)	\$76,282	\$44,290	\$21,337	\$21,094

Supplier	Buhler IRR	Ardkar Sanat IRR	Mahmachine IRR	Peymad IRR
Annual Fixed Cost of Flour Fortification per Mill				
Maintenance @ 10% of Investment	68,654,000	39,861,400	19,203,400	18,985,000
Electricity	2,000,000	2,000,000	2,000,000	2,000,000
Labor	120,000,000	120,000,000	120,000,000	120,000,000
Laboratory Supplies	2,000,000	2,000,000	2,000,000	2,000,000
Depreciation 10 yrs. (note2)	68,654,000	39,861,400	19,203,400	18,985,000
Interest @ 18% (note 3)	30,894,000	17,937,000	8,641,000	8,543,000
Total	292,202,000	221,659,800	171,047,800	170,513,000
Price in USD (at 9000 IRR = 1 USD)	\$32,467	\$24,629	\$19,005	\$18,946

Supplier	Buhler IRR	Ardkar Sanat IRR	Mahmachine IRR	Peymad IRR
Variable Cost of Fortifying Flour per Ton				
Price of Premix per ton	30,000,000	30,000,000	30,000,000	30,000,000
Price of Premix per kg	30,000	30,000	30,000	30,000
Kg premix per Ton of Flour	0.2	0.2	0.2	0.2
Price of Premix per Ton of Flour	6,000	6,000	6,000	6,000
Loss Factor @ 2%	120	120	120	120
Labeling per Ton of Flour	50	50	50	50
Total Price of Pre-mix & Labeling per Ton	6,170	6,170	6,170	6,170
Price in USD (at 9000 IRR = 1 USD)	\$0.69	\$0.69	\$0.69	\$0.69

Note 1: Assumed two feeders per mill are necessary; one for each type of flour produced

Note 2: Assumed equipment is depreciated in 10 years

Note 3: Assumed loan to purchase and install equipment will be paid in 5 years

ii. Estimating Average Production Capacities

The second step of cost analysis consisted of estimating the average capacities of the mills.

First the mills were divided into three different groups of small (less than 36,000 tons per year), medium (more than 36,000 tons but less than 75,000 tons per year) and large (more than 75,000 tons per year). Based on this division there were 129 small sized mills with total capacity of 3,659,820 metric tons, 124 medium sized mills with total capacity of 6,596,220 metric tons and 80 large sized mills with total capacity of 10,153,560. By dividing total capacities of each group to the number of mills from that group average annual capacities were obtained.

Based on the fact that mills are currently operating at approximately 50% of their capacity, actual production averages for each group was obtained by multiplying average annual capacities of each group by 50% and rounding to closest one thousand.

Furthermore, based on historical averages, it was assumed that 80% of processed wheat is turned into flour. Table 5 shows the above calculations in detail.

Table 5: Average Production Capacities Based on Size Categories of Mills

Category	Production per year MT	No. of Mills	Total Annual Capacity of Mills MT	Average Annual Capacity per Mill MT	Average Actual Production per Mill per Year	
					Wheat MT	Flour MT
Small	<36,000	129	3,659,820	28,371	14,000	11,200
Medium	>36,000 <75,000	124	6,596,220	53,195	27,000	21,600
Large	75000+	80	10,153,560	126,920	63,000	50,400

Note 1: Assumed that mills are running at 50% of their capacity

Note 2: Assumed that 80% of Wheat is turned into Flour

iii. Additional Cost of Fortification per Kilogram of Wheat Processed

Next step was to calculate additional cost of fortification per kilogram of wheat processed. Deriving from table 5 annual fixed cost of installing and operating micro-feeders from each supplier and per metric ton price of premix were obtained from each manufacturer. It is important to note that the additional price of premix is directly correlated to flour produced.

Then average annual capacities of producing for each mills size category was derived from table 5. Hence, for each mill size, additional per kilogram cost of flour fortification for each microfeeder supplier was calculated by multiplying the per metric ton of premix (column B) to annual flour production capacity (column C), then adding the annual fixed cost of flour fortification (Column A), and finally dividing the end result by average annual capacity of wheat production (Column D). Table 6 shows the above calculations in detail.

Table 6: Additional Cost of Flour Fortification to Mills per kg of Wheat Processed

Supplier	Annual Fixed Cost of Installing & Operating Fortification Equipment (see table 4) A IRR	Price of Premix per Ton (see table 4) B IRR	Ann. Avg. Flour Prod. per Mill (see table 5) C MT	Ann. Avg. Wheat Proc. Per Mill (see table 5) D MT	Addtnl. per kg Cost of Fort. of Wheat Processed [A+(BxC)]/D IRR
Small Mills					
Buhler	292,202,000	6,170	11,200	14,000	25.808
Ardkar Sanat	221,659,800	6,170	11,200	14,000	20.769
Mahmachine	171,047,800	6,170	11,200	14,000	17.154
Peymad	170,513,000	6,170	11,200	14,000	17.116
Medium Mills					
Buhler	292,202,000	6,170	21,600	27,000	15.758
Ardkar Sanat	221,659,800	6,170	21,600	27,000	13.146
Mahmachine	171,047,800	6,170	21,600	27,000	11.271
Peymad	170,513,000	6,170	21,600	27,000	11.251
Large Mills					
Buhler	292,202,000	6170	50,400	63,000	9.574
Ardkar Sanat	221,659,800	6170	50,400	63,000	8.454
Mahmachine	171,047,800	6170	50,400	63,000	7.651
Peymad	170,513,000	6170	50,400	63,000	7.643

iv. Average Additional Fortification Cost for Each Microfeeder Supplier

The next step was to calculate the average flour fortification cost for each microfeeder supplier (see table 7). This was done by multiplying the average additional per kilogram cost of flour fortification for each supplier for each mill category (from table 6) by number of the mills in that specific category and then dividing that number to the total number of mills (from table 5).

Table 7: Average Fortification Cost per Kg per Supplier of Feeders

		Size of Mills			Avg. Cost of Fortification for Each Supplier (note 1)
		Small	Medium	Large	
Avg. Annual Flour Production per Mill (MT)	>	11200	21600	50400	
No. of Mills	>	129	124	80	
Supplier		IRR	IRR	IRR	IRR

Buhler	25.808	15.758	9.574	18.166
Ardkar Sanat	20.769	13.146	8.454	14.972
Mahmachine	17.154	11.271	7.651	12.680
Peymad	17.116	11.251	7.643	12.656

Note 1: calculation guide for last column is as follows:
 small mill using Ardkar Sanat:
 $[(20.769 \times 129) + (13.146 \times 124) + (8.454 \times 80)] / (129 + 124 + 80)$

v. Average Cost of Flour Fortification

It is expected that 25% of mills will purchase microfeeders from Buhler, 15% from Ardkar Sanat, 40% from Mahmachine and 20% from Peymad. Based on this estimates and the respective cost of flour fortification by each supplier, the additional per Kilogram cost of flour fortification was calculated.

Table 8. Average Annual per Kilogram Cost of Flour Fortification

Micro-feeder Supplier	Average Cost of Flour Fortification by Supplier IRR	Estimated % of Mills purchasing from Each Supplier %	Average Annual Additional Cost of Flour Fortification IRR
Buhler	18.166	25%	4.54
Ardkar Sanat	14.972	15%	2.25
Mahmachine	12.680	40%	5.07
Peymad	12.656	20%	2.53
		Total	14.39

Based on the above calculations, it is estimated that the additional cost of flour fortification (Folic Acid and Iron only) to the government to be IRR 14'400 (approximately USD 1.60) per metric ton of wheat processed. This additional cost, excludes marketing campaign, public education programs, training which will be paid by government and outside the scope of this study. Appendix D provides similar calculations for additional cost of flour fortification with the premix that also includes Zinc and certain Vitamin Bs as well.

Appendix A:
Listing of Mills in Each Province and Their Annual Capacities

Mills in East Azarbayejan

	Name	Annual Capacity (MT)
1	Momtaze - Tabriz	10,800
2	Hashtrood	15,600
3	Khoosheh - Ajabshir	18,000
4	Laleh - Sarab	26,400
5	Gandomename - Mehraban	28,200
6	Iran	31,200
7	Sepid	31,200
8	Ettehad	33,600
9	Sabalan	36,000
10	Setareh	36,000
11	Sahand	36,000
12	FerdoseAhar	36,000
13	Kafili	38,400
14	Athar	39,600
15	Etminan	42,000
16	Ahar	43,200
17	Aharkar	43,200
18	Mahane-Derakhshan	48,000
19	Barekategandom	50,400
20	Baharan	50,400
21	Tabriz	50,400
22	Zorrat	51,840
23	Ardogandom	60,000
24	Sonbol	63,600
25	Mianehee	69,120
26	Milade - Marand	72,000
27	Zohreh - Bonab	90,000
28	Soofian	108,000
29	Tabrizkar	132,000
30	Arasmehr	360,000
	Total Annual Capacity	1,751,160

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

**Mills in West Azarbayejan
 Province**

	Name	Annual Capacity (MT)
1	Taavoni 13 (Sepide - Makoo)	21,600
2	Sepide - Qazaldasht	21,600
3	Taavoni 11 (Sepide - Khoy)	36,000
4	Taavoni 20 (Sepide - Salmas)	36,000
5	Taavoni 22 (Sepide - Naghadeh)	36,000
6	Mahmonire - Bookan	36,000
7	Sepide - Oroomieh	43,200
8	KhoosheheNaghadeh	50,400
9	Khooshehe Afshan	54,000
10	Sonbol	54,000
11	Bakhtareh - Oroomieh	64,800
12	Taravate - Miandoab	64,800
13	Ferdos	80,400
14	Shanli - Khoy	108,000
	Total Annual Capacity	706,800

Mills In Ardebil Province

	Name	Annual Capacity (MT)
1	Gandome - Nayer	24,000
2	Roshan	30,000
3	Nik	36,000
4	Salem	43,200
5	Sabalan (Taavoni 605)	43,200
6	Meshkinshahr	43,200
7	Moghan	43,200
8	Samian	72,000
9	Kazemi	108,000
	Total Annual Capacity	442,800

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Isfahan Province

	Name	Annual Capacity (MT)
1	Isfahankar	7,200
2	Setareh	19,440
3	Khabbazan	26,400
4	Sepahan	30,000
5	Baharestan	31,200
6	Behesht	36,000
7	Jamshid	43,200
8	Anooshiravan	48,000
9	Khoosheh	48,900
10	Roshane - Kashan	49,200
11	Zayandehrood	86,400
12	Shokoofehard	86,400
13	Sahra	86,400
14	Azimgolpa	86,400
15	Ghoncheh	86,400
16	Harand	86,400
17	Golard	90,000
18	Motahhar	108,000
19	Joreh	216,000
	Total Annual Capacity	1,271,940

Mills in Ilam Province

	Name	Annual Capacity (MT)
1	Alvare - Ilam	43,200
2	Darreshahr	43,200
3	Shahid Qazanfarie - Dehloran	43,200
4	Shirvan Va Chardavol	79,200
	Total Annual Capacity	208,800

Mills in Booshehr Province

	Name	Annual Capacity (MT)
1	Alzahra	43,200
2	Borazjan	129,600
	Total Annual Capacity	172,800

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Tehran Province

	Name	Annual Capacity (MT)
1	Vatan	10,800
2	Ettehad	14,400
3	Tehran	14,400
4	Shirazi	14,400
5	Pakard	36,000
6	Sanaye Arde - Varamin	36,000
7	Sarve - Karaj	37,440
8	Atlas	41,400
9	Iranno	43,200
10	Mavaddat	47,880
11	Pouinak	54,000
12	Setareh	54,000
13	Momtaz	54,000
14	Mansoobian	54,000
15	Vaziri	57,600
16	Mihan	58,320
17	Tehranbakhtar	60,000
18	Asiabegermez	64,800
19	Yas	64,800
20	Azarghalleh	72,000
21	Vahed	72,000
22	Amin	90,000
23	IranTak	90,000
24	Sefide - Varamin	90,000
25	Morshedi	90,000
26	Helianeh	90,000
27	Taban	108,000
28	Roshan	108,000
29	Zarrinkhoosheh	108,000
30	Sefideakbari	108,000
31	Asadi	144,000
32	Khooshehtalae	144,000
33	Iran	174,960
34	Ariakar	180,000
35	Azadegan	180,000
36	Nader	180,000
37	Take - Karaj	184,800
38	Markazi	196,800
39	Alborz	216,000
40	Kordane - Karaj	232,200

Appendix A:
 Listing of Mills in each Province and their Annual Capacities
 (continued)

Mills in Tehran Province (continued)		
	Name	Annual Capacity (MT)
41	Arddaran	360,000
42	Zare - Karaj	432,000
	Total Annual Capacity	4,468,200

Mills in ChahraMahale Bakhtiari Province

	Name	Annual Capacity (MT)
1	Chalicheh	36,000
2	Khooshezarrin	36,000
3	Hafshehjan	36,000
4	Taavoni 129	43,200
5	Khoosheh - Shahrekord	43,200
6	Kiar	54,000
	Total Annual Capacity	248,400

Appendix A:
Listing of Mills in Each Province and Their Annual Capacities
(continued)

Mills in Three Khorasan Provinces

	Name	Annual Capacity (MT)
1	Setareh beyhaghe-Sabzevar	28,800
2	Valsi - Sabzevar	28,800
3	Zarrin	36,000
4	Shariate - Bojnord	36,000
5	Sanaye - Birjand	36,000
6	Motie - Shirvan	36,000
7	Sarbedaran	50,400
8	Neginegole Shargh	50,400
9	Babarekat	54,000
10	Sefide - Neyshaboor	54,000
11	Kashtobardasht	54,000
12	Sefide - Kashmar	61,200
13	Jame Hesar	72,000
14	Reza - Qoochan	72,000
15	Reza - Mashhad	72,000
16	Sefide - Toos	72,000
17	Fajr	72,000
18	Qalandarabad	75,600
19	Qodse - Razavi	79,200
20	Meysame Setareh - Toos	85,200
21	Khorasan	86,400
22	Aseard	108,000
23	Bijane - Bojnord	108,000
24	Khooshetalaee	108,000
25	Silooye - Khorasan	108,000
26	Golbarga - Birjand	108,000
	Total Annual Capacity	1,752,000

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Khoozestan Province

	Name	Annual Capacity (MT)
1	Behbahan (Taavonie Isargaran)	32,400
2	Shoosh	36,000
3	Zomorode - Izeh	54,000
4	Masjedsoleyman	54,000
5	Falahat	63,000
6	Ahvaz	72,000
7	Khorramshahr	72,000
8	Javaneh	79,200
9	Shole - Dezfool	108,000
10	Khoozestan	192,000
11	Jonoob	194,400
	Total Annual Capacity	957,000

Mills in Zanjan Province

	Name	Annual Capacity (MT)
1	Tabane Khamseh	36,000
2	Daneh Zarrin	43,200
3	Fakhre - Zanjan	43,200
4	Gandomtalaee	72,000
5	Mahdasht	75,600
6	Minoo - Khorramdarreh	75,600
	Total Annual Capacity	345,600

Mills in Semnan Province

	Name	Annual Capacity (MT)
1	Sarcheshmehe - Shahrood	36,000
2	Damghan	51,600
3	Garmsar	60,000
4	Ardosaboos	64,800
5	Omide - Semnan	67,200
	Total Annual Capacity	279,600

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Sistan and Baloochestan Province

	Name	Annual Capacity (MT)
1	Golcharkh	12,960
2	Liona	20,040
3	Setareh - Iranshahr	37,200
4	Neshati	44,400
5	Kosar	54,000
6	Zabol	55,200
7	Taavoni 9 Iranshahr	59,880
8	Shahraki	68,400
9	Kangan	120,000
10	Zahedan-Ala	150,000
	Total Annual Capacity	622,080

Mills in Fars Province

	Name	Annual Capacity (MT)
1	Parvardeh	36,000
2	Sonboleh	36,000
3	Arabzadeh	36,000
4	Fasa	36,000
5	Nasre - Lamerd	36,000
6	Vahdate - Abadeh	43,200
7	Kamran	60,000
8	Naghshe Rostam	90,000
9	Asia	97,200
10	Khoosheh	108,000
11	Shabankareh	115,200
12	Sepidan	144,000
13	Sefide - Jahrom	144,000
14	Khabbaz ard	180,000
15	Eghlid	
	Total Annual Capacity	1,161,600

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Qazvin Province

	Name	Annual Capacity (MT)
1	Atrake - Booinzahra	36,000
2	Takestan	36,000
3	Maghzeqandom	37,200
4	Shamseazar	54,000
5	Behnan	84,000
	Total Annual Capacity	247,200

Mills in Qom Province

	Name	Annual Capacity (MT)
1	Qom	61,200
2	Derakhshan	64,800
	Total Annual Capacity	126,000

Mills in Kordestan Province

	Name	Annual Capacity (MT)
1	Sarvabad (Marivan)	34,200
2	Adami	36,000
3	Rizan	36,000
4	Sanandaj	36,000
5	Shafaghe - Divandareh	36,000
6	Karaftoo	36,000
7	Vahdat	36,000
8	Baneh	39,000
9	Fajr	43,200
10	Sahand	62,400
11	Golnam	64,800
	Total Annual Capacity	459,600

Mills in Kerman Province

	Name	Annual Capacity (MT)
1	Danehsa	21,600
2	Danehsayan	21,600
3	Sahebalzaman	52,800
4	Asban	56,400
5	Tavakkole - Rafsanjan	126,000
6	Goleard	126,000
	Total Annual Capacity	404,400

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Kermanshah Province

	Name	Annual Capacity (MT)
1	Gandomin	26,400
2	Zehtaban	30,360
3	Bakhtar	36,000
4	Bisotoon	36,000
5	Saeed	36,000
6	Taavoni 399 (Saba)	36,360
7	Shahr	39,600
8	Biglari	39,960
9	Atlas	53,100
10	Golchin	54,000
11	Khoosheh gandom	60,000
12	Salamat	64,800
13	Favayedi	90,000
	Total Annual Capacity	602,580

Mills in Kohgiluyeh and Boyer-Ahmad Province

	Name	Annual Capacity (MT)
1	Abshargostare - Yasooj	48,000
2	Maroon	97,200
	Total Annual Capacity	145,200

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Golestan Province

	Name	Annual Capacity (MT)
1	Qarecheh	10,800
2	Zavedi	12,000
3	Sedaghat(Khajenafs)	13,200
4	Bandar	14,400
5	Qareqarbaghi	14,400
6	Nik	17,760
7	Emam Hossein	19,800
8	Ramian	20,160
9	Irandasht	21,600
10	Aliabad	22,320
11	Aq Qalla	24,000
12	Keshavarz	24,480
13	Kalaleh	28,800
14	Shams	31,500
15	Hajighooshan	32,400
16	Hoseinie - Kordkooy	35,040
17	Atrak	36,000
18	Barekat	36,000
19	Tolooe fajr	36,000
20	Kordan Mahalleh	36,000
21	Galikesh	36,000
22	Telor	38,400
23	Talebi	39,600
24	Tabarestan	39,600
25	Yasaghi	43,200
26	Zahedi	46,800
27	Gonbad	55,800
28	Moshtari	66,600
	Total Annual Capacity	852,660

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Gilan Province

	Name	Annual Capacity (MT)
1	Gilan ard	21,600
2	Ahmadzadeh	25,200
3	Asgharnia(Gilankhoosheh)	36,000
4	Boojar	36,000
5	Tejarat	90,000
6	Saeede - Astara	90,000
7	Gilan Patang	90,000
8	Shad	108,000
	Total Annual Capacity	496,800

Mills in Lorestan Province

	Name	Annual Capacity (MT)
1	Edalat	14,400
2	Omid	24,000
3	Hafez	25,080
4	Zeraat	36,000
5	Setareh	36,000
6	Niloofar	36,000
7	Etminan	38,880
8	Sahra	43,200
9	Momtaz	43,200
10	Iran Ashayer	69,300
11	Khorram	78,000
12	Sepidkooh	80,400
	Total Annual Capacity	524,460

Appendix A:
 Listing of Mills in Each Province and Their Annual Capacities
 (continued)

Mills in Mazandaran Province

	Name	Annual Capacity (MT)
1	Pak	14,400
2	Khoosheh	18,000
3	Rezaee (Neka)	19,800
4	Soorak	21,480
5	Khaleghi	21,600
6	Delalat	28,800
7	Laleh	28,800
8	Memarian	28,800
9	Gandomkoob	32,400
10	Galoogah	34,200
11	Eslamhashtikeh	36,000
12	Dastas	36,000
13	Lala - Kiasar	36,000
14	Mahyae	36,000
15	Noor	36,000
16	Gandom talaee	39,600
17	Kosar (Mahmood Babak)	40,800
18	Banafsheh	48,000
19	Nemooneh - Jooybar(Zahedi)	72,000
	Total Annual Capacity	628,680

Mills in Markazi Province

	Name	Annual Capacity (MT)
1	Visaran	28,800
2	Haftsavarar	36,000
3	Tak	54,000
4	Poosan	72,000
5	Khoosheh	72,000
6	Sefid	75,600
7	Minaee	86,400
	Total Annual Capacity	424,800

Appendix A:
Listing of Mills in Each Province and Their Annual Capacities
(continued)

Mills in Hormozgan Province

	Name	Annual Capacity (MT)
1	Taavoni 183 (Sadaf)	14,400
2	Taleghani	36,000
3	Mojtaba Shafiee	36,000
4	Khatam	108,000
5	Asiabab	252,000
	Total Annual Capacity	446,400

Mills in Hamedan Province

	Name	Annual Capacity (MT)
1	Etminan	14,400
2	Momtaz	14,400
3	Novine - Tooiserkan	18,000
4	Ekbatan	27,000
5	Gole gandom	43,200
6	Malayer	43,200
7	Nahavand	51,840
8	Marianajkar	72,000
9	Sina	90,000
10	Rakhshan ard	108,000
	Total Annual Capacity	482,040

Mills in Yazd Province

	Name	Annual Capacity (MT)
1	Pars	24,000
2	Khooshehe - Mehriz	24,000
3	Saadat	24,000
4	Danehsa	36,000
5	Roshan	72,000
	Total Annual Capacity	180,000

Appendix B:
Various Micro-Feeders Recommended by the Federation

Manufacturer	Description		Price in IRR
	Micro-Feeder	Scale/Flow Meter	
Ardkar Sanat	IDVC (Italian)	RC100 Scale (German)	151,401,000
Buhler	MSDL80 (Swiss)	MS DE 70120 Scale (Swiss)	263,000,000
Peymad	Peymand	Peymad Flow Meter	88,500,000
Mahmachine	VFM-300	RTM10 Scale	89,540,000

1 USD = 9100 IRR (approximately)

Appendix C:
Listing of Necessary Laboratory Equipment for Flour Fortification

No.	Laboratory Glassware	Qty.
1	Watch Glass 10cm diameter or 12x8cm	10
2	Graduated Pipettes 1cc	5
3	Graduated Pipettes 5cc	5
4	Volumetric Flask 100 cc	4
5	Burette 25 ml	25
6	Pipetting Balls	2

No.	Description of Chemicals	Qty.	Unit
1	Hydrochloric Acid 37% Merck No. 317	1	Litre
2	Hydrogen Peroxide 30 %Merck No. 7209	1	Litre
3	Potassium Thiocyanate(kscn) Merck No. 5124	100	Grams

Appendix D.

Calculation for Additional Cost of Flour Fortification with Premix Containing Zinc and Certain Vitamin Bs in Addition to Folic Acid and Iron.

The calculations performed in this appendix considers the impact of using a pre-mix which would also include Zinc and certain Vitamin Bs in addition to Folic Acid and Iron.

The price of 1Kg. of this pre-mix is estimated to be \$1.20. It is important to note that the price of pre-mix used for this calculation was furnished by Mr. Mubashar Sheikh of WHO, based on estimates of Messrs. Quentin Johnson and Jack Bagriansky of STC.

Table 6a: Additional Cost of Flour Fortification to Mills per kg of Wheat Processed

Supplier	Annual Fixed Cost of Installing & Operating Fortification Equipment (see table 4) A IRR	Price of Premix per Ton (see table 4) B IRR	Ann. Avg. Flour Prod. per Mill (see table 5) C MT	Ann. Avg. Wheat Proc. per Mill (see table 5) D MT	Addnl. per kg Cost of Fort. of Wheat Processed [A+(BxC)]/D IRR
Small Mills					
Buhler	292,202,000	10,800	11,200	14,000	29.512
Ardkar Sanat	221,659,800	10,800	11,200	14,000	24.473
Mahmachine	171,047,800	10,800	11,200	14,000	20.858
Peymad	170,513,000	10,800	11,200	14,000	20.820
Medium Mills					
Buhler	292,202,000	10,800	21,600	27,000	19.462
Ardkar Sanat	221,659,800	10,800	21,600	27,000	16.850
Mahmachine	171,047,800	10,800	21,600	27,000	14.975
Peymad	170,513,000	10,800	21,600	27,000	14.955
Large Mills					
Buhler	292,202,000	10800	50,400	63,000	13.278
Ardkar Sanat	221,659,800	10800	50,400	63,000	12.158
Mahmachine	171,047,800	10800	50,400	63,000	11.355
Peymad	170,513,000	10800	50,400	63,000	11.347

Table 7a: Average Fortification Cost per Kg per Supplier of Feeders

	Size of Mills			Avg. Cost of Fortification for Each Supplier (note 1)
	Small	Medium	Large	
Avg. Annual Flour Production per Mill (MT)	11200	21600	50400	
No. of Mills	129	124	80	
Supplier	IRR	IRR	IRR	IRR
Buhler	29.512	19.462	13.278	21.870
Ardkar Sanat	24.473	16.850	12.158	18.676
Mahmachine	20.858	14.975	11.355	16.384
Peymad	20.820	14.955	11.347	16.360

Note 1: calculation guide for last column is as follows:

small mill using Ardkar Sanat:

$$[(24.473 \times 129) + (16.850 \times 124) + (12.1584 \times 80)] / (129 + 124 + 80)$$

Table 8a. Average Annual per Kilogram Cost of Flour Fortification

Microfeeder Supplier	Average Cost of Flour Fortification by Supplier IRR	Estimated % of Mills purchasing from Each Supplier %	Average Annual Additional Cost of Flour Fortification IRR
Buhler	21.870	25%	5.47
Ardkar Sanat	18.676	15%	2.80
Mahmachine	16.384	40%	6.55
Peymad	16.360	20%	3.27
Total			18.09

Based on the above figures and calculations, we can estimate that the additional cost of flour fortification will be IRR 14'400 (approximately USD 1.6) per metric ton of wheat processed, if "Folic Acid and Iron" only premix is used and IRR 18'100 (approximately USD 2.0) per metric ton of wheat if the "enriched" premix is used instead.

CURRICULUM VITAE

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PROFESSIONAL ACTIVITIES & EMPLOYMENT (1979 – Present)

(Almost all positions held simultaneously in Tehran, Iran unless otherwise indicated)

1979 – Present	Member of the Board of Directors and Vice President of Taban Flour Mills Company
1988 - Present	Advisor to the Self Sufficiency and Research Center for Flour Milling, Baking and Related Industries
1988 - 1990	Co-Founder and Member of the Board of Directors of the Industrial Research Complex of Iran
1987 - 1989	Co-Founder of the Association of Scientific and Industrial Research Centers of Iran; also served as Member of the Leadership council and Member of the Board of Directors for this association in 1989
1990 – Present	Member of the Board of Directors and President of Iran-Ardin Company
2000 – Present	Deputy General Secretary for the Federation of Iranian Associations of Flour Milling Industry
2000 – Present	Member of the Board of Trustees and Member of the Board of Directors of the Food Science and Technology School of Higher Education (Hashtgerd, Iran); the institute offers an Associate of Science degree training program for undergraduate students interested in food science and technology
2001 – 2003	Member of the Social Security High Council of Iran
2001 – Present	Managing Director of Research and Engineering Services, Inc. Flour Milling, Baking & Related Industries

2002 – Present Member of the International Association of Operative Millers
(IAOM), Leawood, Kansas

NATIONAL & INTERNATIONAL CONFERENCE PARTICIPATION & LEADERSHIP POSITIONS (1990 – Present)

2005 Participated in the 16th Annual National Congress on Food Industries, Tehran Iran. Note I have attended nearly all of the conferences and have served either as a member of the Scientific Board or Executive Panel for those meetings.

2004 Served as a Member of the Executive Committee, IAOM Middle East & Africa (MEA) Division conference held in Tehran.

2004, 2003 & 2002 Attended the IGC Conferences held in London, England

2003 Participated in the IAOMMEA Division meeting held in Dubai, United Arab Emirates (UAE)

1990 Acted as Conference Secretary for the First Self-Sufficiency & Research Center for Milling, Baking & Related Industries meeting

PROFESSIONAL ASSOCIATION MEMBERSHIPS & LEADERSHIP OR EMPLOYMENT POSITIONS HELD PRIOR TO 1979 (All positions held in Tehran, Iran)

1978 Manager of the Quality Control Laboratory for Pars Pharmaceutical Factory

1978 Manager of the Quality Control Laboratory for the Minoo Industrial Group

1979 Manager of the Research & Development Department for the Minoo Industrial Group

PUBLICATIONS (ORIGINAL & TRANSLATED BOOKS)

(Note all publications listed below were published by the Self Sufficiency & Research Center for Milling Baking & Related Industries sponsored by the Federation of Iranian Associations of Flour Milling Industry headquartered in Tehran, Iran)

(Original Farsi Language Publications)

Izadyar, J., Yazdjerdi, H. & Samaii, M. *Wheat, Flour & Bread*, 1995.

Yazdjerdi, H. *Proceedings of the First Self-Sufficiency & Research Center for Milling, Baking & Related Industries Conference*, 1991.

(Translations of English Language Texts to Farsi)

Yazdjerdi, H. & Samii, M. *Wheat Impurities and Their Effect on Cleaning Processes During Flour Milling*, 1991.

Ahmadzadeh, K. & Yazdjerdi, H. *Nutritional Value of Wheat Flour as Affected by the Rate of Extraction*, 1989.

Yazdjerdi, H. *Desirable Factors in Production of Macaroni*, 1988.

Yazdjerdi, M. & Yazdjerdi, H. *Trying to Reach a Common Approach in the Self-Sufficiency & Research Center for Milling, Baking & Related Industries Center*, 1988.

PRESENT VOLUNTEER COMMUNITY SERVICE LEADERSHIP POSITIONS (All positions simultaneously held in Tehran, Iran); 1990 - Present

- | | |
|----------------|--|
| 1990 – Present | Member of the Board of Trustees and Member of the Board of Directors of The Charitable Institute of Gholamreza Yazdjerdi (organization founded and directed by father). This institute provides housing, healthcare and educational centers for mentally retarded, brain damaged, blind, deaf and mute children in Iran. |
| 2000 – Present | Member of the Board of Trustees for the <u>Yazdjerdi Koran</u> Preservation Project. This Koran, measuring 1.92 by 1.22 meters, is the single largest handwritten original book in the world and is currently on display in the National Library of Iran in Tehran. The display also highlights work being done by The Charitable Institute of Gholamreza Yazdjerdi to give extensive assistance to disabled Iranian children. |
| 2003 – Present | Member of the Board for The Vardovard Center for Limited (Dental & Mandibular) Surgery on Disabled Children (Vardovard, Tehran Province, Iran). |

EDUCATIONAL TRAINING

- 1972 Bachelor of Science (B.Sc.) degree in Chemistry awarded by National University of Iran, now known as Shahid Behesti University (Tehran, Iran)
- 1978 Doctor of Philosophy (Ph.D.) degree in Chemistry awarded by the Victoria University Faculty of Technology (Manchester, England)

PHD DISSERTATION

- Advisor: R. Thompson, Ph.D.
- Title: Spectroscopic Methods for Identification of Chemicals

LANGUAGE SKILLS

- Native proficiency in Farsi (Persian)
- Advanced user of English (Second Language)

فهرست پاره ای از نشریات هسته

* کوششی به منظور ایجاد نگرش مشترک در هسته خودکفایی - تحقیقاتی صنایع آرد و نان
دکتر حسین یزدجردی - دکتر محسن یزدجردی شهریور ۱۳۶۷

* گزارش سالانه هسته خودکفایی - تحقیقاتی صنایع آرد و نان آبان ۱۳۶۷

* ارزش غذایی گندم
مهندس خسرو احمدزاده شاد شهریور ۱۳۶۷

* درجه نرم بودن محصولات آسیاب شده گندم " دوروم " از نقطه نظر یک تولید کننده ماکارونی
مهندس خسرو احمدزاده شاد شهریور ۱۳۶۷

* عوامل مطلوب در تولید فرآورده های ماکارونی
دکتر حسین یزدجردی آبان ۱۳۶۷

* گزارش گردهمایی (مجمع عمومی) دی ۱۳۶۷

* ارزش غذایی آرد گندم با تاکید بر تاثیر درجه استخراج
مهندس خسرو احمدزاده شاد - دکتر حسین یزدجردی اردیبهشت ۱۳۶۸

* درصد استخراج آرد و اثر آن بر روی ارزش غذایی نان
مهندس محمد سمیعی خرداد ۱۳۶۸

* ناخالصی های گندم و چگونگی عملیات بوجاری در جریان آردسازی
مهندس محمد سمیعی - دکتر حسین یزدجردی اردیبهشت ۱۳۶۹

* سیر تکاملی نان در جهان
دکتر ناصر رجب زاده - مهندس محمد سمیعی اسفند ۱۳۶۹

* مجموعه سخنرانی ها و مقالات ارائه شده در اولین سمینار هسته خودکفایی - تحقیقاتی صنایع
آرد و نان اسفند ۱۳۷۰

* گندم - آرد - نان
جعفر ایزدیار - مهندس محمد سمیعی - دکتر حسین یزدجردی فروردین ۱۳۷۴

* طرح گسترش سیلوهای کشور
جعفر ایزدیار ۱۳۷۴

* برآورد حجم تقاضای نان بدون یارانه (ماشینی)
جعفر ایزدیار آبان ۱۳۷۵

* بازارهای جدید آسیابانی
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* کیفیت گندم های ایران
محمد سمیعی شهریور ۱۳۸۳



هسته خود کفایی، تحقیقاتی صنایع همگن آرد و نان

برنامه ملی
غنی سازی آرد
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ارزیابی صنعت آرد کشور

و تحلیل هزینه های غنی سازی

تهیه و تدوین :

دکتر حسین یزد جردی

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