Latin America and Caribbean: Wheat Flour Industry and Flour Fortification Situation Assessment

The Micronutrient Initiative

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The information used in this summary report is extracted from a comprehensive report entitled "Latin America and Caribbean Region Food Industry Assessment" being prepared by the Micronutrient Initiative [1]

[1] for the International Centre for Diarrhoeal Disease Reseach, Bangladesh as part of the Mainstreaming Nutrition Initiative supported by the World Bank

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Executive Summary

The objective of this activity undertaken by the Micronutrient Initiative was to prepare a summary of the different aspects of the wheat flour industry in Latin America and Caribbean. It includes production, importation, exportation, flour fortification, and consumption of flour food products as well as commerce between countries in the region and between countries and other continents and trade agreements that affect or may affect the market of wheat flour in the region. An understanding of the industry in a region where flour fortification is in place for more than a decade is envisaged to identify ways to strengthen successful implementation and support areas that need improvement to ensure adequate and sustainable fortification of all industrially milled flour.

While wheat and corn are widely consumed staples in the region this report focuses on wheat flour. Per capita consumption varies from 72 g flour /person/day in Central America to : 110 g /person/day in South America. The extraction rates in the region remove most of the micronutrients present necessitating restoration and enrichment of the flour through fortification.

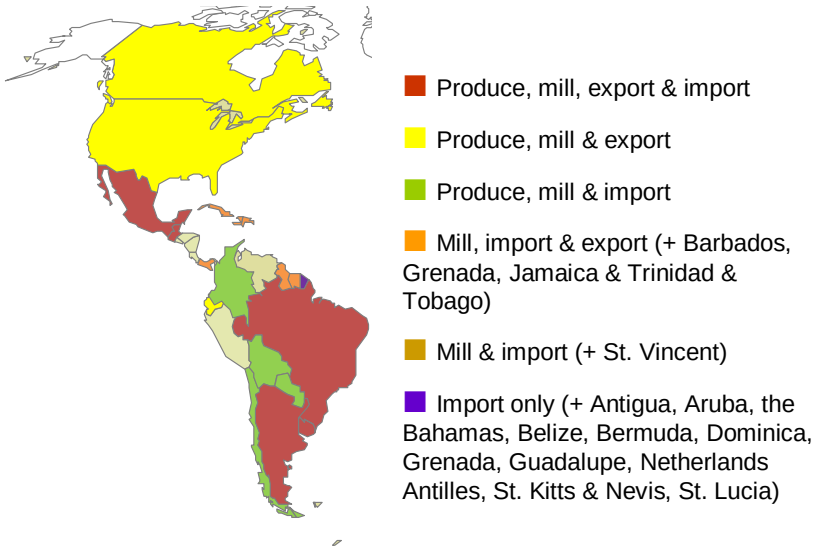
Wheat flour fortification is almost universal & mandatory in most countries of the region. This is facilitated by the fact that the milling industry is well organized, with modern milling facilities and willingness to fortify. Over the past decade the mills have integrated fortification well within their systems. Premixes are readily available and the low incremental cost is absorbed as part of the cost of flour. However although this is an inexpensive public health measure, fortification levels may not be sufficient in low consumption countries and sub/populations to effect significant impact on iron stores and anemia prevalence

Industry Situation and Trade Flow

The wheat flour industry includes countries that:

- Produce, mill, export and import: Argentina, Brazil, Guatemala, Mexico, Uruguay
- Produce, mill and export: Ecuador,
- Produce, mill and import: Bolivia, Chile, Colombia, Paraguay
- Mill, import and export: Barbados, Costa Rica, El Salvador, Grenada, Honduras, Jamaica, Nicaragua, Peru, Trinidad & Tobago, Venezuela
- Mill and import: Cuba, the Dominican Republic, Guyana, Haiti, Panama, St. Vincent, Suriname,

- Import only: Antigua, Aruba, the Bahamas, Belize, Bermuda, Dominica, Grenada, Guadalupe, the Netherlands Antilles, St. Kitts & Nevis, St. Lucia, French Guiana



Most of the wheat is milled in modern industrial mills, where extraction levels varies from 72 to 76%, the most common being 74 %, even though in the Caribbean the average drops to around 70%.

The installed milling capacity in Latin America and the Caribbean exceeds the demand, thus the inefficiency in the industry. Pricing/cost and donations of wheat – and sometimes of wheat flour – are also a factor in the operation or not of mills in countries like Peru, Bolivia, Ecuador and others. In Brazil, for example, of the 198 mills mentioned, only 98 are producing at their capacity (ABITRIGO Presentation at ALIM 2002), the other mills produce once in a while or in some instances are closed for several years and then re-started.

The structure of the flour milling industry within the region can be categorized in five groupings: multinational firms, large-scale firms, medium-sized firms, small-scale firms, and micro-sized firms. Several multi-nationals have milling facilities in strategic parts of the region and therefore their products are being widely distributed.

In additional to the multi-nationals which operate milling facilities and trade wheat flour within the region (bulk & packaged) some international and

national milling operators supply both wholesale and retail ready flour to neighboring countries.

Barbados imported approx. 22 million kilos of wheat in 2004 and exported over 5 million kilos of wheat flour to neighboring countries including Dominica, Grenada, St. Kitts & Nevis, Saint Lucia and Trinidad & Tobago while in turn importing over 1 million kilos of wheat flour from St. Vincent and Trinidad & Tobago.

Similarly, Grenada, which imported approx. 7 million kilos of wheat in 2004, exported substantial volumes to Dominica, St. Kitts & Nevis, Saint Lucia and Trinidad & Tobago.

As much as the Caribbean countries trade largely among themselves (as seen in the trade flow charts below) a similar trend is seen among the countries in Central America and with Mexico. For example, in 2004 Nicaragua and Guatemala both exported substantial quantities to Costa Rica, El Salvador and Honduras. In turn, Mexico shipped to Belize and Guatemala while still being an importer.

In both the Andean and the Southern Cone regions, the flow of trade remains primarily within the regions with exception of exports to Cuba. Argentina is the primary exporter as Brazil, also a large wheat producer, has to import to meet national demand.

Importer	Net Weight (kg)	Main Supplier/s
Aruba	376,140	Trinidad, Venezuela
Barbados	1,049,313	St Vincent, Trinidad
Cuba	20,372,342	Argentina, Mexico
Dominica	4,079,467	Barbados, St. Vincent, Trinidad
Grenada	403,276	Barbados
Jamaica	5,163,483	Trinidad & Tobago
Saint Kitts and Nevis	1,520,828	Grenada
Saint Lucia	8,772,904	Barbados, Grenada, St. Vincent
Saint Vincent	10,250	Mexico
Suriname	100,730	Trinidad & Tobago
Trinidad and Tobago	1,578,986	Jamaica
Belize	22,680	Mexico
Costa Rica	16,700,312	El Salvador, Nicaragua
El Salvador	7,411,120	Guatemala, Nicaragua
Guatemala	15,464,023	El Salvador, Mexico

Honduras	8,145,147	Nicaragua
Mexico	374,880	Ecuador
Nicaragua	17,341,640	Costa Rica
Bolivia	70,952,374	Argentina, Paraguay, Peru
Venezuela	1,056,000	Colombia
Argentina	1,440,003	Peru
Brazil	11,162,609	Argentina, Uruguay
Chile	5,136,957	Argentina
Uruguay	253,000	Argentina
SOURCE: COMTRADE 2004		

Although some of the main exporters are wheat producing countries, it should be noted that many countries import wheat for milling as well as wheat flour and that there is substantial movement of wheat flour within the regions. In addition some wheat producing countries, such as Argentina, Brazil and Mexico, are supplementing their requirements with wheat flour imports. This is a strong indication that, if all wheat flour processed in LAM were to be fortified then the carry-over effects of mandatory, monitored and enforced fortification should provide nutritional benefits throughout the entire region.

Case Studies Industry Players

Argentina, on average the second largest wheat exporting country second to the USA, has producers currently weighing the risk of more government restrictions, such as export bans and price controls. The wheat planted area will depend heavily on producer's confidence in the lifting of the export registration ban and the effect new subsidy programs will have on the wheat production chain. Some analysts forecast wheat area will be down 15 percent from last year due to the wheat export ban that was reinstated at the beginning of March 2007.

A new system of subsidies has been put in place to control the domestic wheat supply to the milling industry and, in turn, control consumer bread, pasta, and flour prices. However, an export ban could have a major impact on the regions importers which in 2004 included Bolivia, Brazil, Chile, Cuba and Uruguay and accounted for 90 million kilos of Argentina's exports of wheat flour. It is also important to note that contraband wheat flour is being shipped to neighboring countries.

Brazil is both a large producer and consumer of wheat flour. Brazil imports, on average, about 5 million tonnes of wheat from Argentina, however,

Argentina does not have sufficient quantities of wheat to supply Brazil, made even more evident by the closed export registry, which will require Brazilian wheat millers to look outside of Mercosur.

Recently Brazilian millers have been faced with higher input costs and significant competition from Argentine wheat flour. If the Argentine government does not equalize its export registration policy and differential export taxes, it is expected that wheat flour imports will continue to rise as a percentage of total wheat imports, likely leading to some consolidation in the Brazilian milling industry.

In **Chile**, an increase in wheat planting intentions calls for a larger output which should result in smaller imports when compared to previous years. Wheat is politically Chile's most important annual crop. There are an estimated 89,000 producers, of which a little over 10,000 producers are in the so-called subsistence group with little or no alternative crops (production).

The milling industry is Chile's main wheat destination. An estimated 85 percent of total wheat supply (domestic production plus imports – mainly from Argentina) is milled for flour. An estimated 80 percent of wheat flour is sold directly and produced by 85 milling facilities nationwide. Industry sources indicate that the wheat produced in Chile is in general of a lower quality than that required by the bread and pasta industry. It is mainly low in protein and the quality varies a lot.

The wheat and wheat flour industries in **Uruguay** are much smaller in comparison to Argentina, Brazil & Chile however still plays an important role in the region and on the export market although also relying on imports to supplement supplies.

Mexico is a net importer of wheat and wheat flour. Although Mexican wheat production[2] for MY 2007/08 is forecast at 3.26 million tonnes with bread wheat being produced in the states of the central plateau, the demand for wheat and wheat flour far outweighs the local production.

Wheat flour mills operate throughout the region and trade exists among the regions countries, however, imports from large wheat producing countries supplement local capacity where needed.

[2] USDA GAIN Report – MX7024

Primary Imports from non-LAC countries

Importer	Net Weight (kg)	Main Supplier/s
Bahamas	5,601,437	Canada, USA
Bermuda	1,116,996	Canada, USA
Bolivia	17,354,800	USA
Chile	5,730,984	Netherlands, Spain
Colombia	564,687	USA
Cuba	87,766,609	France, Italy, Spain
Dominican Rep.	1,198,374	USA
Ecuador	238,773	France, Spain
Haiti	35,987,565	Netherlands, USA
Honduras	1,401,437	USA
Mexico	28,833,518	USA
Netherlands. Antilles	5,555,885	Belgium, Canada, Netherlands, USA
Panama	1,257,750	USA
Peru	3,014,327	Canada
Saint Lucia	557,886	Canada
Suriname	15,653,910	Netherlands
Trinidad &Tobago	2,566,217	Germany, Netherlands
Venezuela	661,710	Spain

The USA and Canada as well as several European countries supply substantial quantities of wheat flour to both Latin America and the Caribbean with Cuba being the single largest importer. All the exporting countries having stringent fortification regulations and practices and the importing countries have fortification legislation.

Trade Agreements

Trading blocks, such as the Caribbean Community and Common Market (**CARICOM**) offer duty-free access to many of the eastern Caribbean islands for other member states. In general, the region is characterized by relatively liberalized import policies for regional production, on both raw materials and already processed commodities, which encourage regional trade. As well, there are established and efficient supply chain systems.

DR-CAFTA, the Free Trade Agreement that five nations of Central America (Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua) and the Dominican Republic have signed with the U.S., promises to increase trade and investment, boosting economic growth and poverty reduction in Central America.

ALADI (ASOCIACIÓN LATINOAMERICANA DE INTEGRACIÓN / ASSOCIAÇÃO LATINO-AMERICANA DE INTEGRAÇÃO) is the largest Latin-American group of integration. It has twelve member countries: Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela, totaling 20 million sq km and more than 493 million people.

The ALADI promotes the creation of an area of economic preferences in the region, aiming at a Latin-American common market.

The **Andean Community Nations (CAN)** consists for four member countries – Bolivia, Colombia, Ecuador and Peru. Venezuela was a founding member however is not currently indicated as a member.
The CAN has completed a "block to block" trade agreement with MERCOSUR. Under the MERCOSUR-CAN agreement, member countries agreed to liberalize 80 percent of the tradable products between the two blocks, reducing to zero at the end of 10 years. Products considered "sensitive" (such as wheat for the CAN) will have their tariffs reduced in 15 years. This agreement was finalized in October 2004 and was scheduled to enter into force in January 2005.

Mercosur or Mercosul is a Regional Trade Agreement (RTA) between Brazil, Argentina, Uruguay and Paraguay. Bolivia, Chile, Colombia, Ecuador and Peru currently have associate member status. Venezuela signed a membership agreement on 17 June 2006, but before becoming a full member, its entry has to be ratified by the Paraguayan and the Brazilian parliaments.

Domestic and Mercosur companies are the largest sellers to local food processors. Mercosur companies benefit from a tax free trade agreement among the member countries, therefore are able to compete with local suppliers. Exports of ingredients from non-Mercosur countries do occur, but the market is clearly more challenging for due to weight of import tariffs.

Consumption

The main staple foods consumed in the region are wheat, maize, and rice. Per capita supply of wheat varies considerably in the region. In those countries with low wheat supply (Central America and Mexico), maize or rice are staples. There is a tendency of increased consumption of wheat flour products even in countries that traditionally consume maize. This is because of consumer choice and increasing availability of wheat flour

products. Wheat flour and foods manufactured from wheat flour, such as pasta, are becoming food staples and consumption is fairly stable despite fluctuations in the international markets.

Country	Per capita supply flour cal/day FBS 2002	Supply wheat flour/day,grams, FBS, calculated using 3.64 cal/g	Consumption, grams wheat flour/day, assume 10% wastage
Antigua Barb	482	132	119
Argentina	802	220	198
Bahamas	385	106	95
Barbados	572	157	141
Belize	558	153	138
Bolivia	358	98	89
Brazil	354	97	88
Chile	909	250	225
Colombia	210	58	52
Costa Rica	337	93	83
Cuba	429	118	106
Dominica	528	145	131
Dominican Republic	203	56	50
Ecuador	233	64	58
El Salvador	230	63	57
Grenada	401	110	99
Guadalupe*		150	135
Guatemala	231	63	57
Guyana	421	116	104
Haiti	312	86	77
Honduras	236	65	58
Jamaica	567	156	140
Mexico	272	75	67
Netherlands Antilles	563	155	139
Nicaragua	192	53	47
Panama	297	82	73
Paraguay	142	39	35
Peru	374	103	92
St Kitts & Nevis	394	108	97
St. Lucia	703	193	174
St. Vincent	600	165	148
Surinam	402	110	99
Trinidad Tobago	675	185	167
Uruguay	737	202	182
Venezuela	334	92	83

* Consumption estimated
Wheat Flour Consumption estimated from 2002 FAO FBS

Case Studies Consumer Countries

Per capita consumption in **Bolivia** is relatively low with an estimated 60 percent of the population living below the national poverty line.

Many efforts in Bolivia to fortify commodities have been partially successful, and many reasons exist for the lack of total success. Some of them are politically motivated, as well as the fact that the government has not been able to control contraband wheat flour from neighboring countries, thus affecting the local industries.

Bread consumption in **Peru** continues to be very small. According to industry officials Peruvian per capita consumption is around 26 kilograms per annum. With 10 kilograms per capita, Peru continues to be the second largest pasta consumer in South America.

The fortification efforts in Peru have been many. Just as in many other of the Latin American countries, Peru has made the efforts mainly one sided by the wheat milling industry. In the areas of quality assurance – control, surveillance and monitoring – the weakness is a lack of enforcement and this area is one which deserves much attention. This, in addition to contraband wheat flour from Argentina, has circumvented attempts to ensure that all flour sold and consumed in Peru be fortified.

Paraguay is being faced with stagnant or declining per capita consumption and heavy competition from illegal imports of Argentine flour. It is estimated that Argentine imports account for about 25% of the market therefore avoiding the Argentine export tax on wheat and wheat flour.

Since a large percentage of the population derives its living from agricultural activity, often on a subsistence basis, achieving 100% fortification could be difficult taking into account that there are many micro-sized (artisan) mills operating as well as the contraband flour shipments.

Fortification Status

In the developing world the LAC countries are leaders in food fortification due to their well-developed food industries; growing urbanization and the use of industrially processed foods; government and public acceptance of

food fortification with micronutrients; and the pages of legislation to support fortification efforts[3].

The data in this following table has been obtained from the private sector, then confirmed with Micronutrient mix suppliers and verified with existing legislation.

	FORTIFICATION STATUS AND COMPOUNDS USED			
Country	Fortification Compulsory	Iron Compound	Level	Current folic acid fortification level, if any
Argentina	YES	Ferrous sulfate	30 as Fe	2.2
Barbados	YES	Not defined	>29 or <46	NO
Belize	YES	Reduced Iron	60	1.5
Bolivia	YES	Reduced Iron	60	1.5
Brazil	YES	Reduced Iron	42	1.5
Chile	YES	Ferrous sulfate	30	up to 2.4
Colombia	YES	Reduced Iron	44	1.5
Costa Rica	YES	Reduced Iron	60	1.5
Cuba	YES	Reduced Iron	45	2.5
Curacao*	YES	Not defined	>29 or <46	NO
Dominican Republic	YES	Ferrous Fumarate	60	1.8
Ecuador	YES	Reduced Iron	55	0.6
El Salvador	YES	Reduced Iron	55	up to 1.8
Grenada	YES	Not defined	>29 or <46	NO
Guatemala	YES	Reduced Iron	55	up to 1.8
Guyana	YES	Not defined	>29 or <46	NO
Haiti	YES	Not defined	>29 or <46	1.5
Honduras	YES	Reduced Iron	55	up to 1.8
Jamaica	YES	Reduced Iron	44	1.5
Mexico	YES	Reduced Iron	35	2.0
Nicaragua	YES	Reduced Iron	55	up to 1.8
Panama	YES	Reduced Iron	60	1.5
Paraguay	YES	Ferrous sulfate	45 as Fe	up to 3.3
Peru	YES	Reduced Iron	28	NO
Puerto Rico	YES-voluntary	As in CODEX		1.5
St. Vincent	YES	Not defined	>29 or <46	NO
Surinam	YES	Not defined	>29 or <46	NO
Trinidad Tobago	YES	Not defined	>29 or <46	NO
Uruguay	YES	N/A		2.4
Venezuela	YES	Ferrous Fumarate	20 as Fe	NO

[3] Health in the Americas, 2002 Edition, Volume 1 - Promoting Health in the Americas - page 184

It is important to note that overall the installed capacity in the region is notably more than the utilized milling capacity, which makes for a not very efficient industry. On top of this wheat flour is a commodity with very small margins which makes any price increase difficult to absorb. Yet, fortification represents a very small percentage of the cost has been embraced in many instances by the industry, with minor price increases to the consumers.

Successful Fortification

It appears that all LAC countries have flour fortification programs in place. In the Americas, the flour millers are well-developed and organized. Many of the wheat flour millers participate in the Latin American Association of Industrial Millers (Asociación Latinoamericana de Industrias Molineros, ALIM) or the Caribbean Millers' Association. In 1997, at the ALIM General Assembly held in Lima, Peru, all of the association millers agreed to support the mandatory fortification of wheat flour, thereby committing to promote national legislations for mandatory fortification and work jointly with the health authorities to develop them[4].

In addition to the indispensable role of individual flour millers in the national food fortification programs and given their commitment and support of food fortification as a public health measure, the associations of industrial millers in Latin America and the Caribbean hold an important role in promoting and enabling effective flour fortification throughout the Region, particularly by tapping expertise and resources in technology transfer, business development, fair trade and marketing in support of food fortification.

The government's role still has to be seen as the most important contributor to the sustainability of fortification programs. The activity of food control, inspection and surveillance, as well as assessment of the epidemiological conditions before and after the establishment of the programs is essential to evaluate the effectiveness and success of fortification.

Legislation for wheat flour fortification should encompass the entire supply chain where it is either used in further processing and/or manufacturing. Argentina has gone so far as to mandate the use of enriched/fortified flour in all products destined for domestic production, both locally-manufactured and imported.

In several countries the lack of or weak quality control, supervision, and surveillance were identified as major obstacles to the effectiveness and

[4] PAHO Report FCH/NU/49-24/04

sustainability of programs. In an effort to overcome these limitations, plans and procedures must be put in place and enforced.

	MANDATORY / VOLUNTARY	% OF WHEAT IN THE COUNTRY FORTIFIED	% OF WORLD
Argentina	Mandatory	100.0%	1.166%
Barbados	Mandatory	100.0%	0.005%
Belize	Mandatory	100.0%	0.005%
Bolivia	Mandatory	100.0%	0.116%
Brazil	Mandatory	100.0%	2.403%
Chile	Mandatory	100.0%	0.504%
Colombia	Mandatory	100.0%	0.338%
Costa Rica	Mandatory	100.0%	0.049%
Dominican Republic	Mandatory	60.0%	0.031%
Ecuador	Mandatory	100.0%	0.108%
El Salvador	Mandatory	100.0%	0.050%
Grenada	Mandatory	100.0%	0.001%
Guatemala	Mandatory	100.0%	0.107%
Guyana	Mandatory	100.0%	0.012%
Honduras	Mandatory	100.0%	0.054%
Mexico	Mandatory	100.0%	1.035%
Nicaragua	Mandatory	100.0%	0.036%
Panama	Mandatory	100.0%	0.033%
Paraguay	Mandatory	100.0%	0.031%
Peru	Mandatory	100.0%	0.408%
St. Vincent	Mandatory	50.0%	0.001%
Surinam	Mandatory	100.0%	0.006%
Trinidad Tobago	Mandatory	50.0%	0.016%
Uruguay	Mandatory	100.0%	0.096%
Venezuela	Mandatory	100.0%	0.313%
Total for All Countries			6.926%
Total Metric Tons of Flour Consumed Worldwide:			361871.2

Pre-mixes

All countries use industrial premixes except Peru where only iron is being added to wheat flour. Most countries include the traditional premix

containing thiamin, riboflavin, and niacin, with the recent addition of folic acid [5].

Complete data on premix vendors is available for every country and this preliminary point is critical to starting quality assurance and control of the fortification process. Usually there are no more than three or four vendors in every country. Quality certification of every batch should be demanded. Information about amounts being sold can also be of great value as an indirect monitoring tool of the process.

[5] Nutrition Reviews , Vol. 60, No. 7