

Why Wheat?

**Price per bushel increases from \$3.10 to \$14 - \$15
in just 8 months,
From August, 2007 to March, 2008**

The Impact of Wheat Prices on the WtM Program in Armenia

Current Situation

The wheat price has risen in international markets by almost 400% since last harvest. How will that impact the Water-to-Market program in Armenia, given that its basic premise is to introduce alternative high yielding horticulture crops to substitute for low income wheat and grains? Several questions must be asked. Will the increase in wheat prices turn the production of wheat from a low-income grain to a high-income horticulture crop, or at least one that competes equally with horticulture? Will the new wheat price continue to increase or at least maintain this level all the way through this year's harvest period (summer 2008 when winter wheat is harvested), and continue steady on for years to come? Or will the wheat price tumult after this year's harvest and revert back to the ten year trend level? The answer to some of these questions is based on an in-depth analysis of the factors that have caused this sudden price hike.

Reasons for the Price Increase as Expressed in the Press

1. Canadian planting down 17%, lowest since 1970
2. World stocks lowest in 30 years
3. Australia stocks low but 2008 crop good
4. Argentine crop fully committed, no exports
5. Heavy rains affect Western European quality
6. Drought hits Eastern Europe, Ukraine and Russia
7. North Africa drought, Morocco crop down 76%
8. Ocean freight rates at record highs
9. US winter wheat missed predictions
10. Corn/wheat price spread at record levels
11. Oil prices increase to \$110/barrel
12. Sub-prime mortgage debacle in U.S. causes some international financial institutions to collapse; need for bailout of Bear Stearns; decision to bolster U.S. incomes by \$152 billion in May, 2008; Federal Reserve Bank to decrease interest rate sparking concerns over inflation; investment hedge funds diverting money flows from mortgage financing to agricultural commodities, oils and metals and other measures to prop up mortgage firms.
13. Dollar falls to all-time low against Euro
14. War spending predicted at \$3 trillion, causing U.S. to borrow heavily

The first ten of these reasons, regarding production and consumption around the world, are cited by the U.S. Wheat associates. Then, in a series of highlighting paragraphs, they go on to explain the situation in each country and region, and their comments are completely contradictory. I quote "Wheat production for 12 countries of the former Soviet Union increased 1.25 million tons..... Good rains and favorable temperatures boosted spring wheat production prospects in Russia and Kazakhstan. Harvest reports in Ukraine indicated wheat crop... up fractionally.",

“Wheat crop in India increased...”, “Russia has improved production prospects for spring wheat...”.

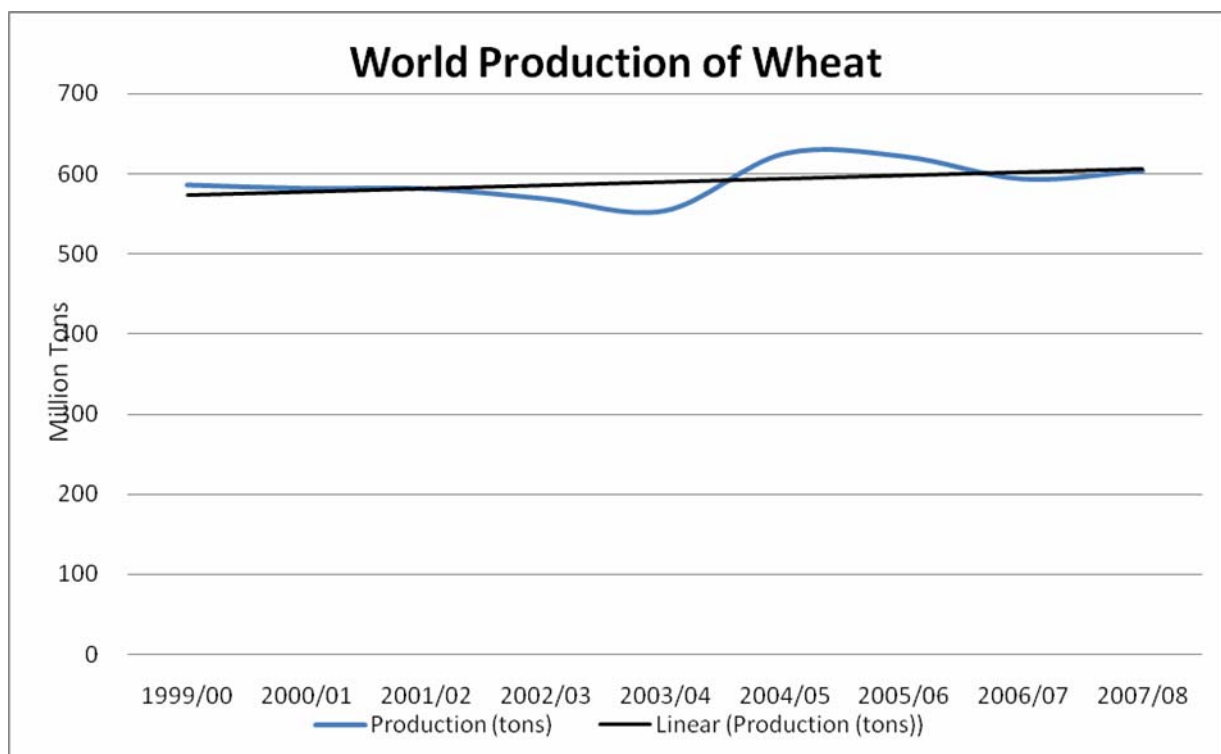
There are some individual cases of lower production, and some cases of countries prohibiting exports to protect their own consumption. But all in all, there is nothing so dramatic, like a Tsunami, that is causing the current increase in the wheat price.

The reasons above numbers 11 to 14, are heard in the press on a daily basis, and are related to the demise of the overall world-wide economy.

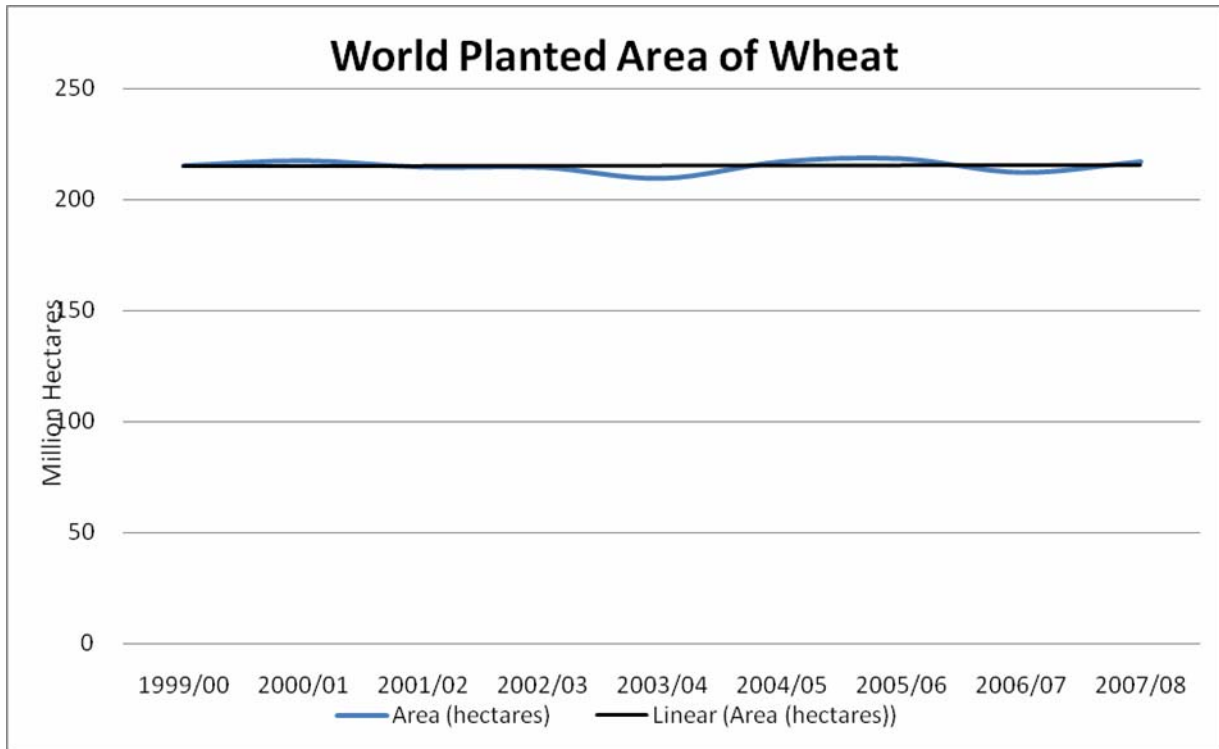
So let’s look at some of the fundamental facts. Let us begin by looking at trends in production, consumption and prices of wheat and other grains, and how this affects world-wide inflation.

Fundamentals of Production, Consumption and Prices of Grains

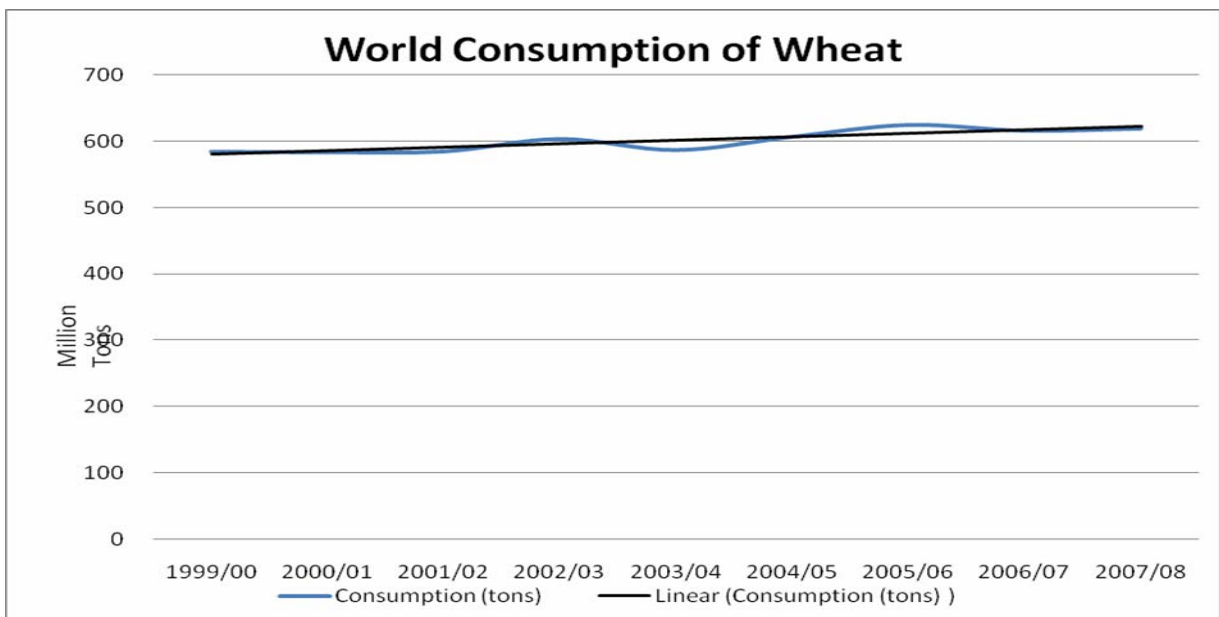
The first set of data to look at is world-wide production of wheat. The chart below shows that wheat production has remained steady over the last decade, with minor increases and decreases. A trend line has almost no slope.



A corollary argument is that acres planted to wheat are decreasing. The next chart shows land planted to wheat world-wide in hectares. Here the trend line is even more horizontal over the last decade. Changes in planted hectares are not causing the dramatic price increases.

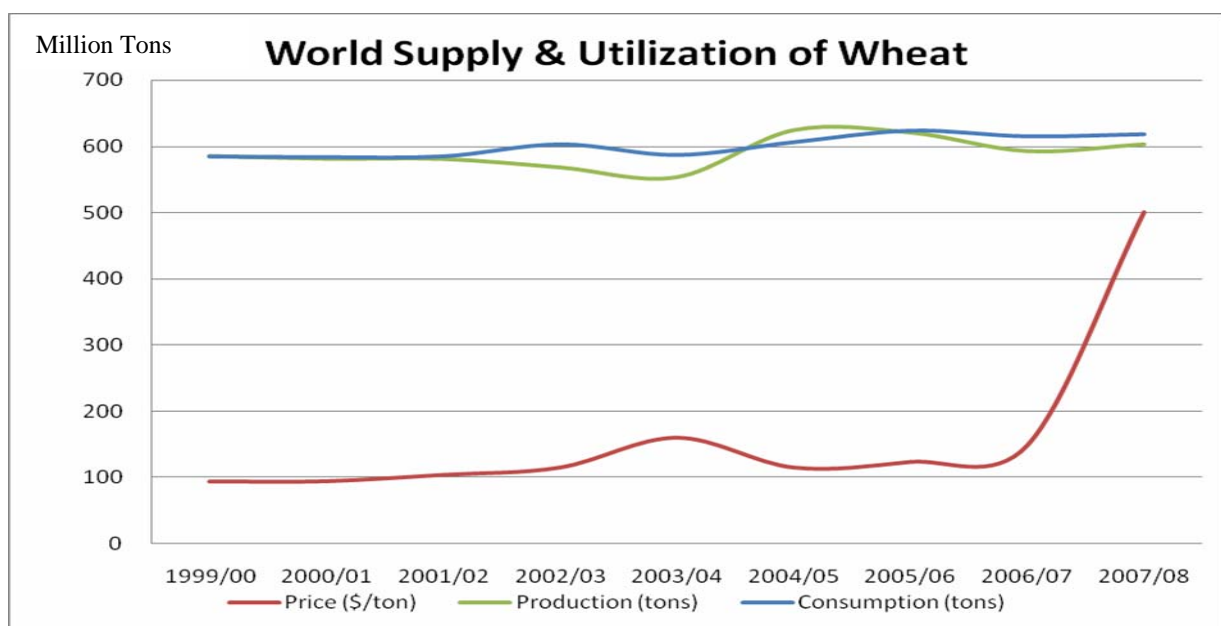


The conclusions from these two charts are that production increases and shortfalls do not seem to be dramatic enough to cause a sudden price increase in wheat. Let's now look at consumption, based on the claim that developing countries, especially India and China, have rapidly increasing incomes and are switching from rice bowls to wheat bread. The suggestion is that wheat consumption is significantly higher than production, and this is causing the problem.



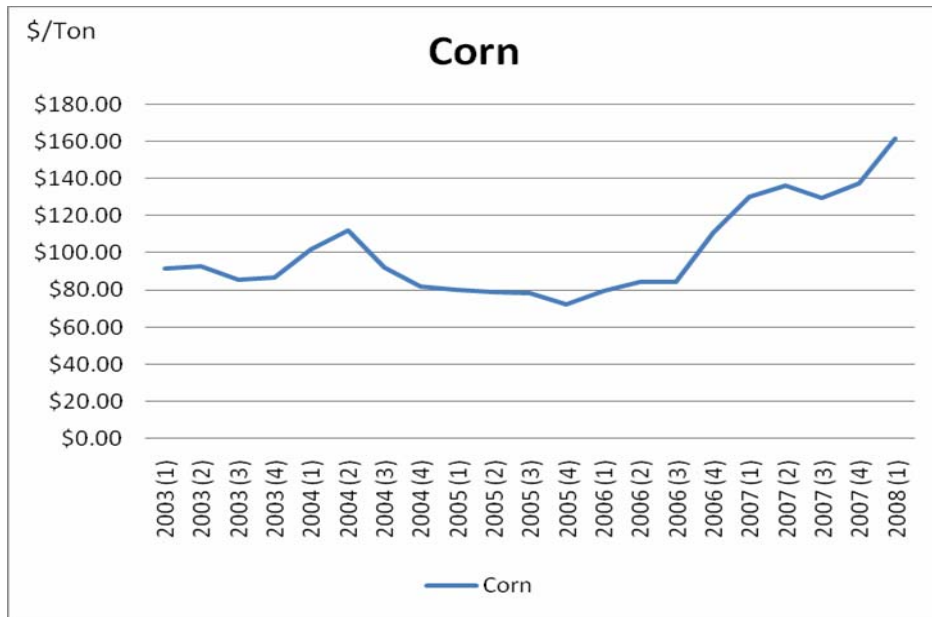
As expected, world-wide consumption of wheat has been increasing steadily over the last decade due to the reasons above, but there has been nothing dramatic to cause the sudden increase in wheat prices.

Putting these three charts together further strengthens this argument. The chart below shows that consumption increased above production in 2002, and this caused a relative increase in price of approximately 50%. However, that difference between production and consumption was twice as much as the current deficit, yet the current price hike is almost 400%, or an effective price change which is eight times greater.

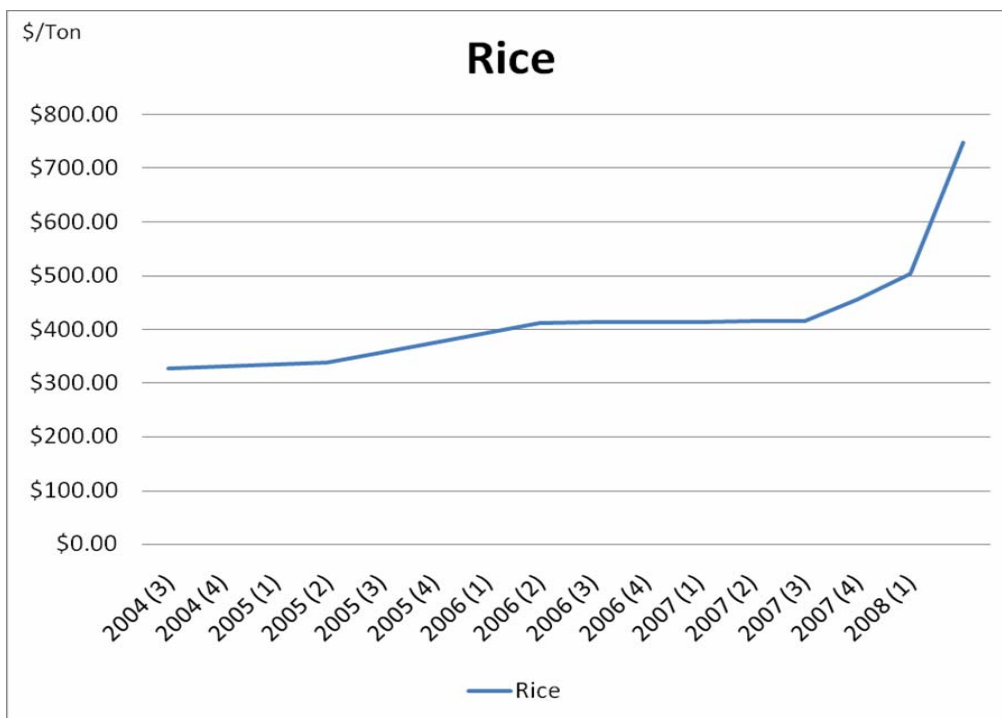


Prices of Wheat			
\$/bushel	\$/kg	\$/ton	AMD/kg
\$3.10	\$0.11	\$114	35
\$7.00	\$0.26	\$257	80
\$11.45	\$0.42	\$421	130
\$13.60	\$0.50	\$500	155
\$14.00	\$0.51	\$515	160
\$15.00	\$0.55	\$551	171
\$17.55	\$0.65	\$645	200

Some analysts claim that the reason for this price increase is due to the incredible increase in the demand for corn for ethanol. Of course this would lead to a dramatic increase in the price of corn. However, the increase in the price of corn has reflected the basic fundamentals, that when consumption outstrips supply the price will increase in the 50% range. The chart below shows that this is what is happening, and basically, more land is put into to corn production as a result.

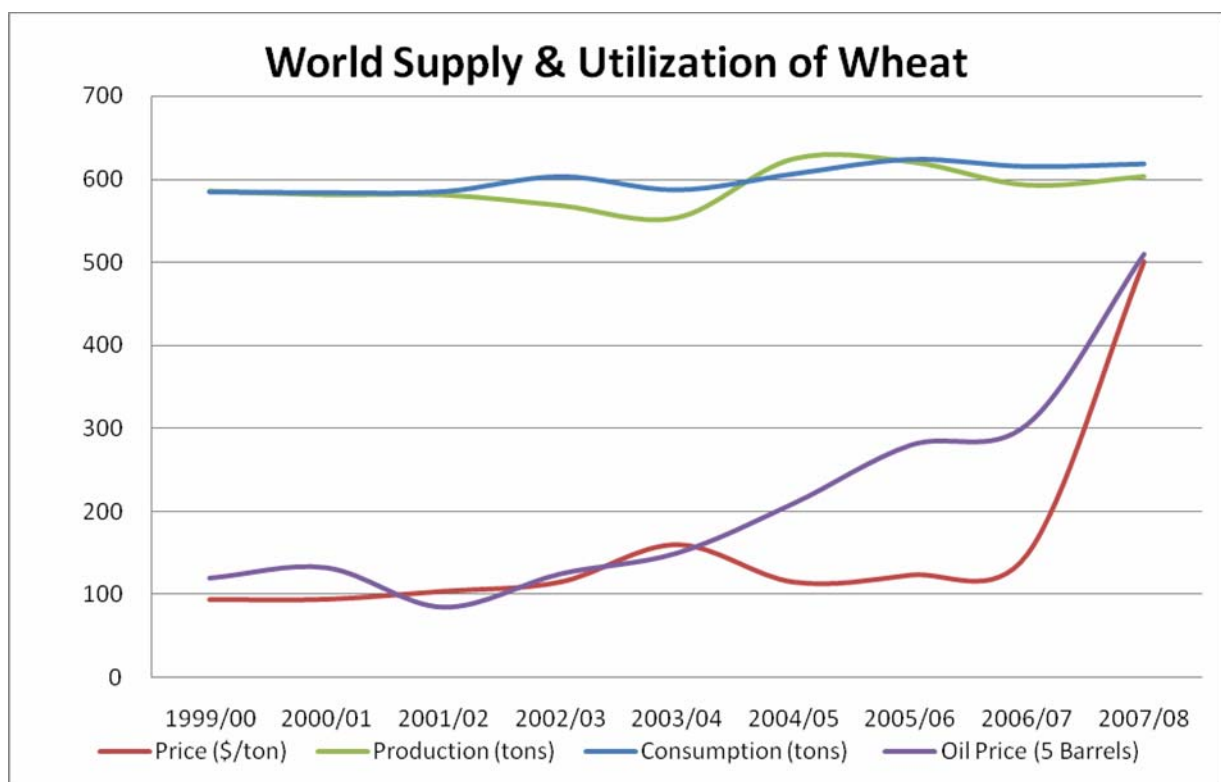


On a world-wide basis, the demand for corn for ethanol, which leads to increasing land for corn, should have a corollary effect on wheat and rice and other grains. Moreover, the demand for wheat for consumption in preference to rice should have a negative effect on rice. However, as wheat prices skyrocket there should be a return to consumption of rice, and an increase in its price. The actual result is that rice prices are increasing moderately (80%) and do not show a dramatic increase like that of wheat.



World-wide Non-Agricultural Money and Commodity Prices

So if the reason for the dramatic four-fold increase in wheat prices is not due to the fundamentals of supply and demand for grains, what then has caused this phenomenon? To get a handle on the reasons for this situation we must look at the international financial markets for non-agricultural commodities and currencies. Perhaps the U.S. subprime mortgage crisis has had more of an effect on the world-wide economy than has initially been attributed to it. Large financial “hedge-funds” that heavily invest in commodity futures markets, and then off-set their positions with spot market purchases, have moved out of mortgages and into three basic commodities – oil, metals and grains. This has caused a dramatic increase in the prices for these goods. The chart below shows the rise in the price of oil (\$ for 5 barrels) and wheat (\$ per ton - \$500/ton = \$14/bushel), compared to the supply of wheat and the consumption of wheat.



But why are these commodities increasing so rapidly? Part of the reason is that because of the subprime mortgage crisis, investment funds have large amounts of money to invest elsewhere, and they must make a choice as to where to invest to stay afloat. Several large firms have gone into bankruptcy or stressed sellouts. And the costs of the Iraq war have forced the U.S. to borrow heavily on the bond markets to finance these expenditures. This has increased the U.S. debt and led to a fall in the value of the dollar against the Euro. With such a tightening of the financial markets, the only possible outlets are the commodity futures markets, which are in oil, metals and agriculture. Since wheat is the major agricultural product that is grown, sold and traded world-wide, it attracts the most attention, the prices shown above prove this point, beyond the scope of imagination or prediction. This has never happened before in the recent history of the wheat trade.

This begs the question as to whether or not the price of wheat will subside as soon as next year's crop is planted, and it is shown that acreage has expanded 20% to 30%? The answer to this dilemma is difficult to predict. Surely, new production will be generated and if the market were to be operating in a rational way, based on the fundamentals of supply and demand, the price would fall as fast as it rose, or even more precipitously. But the market is not rational. The price hike has been fueled by the oil prices, the subprime financial crisis, the fall in the dollar, and the war in Iraq. None of these problems will correct themselves readily or in the near future. Therefore, it is unlikely that the price of wheat will fall as dramatically as it rose. Higher wheat prices will remain with us well into the future. It's fall will be sticky.

How, then, do we respond to this situation of higher wheat prices here in Armenia?

Costs and Returns to Wheat Production in Armenia

The Water-to-Market activity of the Armenian Millennium Challenge Account is based on the premise that incomes to farmers for wheat production is low and they would be better off if they were to increase acreage or switch to high value fruit and vegetable production. Focus group and farm interview studies over the last year, and throughout the course of six months of the HVA training program, have shown that returns to wheat production are from -\$16 to \$558 for un-irrigated AND irrigated wheat. (The crop budget profiles appear below.)

Production costs for Wheat (no irrigation) per 1 ha						
Costs	Means	Total Costs (June '07)		Total Costs (June '08)		
		0	(\$ US)	(AMD)	(\$ US)	
Total Material Costs		80,000	\$258	80,000	\$258	\$258
Fertilization	manure	0	\$0	0	\$0	\$0
	N	20,000	\$65	20,000	\$65	\$65
	P	0	\$0	0	\$0	\$0
	K	0	\$0	0	\$0	\$0
Total		20,000	\$65	20,000	\$65	\$65
Land preparation	Soil preparation, & cultivation	30,000	\$97	30,000	\$97	\$97
	leveling, weeding	0	\$0	0	\$0	\$0
Total		30,000	\$97	30,000	\$97	\$97
Seeds	300	60,000	\$194	60,000	\$194	\$194
Plant protection		0	\$0	0	\$0	\$0
Irrigation		0	\$0	0	\$0	\$0
Harvesting		15,000	\$48	15,000	\$48	\$48
Labor		0	\$0	0	\$0	\$0
Total costs		125,000	\$403	125,000	\$403	\$403
Expected yield (Ton)	Ton	1.5	1.5	1.5	1.5	2.0

Sales Price	Price per 1kg	80	\$0.26	130	\$0.42	\$0.65
Revenue		120,000	\$387	195,000	\$629	\$1,290
Net Income		-5,000	-\$16	70,000	\$226	\$887
Work Days (wage rate)		13	\$11.29		\$11.29	\$11

Notice in this crop budget for un-irrigated wheat, production is only 1.5 tons per hectare. In this case last year the sale price of wheat was 80 AMD/kg. At these levels of production costs and gross revenue, the farmer loses 5,000 dram per hectare. If the farmer's labor is his own labor he earns about \$100. However, in all of the training courses, the farmers conclude that they basically lose money with wheat. (See the middle-left columns of figures in the chart above.)

However, if the new price of wheat is 200 AMD/kg, as announced, then the farmers producing 2.0 tons per hectare un-irrigated wheat stand to earn \$887 plus \$100 for their labor. (See the right column of figures in the chart above.) Nonetheless, the farmers indicate that they only expect 130 AMD/kg with no increase in yield, and hence, their income would rise to only \$226 per hectare. (See middle-right columns above.)

For those farmers who have irrigated wheat the picture is similar but with higher incomes. The chart below shows this analysis. In this case the yield is 5 tons per hectare and the total costs

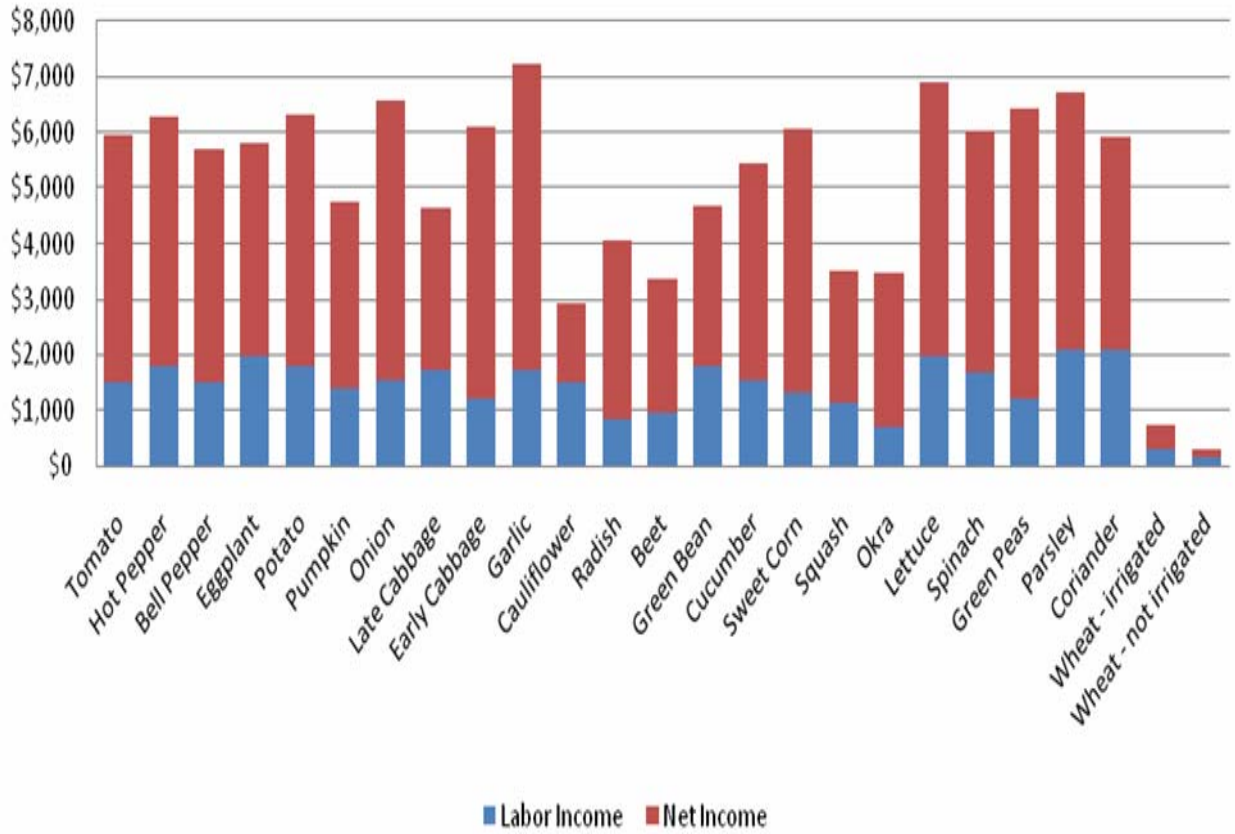
Production costs for Wheat (w/irrigation) per 1 ha							
Costs	Means	Total Costs (June '07)		Total Costs (June '08)		Total Costs (June '08)	
		(AMD)	(\$ US)	(AMD)	(\$ US)	(AMD)	(\$ US)
Material Costs		148,000	\$477	148,000	\$477	148,000	\$477
Fertilization	manure	0	\$0	0	\$0	0	\$0
	N	30,000	\$97	30,000	\$97	30,000	\$97
	P	15,000	\$48	15,000	\$48	15,000	\$48
	K	15,000	\$48	15,000	\$48	15,000	\$48
Total		60,000	\$194	60,000	\$194	60,000	\$194
Land preparation	Soil prep & cultivation	45,000	\$145	45,000	\$145	45,000	\$145
Weeding		35,000	\$113	35,000	\$113	35,000	\$113
Total		80,000	\$258	80,000	\$258	80,000	\$258
Seeds	300	45,000	\$145	45,000	\$145	45,000	\$145
Plant protection		8,000	\$26	8,000	\$26	8,000	\$26
Irrigation		35,000	\$113	35,000	\$113	35,000	\$113
Harvesting		25,000	\$81	25,000	\$81	25,000	\$81
Labor		94,000	\$303	94,000	\$303	94,000	\$303
Total costs		347,000	\$1,119	347,000	\$1,119	347,000	\$1,119
Expected yield (Ton)	Ton	5.0	5.0	5.0	5.0	5.0	5.0

Sales Price	Price per 1kg	90	\$0.29	130	\$0.42	200	\$0.65
Revenue		450,000	\$1,452	650,000	\$2,097	1,000,000	\$3,226
Net Income		103,000	\$332	303,000	\$977	653,000	\$2,106
Work Days	(wage rate)	57	\$10.00		\$12.90		\$12.90

are almost triple the amount for un-irrigated wheat at 347,000 dram. Farmers with irrigated wheat report last year's price at 90dram /kg, so that net income per hectare is \$332, plus about \$250 in labor income, which in this case is probably a mix between hired and family labor. (See middle-left columns of the above chart.) However, when the new price of 200 dram/kg is used, net income jumps to \$2,106/hectare, a value that starts to compete with our other vegetables. (200dram/kg = \$645/ton, \$17.55/ bushel) However, given the current world price of just under US \$500/ton, the irrigated farmer's think they will receive 130 dram per kg, which earns them \$977/hectare.

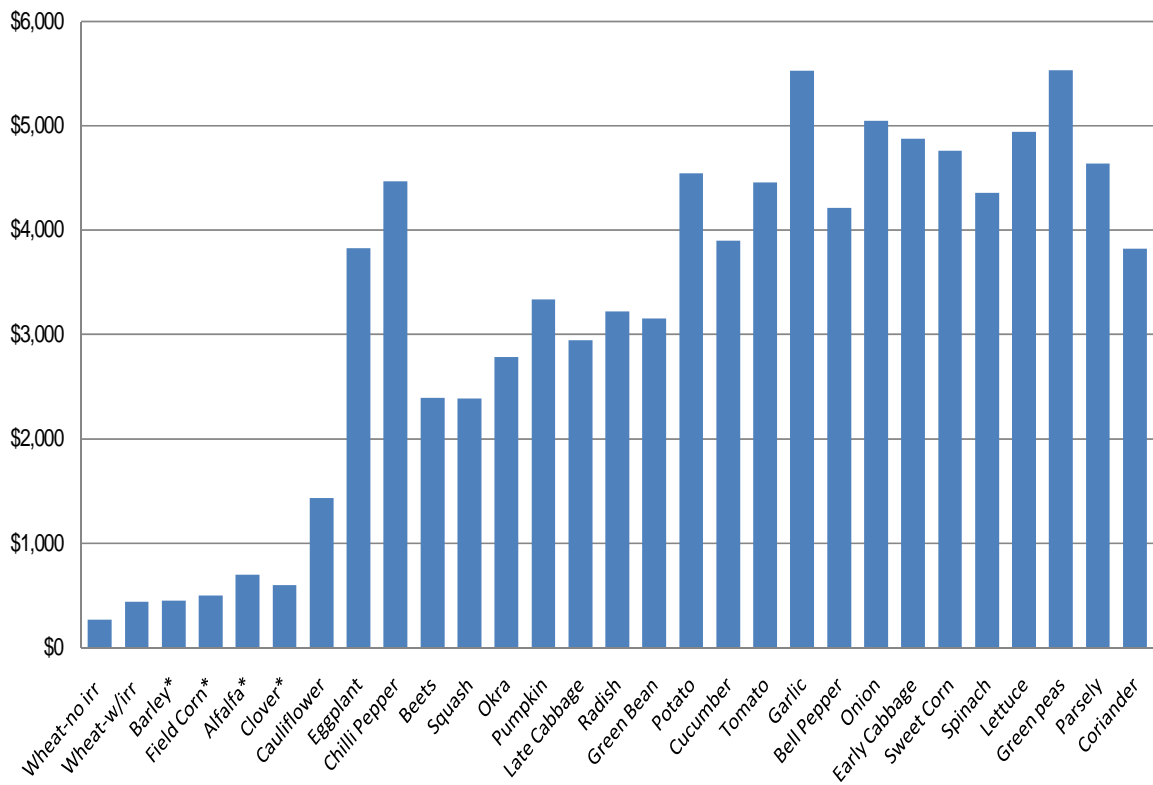
Our crop budget analyses of all the vegetable crops shows incomes of \$1,500 to \$5,000 per hectare for 2007, and with the new prices due to inflation and the fall of the value of the dollar, these incomes have increased almost double. Incomes to fruit production are similar. (See the right hand columns in the chart above.)

Vegetable Crop Incomes
 Armenia, 2007
 (Income/Hectare)

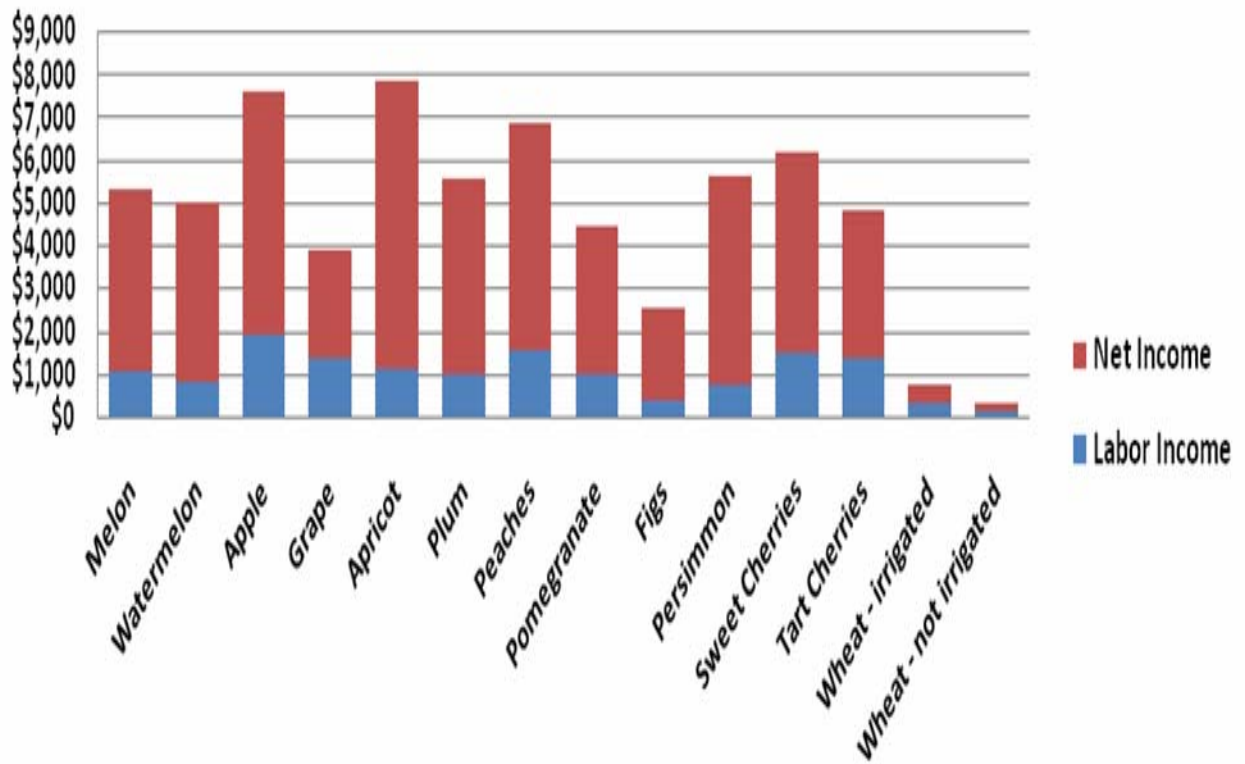


Crop Budgets for Vegetables, Armenia

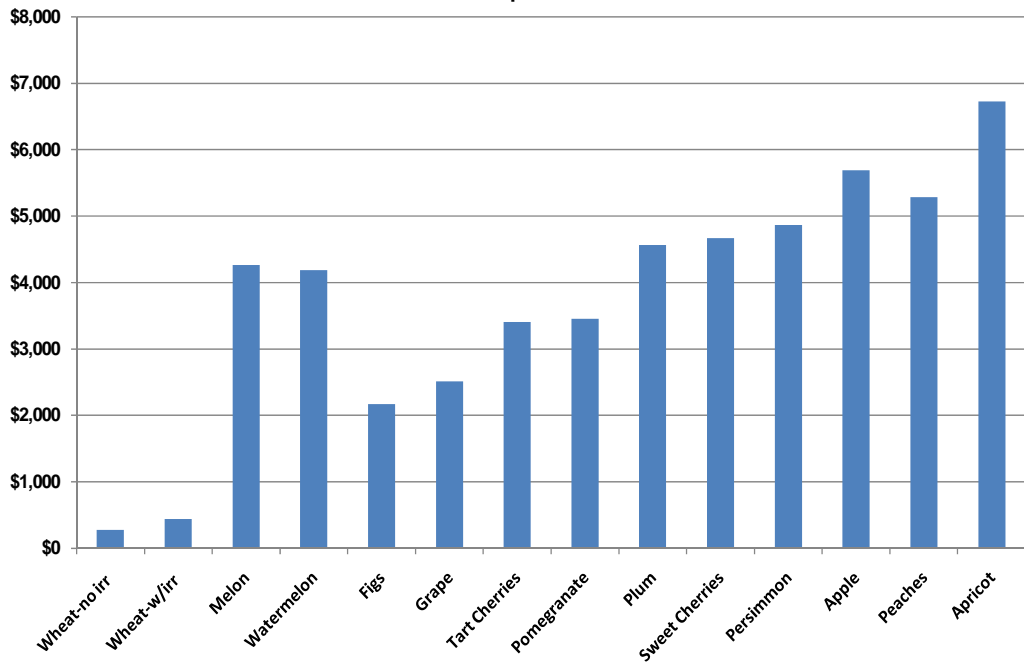
Net Incomes (per hectare)



Fruit Crop Incomes Armenia, 2007 (Income/Hectare, 6th Year)



Crop Budgets for Fruit, Armenia
Net Income per hectare



Some farmers specialize in wheat seed production. Our analyses of this production show the following results.

Production costs for Seed Wheat (w/irrigation) per 1 ha					
Costs	Means	Total Costs (June '07)		Total Costs (June '08)	
		(AMD)	(\$ US)	(AMD)	(\$ US)
Total Material Costs		210,000	\$677	210,000	\$677
Fertilization	manure	0	\$0	0	\$0
	N	30,000	\$97	30,000	\$97
	P	10,000	\$32	10,000	\$32
	K	10,000	\$32	10,000	\$32
Total		50,000	\$161	50,000	\$161
Land preparation	Soil preparation, & cultivation	45,000	\$145	45,000	\$145
	leveling, weeding	30,000	\$97	30,000	\$97
Total		75,000	\$242	75,000	\$242
Seeds	300	75,000	\$242	75,000	\$242
Plant protection		50,000	\$161	50,000	\$161
Irrigation		35,000	\$113	35,000	\$113
Harvesting		35,000	\$113	35,000	\$113
Labor		60,000	\$194	60,000	\$194
Total costs		380,000	\$1,226	380,000	\$1,226
Expected yield (Ton)	Ton	6.5	6.5	6.5	6.5
Sales Price	Price per 1kg	200	\$0.65	250	\$0.81
Revenue		1,300,000	\$4,194	1,625,000	\$5,242
Net Income		920,000	\$2,968	1,245,000	\$4,016
Work Days (wage rate)		49	\$11.29		\$11.29

In this case, the farmer receives an income of \$2,968/ha under current conditions, and \$4,016/ha with the new wheat prices. The seed wheat producer sells seeds for roughly 25% above the market price of wheat. Since one hectare of wheat seed only requires 300 kg of seed and produces 6.5 tons of seeds, this is a very profitable business.

What about corn? Can farmers earn high incomes with the new price of corn, which is shown to be \$160/ton on the chart presented above? A look below shows that even with the higher price, net income to corn only rises to \$499/ha. This is still a low-income crop.

Corn								
	1 bushel = 45 lbs		20.5 kg					
Year	Price	Yield	Py/ton	Py/kg (\$)	Py/kg (AMD)	Inc/ha	Costs/ha	Net Inc
2005	\$2.05	2,700	\$100	\$0.10	31	\$271	\$300	-\$29
2007	\$2.82	3,000	\$138	\$0.14	43	\$414	\$300	\$114
2008	\$3.27	5,000	\$160	\$0.16	50	\$799	\$300	\$499
Wheat								
	1 bushel = 60 lbs		27.2 kg					
Year	Price	Yield	Py/kg	Py/kg (AMD)	Inc/ha	Costs/ha	Net Inc	
Ararat	Irrigated							
2005	\$3.00	5,000	\$110	\$0.11	34	\$551	\$450	\$101
2007	\$8.00	5,000	\$294	\$0.29	90	\$1,452	\$1,119	\$332
2008	\$11.45	5,000	\$421	\$0.42	130	\$2,097	\$1,119	\$977
Aragasotn	Un-irrigated							
2005	\$3.00	1,500	\$110	\$0.11	34	\$165	\$200	-\$35
2007	\$7.00	1,500	\$257	\$0.26	80	\$387	\$403	-\$16
2008	\$11.45	1,500	\$421	\$0.42	130	\$631	\$403	\$226

In this table it is shown that both corn and un-irrigated wheat lost money in terms of income per hectare in 2005. In 2007 corn earned moderately and un-irrigated wheat still lost. In 2008, corn stands to earn \$500/ha while un-irrigated wheat will earn \$226/ha. Irrigated wheat, on the other hand, lost money in 2005, earned \$332/ha in 2007 and stands to earn \$977/ha in 2008.