

## 6 Social/Economic Considerations

### 6.3 Economic Impacts of Agriculture in North Central Washington

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#### INTRODUCTION:

Agriculture is a resource-based enterprise that both draws from and enhances the natural and economic environment in the three counties of North Central Washington (NCW). All three counties are economically dependant on industries that are resource-centered: agriculture, logging and mining (the latter two in Okanogan County, primarily).

Tree fruit production is common to all three counties as the leading industry, although its makeup is not identical in all three counties. Livestock is common to Douglas and Okanogan; cereal grains are dominant in the plateau areas of Douglas County while mining is mainly found in Okanogan County.

Analysis of the impact of agriculture on NCW is difficult because of the lack of study data that accurately reflects the cumulative, interdependent nature of multipliers that impact other sectors of the economy. The author has identified one study of the tree fruit industry in NCW, funded by the Washington Horticultural Association and the Washington Research Commission, which looks at the total impact of the tree fruit industry across economic sectors in each county and as a unit, compared to other FRD's (Fruit Reporting Districts), as well as all of Washington, Oregon and Idaho. Additionally, a WSU economics student's Master's thesis examines the economy of Okanogan County from the perspective of its resource-based industries, their exports and their role as the driver of Okanogan's economy. Both of these studies will be cited extensively here. No study was identified that examined the economic impact of agriculture in Douglas County with implications across the various sectors of that economy.

One factor which changed forever the landscape, economy and social structure of NCW is the introduction of irrigation water for agriculture. Without water, most of NCW would more closely resemble a desert than the center of the state's fruit production. While this seems such an obvious fact, it cannot be overlooked when estimating the economic value of the agricultural enterprise which arose from the introduction of irrigation to the region. To fairly determine agriculture's economic impact, even the casual observer will realize that the very fabric of life in NCW is rooted in the agricultural products that are grown, processed, sold and exported to the rest of the country and around the world. Whether examining retail sales, real estate or any other sector of the economy, it is all indebted in some way to the area's economic engine: agriculture. Employment in Agriculture (farm workers/owners) has actually increased at a rate faster than the national average for farm employment in each of the three counties of NCW (NIIP, Shift-Share Analysis).

#### SITUATION:

Okanogan is the largest county of the state but has a relatively low density of 7.5 persons per square mile (Washington) – indicative of the large amount of land (70%) that is not in private ownership and the land involved in the resource-based industries of agriculture, logging and mining (Okanogan). Livestock numbers for Okanogan County in 2005 were slightly under the

1 five-year average of 49,500, totaling 47,500 - but this was enough to make it the leading  
 2 livestock producer in the state, with an average value per head of \$94/cwt (WASS). Tree fruit  
 3 production is the leading economic factor in the county, with 25,346 acres (WASS); agriculture  
 4 in total, directly accounted for a 20.4% share of the total employment (NIIP) but just 16.67% of  
 5 wages earned (WAESD). Mining contributed less than 1% of the county employment in 2005  
 6 and has been in decline for the past several years (Potter).

7 Douglas County’s economy is dominated by agriculture; livestock, cereal grains and tree fruits  
 8 are the primary agricultural enterprises, accounting for a 22.2% share of all employment (NIIP)  
 9 and 15.26% of wages earned in the county (WAESD). The county had about 11,000 head of  
 10 cattle and calves, 4,500 acres of hay, 199,800 acres for all cereal grains (mostly non-irrigated)  
 11 and 14,901 acres of tree fruits (WASS). The CRP program in Douglas County, with nearly  
 12 186,000 acres enrolled, has drastically reduced soil erosion and sedimentation. Before  
 13 implementation, loss from rainfall runoff averaged 7.4 tons per acre per year (Foster). After  
 14 putting lands into the CRP program that number has been reduced to practically zero, 0.56  
 15 tons/acre (Foster), improving water quality for all the creeks in Douglas County: Foster, Pine,  
 16 Douglas, McArtney, Rattlesnake, for the Columbia River and Banks Lake (Bareither).

17 Chelan County’s economy is somewhat more diversified outside of the resource-based sectors,  
 18 but still dominated by agriculture, primarily tree fruit production on 37,212 acres (WASS). Total  
 19 fruit production has increased over the past thirty years (Smith). On-farm jobs in Agriculture  
 20 accounted for a 9.1% share of the total county employment in 2003 (NIIP), but accounted for  
 21 nearly 12% of total wages in the county (WAESD).

22 **ECONOMIC IMPACTS:**

23 The total employment in NCW that is directly and indirectly related to all agriculture is not  
 24 available in any study identified. The generally accepted multipliers of employment impact on  
 25 the other sectors of the economy range from 1.5 to 2.3 to account for employment “ripples”, but  
 26 even these would not adequately account for the situation where agriculture is such a dominant  
 27 feature of the economy.

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30 **Employment multipliers for agriculture in NCW:**

| <i>County</i> | <i>Ag’s Share</i> <sup>1</sup> | <i>at 1.5</i> | <i>at 2.3</i> |
|---------------|--------------------------------|---------------|---------------|
| Okanogan      | 20.4                           | 30.6          | 46.92         |
| Douglas       | 22.2                           | 33.3          | 51.06         |
| Chelan        | 9.1                            | 13.65         | 20.93         |

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<sup>1</sup> (NIIP), National Income Indicators Project, Smith, Gary, PhD, “Shift-Share Analysis Results” for Chelan, Douglas and Okanogan Counties, <<http://niip.wsu.edu/washington/laod.niipReport.htm>>, Accessed Jan., 2006

1 While showing this range of employment share for each county gives a more balanced picture of  
 2 agriculture’s impact across all the sectors of the economy of each county, it is also useful to  
 3 examine a specific example. Employment at fruit packing sheds is not included in the number  
 4 given for agricultural employment. Nevertheless, “Additional employment caused by the  
 5 existence of the packing industry is about 3,090 jobs, a ratio of about 1.41. In other words, for  
 6 every job in the warehouse, another .41 jobs is required either in terms of providing production  
 7 inputs to the warehouses (other than fruit) or in those sectors supporting the lifestyles of the  
 8 employees. So, in addition to the 7,500 jobs in the warehouses, there are another 3,090 jobs in  
 9 related industries or in the local communities that are due to the existence of the warehouses.”<sup>2</sup>

10 In another example, the Retail Sales sector of the economy accounts for 18% of employment in  
 11 Chelan County (WAESD), but there is no accurate way to measure how much of that is related to  
 12 sales of agricultural machinery, supplies, or services since that breakout is not available in  
 13 current data. The economic impact of agriculture in NCW is obviously much larger than is  
 14 indicated by the usual breakout of sector data used by the census and other statistical analyses.

15 In Okanogan and Douglas Counties, livestock is a major portion of the agricultural picture.  
 16 Okanogan dominates the region with the sale of 24,548 head of cattle and calves compared to  
 17 6,204 in Douglas County for 2002 (WASS); the estimated value of the combined counties’  
 18 industry sales in 2002 was \$17.2 million (WASS). For the same year, cereal grains (wheat,  
 19 barley and oats) plus hay acreage (excluding haylage, grass silage, and greenchop) in Chelan,  
 20 Douglas and Okanogan Counties totaled 242,161 acres (WASS) with an approximate combined  
 21 farmgate value of \$37,673,060 ([Appendix 6.3.1](#)). No exact figure for these values exists because  
 22 of the price variations during the season for these products as well as the proprietary nature of  
 23 some reporting. Rental payments for CRP contracts in 2005 for Douglas County = \$8,390,894  
 24 (FSA).

25 The dominant agricultural enterprise in all three counties is tree fruit production, consisting  
 26 primarily of (in order of magnitude) apples, pears, cherries, peaches, apricots, nectarines,  
 27 plums/prunes, and juice culls (Jensen, Exhibit 7).

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| 30 | <u>Tree fruit acreage in NCW</u> | <u>Total Acres (WASS)</u> | <u>Bearing Acres (2004 – Jensen)</u> |
|----|----------------------------------|---------------------------|--------------------------------------|
| 31 | Chelan:                          | 37212                     | 27253                                |
| 32 | Douglas:                         | 14901                     | 14064                                |
| 33 | Okanogan:                        | <u>25346</u>              | <u>21729</u>                         |
| 34 | TOTALS:                          | 77,459                    | 63,046                               |

35 Keeping in mind that 30% of the tree fruit bearing acres in the state of Washington are in the  
 36 three counties of NCW, and to better understand the magnitude of the industry, [Appendix 6.3.2](#)

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<sup>2</sup> Schotzko, R. Thomas and Smith, Timothy J., WSU Extension Educator, “The Economic Significance of Washington Apples,” 2002

1 shows the production of apples only in Washington relative to the rest of the country. [Appendix](#)  
2 [6.3.3](#) shows Washington State’s dominance in farmgate value among the northwest states of  
3 Oregon (11%), Idaho (2%) and Washington (87%). The estimated impact of the tree fruit  
4 industry’s income (as depicted in an input-output model of analysis) on the state of Washington  
5 is **\$2,842,333,172**<sup>3</sup>. The impact on the economy of NCW alone is accounted for in the following  
6 listing of impacts reaching across the broad sectoral categories.

7 *NCW Impact Results:*

|    |   |                                   |
|----|---|-----------------------------------|
| 8  | Direct and Indirect Purchases by Business Sectors         | \$154,473,468                     |
| 9  | Total Household Income of Owners and Employees            | 444,297,553                       |
| 10 | Local Business Sectors Impacted by Household Expenditures | <u>199,728,201</u>                |
| 11 | Total Economic Income Impact to Region                    | <b>\$798,499,222</b> <sup>3</sup> |

12 [Appendix 6.3.4](#) examines the impact of tree fruit agriculture in NCW extrapolated to the other  
13 sectors of the economy using IMPLAN data and applying the input-output model of analysis.  
14 One of the categories listed is “Other,” and is explained as, “an array of the distribution of local  
15 household spending as an estimate of household spending on goods and services from outside the  
16 region (imports). These imports from outside the region are an important consideration for  
17 economic development opportunities.”

18 Another area of impact is that of the income to local government in the form of property taxes  
19 flowing to city and county general funds. The only estimate that was identified taking into  
20 account the comprehensive impact of the tree fruit industry was that found in a study in 2004  
21 done by Tom Schotzko and Tim Smith (both are WSU Extension faculty) that focused on the  
22 apple industry, but in this one measure, spoke more broadly about the larger tree fruit industry  
23 impact that included warehouses: “The combined estimate of property taxes paid by growers  
24 and warehouses, and the property tax payments generated as a result of the total economic  
25 impact of the industry is over \$30 million per year. Those dollars support schools, roads, fire  
26 and police services and local government, etc.”<sup>4</sup>

27 *ANAYLSIS:*

28 Combining the value of the major agricultural enterprises in NCW, we can understand the  
29 importance of these industries on the regional economy. Studies such as the one conducted on  
30 the impact of grazing cattle near riparian zones are critical in finding measures that satisfy the  
31 need to restore and maintain a healthy environment while also allowing a major agricultural  
32 enterprise to stay healthy. That study, for example, shows that, “As riparian utilization becomes  
33 more restrictive, providing off-stream water and salt may be a way that traditional grazing levels  
34 can remain while environmental objectives (reduced livestock impacts in the riparian area) are  
35 also obtained.” ... “initial ecological assessments ...may show improvements in riparian area

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<sup>3</sup> Jensen, William S., Ph.D., “*Economic Impact of the Tree Fruit Industry in Washington State and the Northwest*”, August, 2004.

<sup>4</sup> Schotzko, op. cit.

1 health” (Journal of Range Management). Other research has demonstrated that, “Implementing  
 2 offstream water and trace-mineral salt into a grazing system can be effective in altering  
 3 distribution patterns of cattle grazing a riparian meadow and its adjacent uplands and also can  
 4 result in increased weight gain” (Journal of Animal Science).

5 While seeking the funding and other resources to achieve an environmental goal it is also  
 6 necessary to fund the research that will find the ways that allow agriculture to thrive at the same  
 7 time. Studies such as the two referenced above, demonstrate that discerning the best mitigation  
 8 practice to achieve the necessary environmental goals is not incompatible with good agricultural  
 9 practices. The key is to use good information that is research based.

10 To help understand the relationship between the amount of water flowing in a river and the  
 11 amount of water needed for agriculture, [Appendix 6.3.5](#) shows the amount of water used by one  
 12 acre of fruit trees in one day, then for an entire season, taking into account the differences for  
 13 cool, average and warm temperatures. Additionally, it indicates that additional water  
 14 requirements must be added to that used by trees to account for the inefficiencies of most  
 15 irrigation systems: compensating for soil differences and dry spots within the unit, loss of water  
 16 in the irrigation delivery system, evaporation, etc.

17 A significant difficulty when discussing irrigation requirements is that agricultural scientists and  
 18 natural resource scientists use two different measuring systems to account for the same resource:  
 19 water. Agriculture measures the quantity of water used or needed in terms of the amount of  
 20 water applied evenly to one acre of land in either inches or feet, termed Acre Inches (Acre in) or  
 21 Acre Feet (Acre ft). Natural resource scientists measure the quantity of water moving down a  
 22 river in cubic feet per second (cfs) or (ft<sup>3</sup>/sec).

23 The major difference is the agricultural scientist is measuring a static volume whereas the natural  
 24 resource scientist is measuring movement of volume in time (seconds). How these two metrics  
 25 correlate was not found in the literature search. With the help of WSU’s water quality specialist,  
 26 Robert Simmons, this gap can be bridged in the calculations noted on the bottom of [Appendix](#)  
 27 [6.3.5](#), notes A - C. In step “D”, the range of water needed for irrigation, including inefficiencies,  
 28 is calculated to determine the total amount of water used per acre in one season by all  
 29 commercial fruit trees in NCW. Considering the total cfs of all the rivers in NCW, the amount  
 30 needed for tree fruits is small.

| Acres of Tree<br>Fruit    | Water needed in one<br>season (Ac in)<br>average temps | Water needed in one season (cfs) average temps |                         |
|---------------------------|--|--|-------------------------|
|                           |  | <u>15% inefficiency</u>                        | <u>40% inefficiency</u> |
| 1                         | 33.45  | 0.004425435                                    | 0.005388795             |
| 77,459 acres <sup>5</sup> | 2,591,003.5  | 342.79   | 417.4                   |

35 A more productive dialogue is possible when we bring together these three pieces of  
 36 information: the amount of water used each month by an acre of fruit trees with irrigation  
 37 inefficiencies, the conversion of this amount to cfs and monthly stream flow data. Most

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<sup>5</sup> This number represents the total of all the tree fruit acreage in Chelan, Douglas and Okanogan Counties, combined, in 2005 (WASS)

1 irrigation begins in mid-March and concludes by mid-October. The heaviest use comes in July  
2 and August when temperatures are normally highest ([Appendix 6.3.6](#)).

3 [Appendix 6.3.7](#) shows the water requirements for 10,000 Acres of fruit trees. This unit of trees  
4 will allow most irrigators to determine the water needed for their districts, while the cfs number  
5 for this unit of trees can be used by natural resource agencies to more easily calculate the amount  
6 of water diverted to irrigation from any given stream, river or watershed.

7 Using data for the Wenatchee River at Monitor, [Appendix 6.3.7](#) shows that each block of 10,000  
8 acres uses less than 4% of streamflow during July and about 10% during August.

9 CONCLUSION:

10 The economic studies identified either examined just one aspect of agriculture in NCW or only  
11 looked at one county. Broad statistical summaries, such as the Census of Agriculture, the  
12 Washington Agriculture Statistics Service and the WSU National Income Indicators Project were  
13 all limited either in their scope or in their ability to cut across economic sectors to show a more  
14 accurate picture of the role played by agriculture in NCW. IMPLAN data, while obviously  
15 available, could provide this analysis, but has not been used for such a study to this point.

16 Combining the value of the agricultural enterprises in NCW as identified in this examination,  
17 yields the following summary:

| <u>Ag Enterprise</u> | <u>Annual Impact</u>   | <u>Counties Included</u>               |
|----------------------|------------------------|--|
| Tree Fruits          | \$798.5 Million        | Chelan, Douglas, Okanogan              |
| Livestock            | \$17.2 Million         | Douglas, Okanogan                      |
| Cereal Grains        | \$46.1Million          | Douglas, Okanogan (includes CRP Pymts) |
|                      | <u>\$861.8 Million</u> | <u>TOTAL IMPACT IN NCW</u>             |

23 Using the minimum economic multiplier factor of 1.5, we arrive at an estimated total impact of  
24 \$1.3 Billion for the economy of NCW for one year from all agricultural activity across sectors.

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