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THE COMMUNITY ECONOMICS OF COMMUNITY FORESTRY: A PARTIAL ANALYSIS OF WALLOWA RESOURCES, WALLOWA COUNTY, OREGON

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Introduction

Community Based Forestry (CBF) implies commitment to the long term ecological, economic and social well being of forest dependent communities. CBF, or community scale sustainable forestry, constitutes a departure from industrial forestry due to this commitment to the preservation of the ecological integrity of the forest ecosystem in perpetuity and to the maintenance or improvement in the quality of life in the host or gateway community in addition to seeking profits from forest products sales.

CBF and CFOs present a substantial analytical challenge. CBF organizations may assume a great variety of potential roles in a community. These roles may have direct, indirect and/or induced economic impacts on a community. We employ commonly used regional economic development techniques to highlight the local economic impact of CFO programs by tracing the recent activities of Wallowa Resources, a CFO located in NE Oregon, through its local economy. This approach is at variance with the more common application of the same regional economic tools, as it turns the analysis upside down. Typically, regional economic approaches take a snap shot of an entire econ-

omy and then attempt to discern the impact of an individual industry or sector on the entire economy, or from the top down. Here, we begin with CBF programs and derive the impact on the economy from the programs upward. This is only possible due to close collaboration with the CFO as to the inputs, outputs, intended and unintended outcomes of their programs.

The Economy of Wallowa County, Oregon

Wallowa County occupies two million acres in the northeastern corner of Oregon. The Wallowa-Whitman National forest covers nearly ½ of the land within the county. The county currently has a human population of about 7,100 residents, 5,100 over the age of 25 yrs. The county population is growing slowly (0.4% per year), more slowly than the state of Oregon or of the United States more generally. Some 87% of the county population has finished high school and 20% holds a college degree, similar to many other rural counties of the United States. The nearest commercial airport and regional population center is about 1.5-2hrs away. As a result of both its isolated location and the dominance of public lands, the county is culturally and economically highly resource dependent, particularly in forest resources.

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The employment and income profile of Wallowa County reflects this natural resource dependence. According to U.S. Bureau of Economic Analysis data (US Bureau of Labor, 2006), as generated by the Economic Profile System (EPS, 2003), the education and health sector is the largest local employer (21%; 593 jobs), followed by agriculture, forestry, fishing, hunting and mining (18%; 512 jobs).

Employment (and, therefore, income) seasonality is a characteristic of natural resource based industries and a challenge for communities with relatively undiversified local economic bases. Wallowa County suffers from both high variation and high average unemployment, resulting in lower average household incomes, relative to the state of Oregon and the nation as a whole. Some 20% of Wallowa's adult population reported earnings below the poverty line in 1999 (EPS, 2003). Average household income in Wallowa County has increased from \$17,817 in 1970 to \$23,219 in 2003 (in 2003 dollars). Average household income in Oregon and the United States was \$28,734 and \$31,472, respectively (EPS, 2003).

An input-output model of an economy facilitates understanding of the linkages and interdependencies among local economic sectors. A look at the entire Wallowa County economy will help us to later understand the role of Wallowa Resources within the county economy. IMPLAN, a popular input-output based software tool for economic analysis, is used for this part of our analysis.

IMPLAN uses 509 industrial sectors which are based on the North American Industry Classification System (NAICS). These industries can then be aggregated using varying levels of either the NAICS categories or their predecessors, the Standard Industrial Classification (SIC) codes. County level data aggregations and two-digit NAICS codes have been used for this analysis, due to the significant potential for disclosure problems in a relatively undiversified rural economy, as well as for the likely principal level of interest in the activities of Wallowa Resources. For each industry, IMPLAN calculates the total output, employment, total value added and other economic impacts. This allows for a general overview of the economic environment of a region.

Table 1 provides an overview of the Wallowa County economy as generated using IMPLAN. For Wallowa County, total direct industry output, or out of county

sales, is about \$300 million, based upon the most recent data available (2002). Agriculture, Forestry, Fishing and Hunting is identified as the most important economic sector in the county, generating some \$73.27 million in industry output (about 25% of the total economy), 962 jobs and more than \$9 million in employee wages and salaries. Government, construction and manufacturing are also important sources of local employment and income, each comprising approximately 14% of the Wallowa County economy in 2002.

IMPLAN also calculates multipliers, or the distribution of economic impact through an economy due to a dollar of sales outside of the economy or the introduction of a dollar of new money to the economy in the form of output, income and employment. Direct economic effects have to do with economic activity directly associated with the production and sales of goods and services. So, the machinery, labor, and fuel required to cut down trees and to make them into pulp, poles, or boards are economic activities directly associated with the production of wood products. Direct economic impacts are multiplied through the economy by means of indirect and induced effects. Indirect effects are local economic activities stimulated by the production of the direct economic activities. So, locally purchased accounting, legal, and transportation services, associated with the sales of wood products are indirect effects of wood production. Induced effects are the economic purchases unassociated with the good produced, but that are generated due to individuals' association with the production process. So, sawyers are paid for their work. They use their salaries to purchase homes and automobiles, to go to the grocery store, and to local restaurants. If the sawyers spend their money locally, there is an induced economic effect of their spending. Money spent on nonlocal goods and services is called leakage.

Type I multipliers are the indirect effects of production processes on local income and employment. Type II multipliers are the indirect plus the induced multipliers. Multipliers increase with the complexity of the goods or services produced (value added), the size and complexity of the locality, and the amount of local purchases in the production process (leakage). As a result, rural economies based upon extraction of raw natural resources tend to demonstrate relatively low multipliers. Including a Type II multiplier of 1.41, the indirect and induced effects of \$299 million in economic output is approximately \$123 million and the size of the Wallowa County economy is an estimated \$422 million.

Table 1. IMPLAN Total Output Summary for Wallowa County, Oregon, 2002

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Ag, Forestry, Fish & Hunting	73.271	962	9.105	2.814	16.889	1.759	30.568
Utilities	5.169	13	0.992	0.172	1.963	0.560	3.687
Construction	42.087	342	14.885	3.300	1.638	0.236	20.058
Manufacturing	43.305	255	7.033	4.002	4.059	0.757	15.851
Wholesale Trade	1.632	12	0.585	0.057	0.262	0.277	1.181
Transportation & Warehousing	7.800	97	2.619	0.522	0.353	0.237	3.731
Retail trade	23.904	385	7.289	3.517	3.502	3.658	17.967
Information	3.956	33	0.771	0.049	0.340	0.094	1.255
Finance & insurance	10.802	82	2.813	0.107	3.973	0.129	7.022
Real estate & rental	3.731	60	0.368	0.250	1.511	0.386	2.515
Professional-scientific & tech services	4.365	85	1.421	1.241	0.455	0.086	3.203
Administrative & waste services	1.722	23	0.467	0.050	0.218	0.049	0.783
Educational services	0.557	14	0.200	0.046	0.049	0.011	0.306
Health & social services	7.615	171	3.277	1.503	0.780	0.074	5.634
Arts- entertainment & recreation	4.379	57	0.525	0.914	0.315	0.209	1.964
Accommodation & food services	8.083	245	2.198	0.352	0.804	0.438	3.791
Other services	11.665	410	4.655	1.630	0.196	0.104	6.585
Government & non NAICs	45.189	491	21.741	0.000	15.372	1.919	39.031
Totals	299.232	3740	80.944	20.528	52.676	10.984	165.132

* millions of dollars.

Our focus here is on estimating the effect of a community based forestry organization on a local economy. Since many CBF activities are likely to directly or indirectly affect the forestry industry, we provide a focused view of the forestry and logging and its associated service sector within the broader agriculture, forestry, fishing and hunting industrial sector (Table 2). In 2002, the Forestry and Logging sectors employed 269 residents and generated a total of \$24.57 million. Proprietors earned \$2.436 million from this sector and industry value added, or profits that can be reinvested locally or externally, totaled some \$8.4 million.

Tables 3 and 4 show the total output and employment impacts after adjusting for multiplier effects. Based upon a local multiplier of 1.88 in the forestry and logging sector and 1.51 in the agriculture and forestry services sector, the total output impact is \$24.571 million. After adjusting for the additional employment generated by the sector the total employment impact was an estimated 535 jobs.

Wallowa Resources

Wallowa Resources was created as is a non-profit organization in 1996. WR operates primarily as a facilitator of forest-based economic development in

Table 2. Total Output Summary for Forestry and Logging Sectors in Wallowa County, Oregon (IMPLAN), 2002

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Forestry & Logging	19.689	83	2.343	2.078	3.725	0.26	8.407
Agriculture and Forestry Services	4.882	186	3.821	0.358	-0.919	0.055	3.31

*millions of dollars

Table 3. Output Multipliers and Total Output Impacts for Wallowa County (IMPLAN)

Industry	Direct Effects	Indirect Effects	Induced Effects	Total	Type II Multiplier	Total Output (\$ millions)
Forestry & Logging	1	0.697	0.184	1.882	1.882	37.049
Ag & Forestry Services	1	0.158	0.348	1.506	1.506	7.351

Table 4. Employment Multipliers and Total Employment Impacts for Wallowa County (IMPLAN)

Industry	Direct Effects	Indirect Effects	Induced Effects	Total	Type II Multiplier	Total Employment
Forestry & Logging	4.211	8.374	3.105	15.690	3.726	309
Ag & Forestry Services	38.101	2.269	5.857	46.227	1.213	226

Wallowa County, Oregon. Contract and grant funding for the organization have come from both governmental and private agencies. The United States Forest Service, as well as several other government agencies, has contracted WR to provide a variety of services. Private donations made up about 15% of the budget of the organization. WR has undertaken a number of projects intended to rejuvenate or restore the ecology of Wallowa County, create employment opportunities for local entrepreneurs and laborers, as well as increase environmental awareness within the community. Wallowa Resources believes that through community forestry, the social, ecological and economic goals of the organization for the community can be realized.

Wallowa Resources has taken on a variety of activities within the county. The activities can be broadly catego-

rized as educational, natural resource management focused field activities, forest product business ventures, program facilitation and organizational administration. WR offers adult education programs to community members and short courses to visiting students from regional universities and other educational programs to local primary and secondary students. These programs include fire training and organic farming for adults and an outdoor learning school and science education for children. The organization is also involved in field work where members of the community can take part in restoration projects or value-added business ventures. While it is difficult to fully capture the economic impact of these programs, input/output modeling can quantify some of the economic effects of the programs within the community.

By using input/output modeling, the direct, indirect and induced impacts of expenditures can be quantified. Wallowa Resources brings in financial resources from a variety of sources and spends them locally across its portfolio of projects. These 40 various activities have been grouped according to approximate function or focus and assigned a North American Industry Classification System (NAICS) code or codes. This code is then used to determine which sector to input the yearly expenditures. For example, the various field and restoration projects Wallowa manages have been assigned a NAICS code of 92. This sector is described as the administration of conservation programs. From this, the total expenditures can then be input into the model and traced through the economy.

While NAICS codes can be specified to various levels of subsectors, IMPLAN only recognizes sectors to the three-digit level. As a result, the activities have been broadly classified. After using this classification, the aggregated expenditures can then be input into the IMPLAN model. Table 5 illustrates the total impacts of all the expenditures. The top twenty impact sectors are reported here. In total, Wallowa Resources injected \$1,321,910 into the county economy on projects and business operations in 2005. When indirect and induced effects (totaling \$512,659) are accounted for, the total estimated output impact becomes \$1,834,569, or about

½ of one percent of the total county economy. For every dollar that Wallowa Resources brought into the county economy, an estimated additional 28 cents of economic activity was generated in Wallowa County. In 2005, Wallowa Resources had the largest total local economic effect through its administration and management of these substantial external funds. As might be expected, it also had a sizeable effect on the forestry, logging, wood products and associated services and educational services sectors. This same analysis can be performed for employment. WR created or otherwise accounted for about 29 jobs in Wallowa County in 2005, focused in the same sectors as its primary economic impacts.

If each of the groups of activities are broken out, further insights into the relative economic impact of different sorts of CBO programs can be illustrated. In 2005, Wallowa Resources spent \$586,087 on program administration, which had total impact of \$794,270. These expenditures supported a total of 15.3 jobs within the county in 2005. Each dollar of contract and grant funds brought in by WR and used for program administration activities generates an estimated 36 cents in additional economic activity in the local economy, principally through the purchase of professional and technical services.

Table 5. Output Impact of Wallowa Resources Expenditures

Sector No.	Industry Sector	Direct	Indirect	Induced	Total
452	561 Admin support service	586,087	10,669	933	597,689
495	92 Government & non NAICS	413,114	14,257	64,486	491,857
112	321 Wood Products	184,506	29,557	405	214,467
18	115 Ag & Forestry service	62,828	7,034	258	70,120
461	611 Educational services	67,404	244	1,787	69,436
14	113 Forestry & Logging	7,971	58,264	118	66,353
437	541 Profess.- scientific & tech service	0	25,016	5,027	30,043
481	722 Food service & drinking places	0	6,524	17,351	23,875
430	521 Monetary authorities	0	10,089	11,189	21,278
30	221 Utilities	0	8,265	8,225	16,491
482	811 Repair & maintenance	0	7,343	8,220	15,563
401	441 Motor vehicle& parts dealers	0	3,875	11,258	15,133
431	531 Real estate	0	9,393	5,413	14,806
394	484 Truck transportation	0	10,319	4,129	14,448
464	621 Ambulatory health care	0	71	14,335	14,406
420	515 Broadcasting	0	8,151	5,629	13,780
1	111 Crop Farming	0	10,344	2,970	13,314
33	230 Construction	0	10,428	1,753	12,180
405	445 Food & beverage stores	0	2,841	9,019	11,861
491	813 Religious- grantmaking- & similar	0	3,235	5,968	9,203
	Total	1,321,910	280,026	232,633	1,834,569

Field expenditures are primarily money spent on restoration and stewardship programs. This category is considered to be government and non-NAICS. In general, the government oversees the administration of conservation programs, but because Wallowa Resources acts similar to the government when overseeing these projects (does not derive profit) this is a fitting description. Wallowa Resources spent \$413,114 in 2005 on these projects. This expenditure had a total impact of \$516,729 within the local economy. Field projects directly generated 4.5 jobs and had a total employment impact of supporting 6.2 jobs. However, the estimated spillover or multiplier effects of these activities are considered relatively modest. Each additional dollar spent in this sector generates approximately 25 cents in additional local economic activity, mostly through the local spending of salaries and wages associated with the field expenditures.

Wood product expenditures include the value added goods produced by Community Smallwood Solutions. The category of wood product manufacturing includes lumber, plywood, veneer, and prefabricated wood for structures. Wallowa Resources spent \$184,506 which had an additional impact of \$138,528, or about 75 cents of additional economic activity for each dollar spent in 2005. The need to purchase equipment and machinery in addition to labor and the potential for adding value to raw wood products locally are what drive the multiplier for this sector higher than for administrative expenditures or field production. Wood product manufacturing had a total economic impact of \$323,034 in Wallowa County, directly created 1.1 jobs in the sector and indirectly created 0.2 jobs in the Wood Products, Forestry and Logging, and Agriculture and Forestry Services sectors, as well as 0.1 jobs in the Truck Transportation sector.

Wallowa Resources focuses strongly on educational programs for local community members. Because our model specification is limited to the three-digit sectors, the many educational programs have been aggregated into a single sector. The expenditures for educational programs had a total output impact of \$90,936, including an estimated output multiplier of 1.35, and a total employment impact of 2.1 jobs. This does not take into account the value of the skills learned or emotional impact such as confidence or leadership. Therefore the impact of the educational programs administered by Wallowa Resources is greatly underestimated.

While the Agriculture and Forestry Services sector generally focuses more on services for agricultural produc-

tion, forest fuel reduction and forest stand monitoring activities are also included in this category. In 2005, Wallowa Resources spent \$62,828 which had a total output impact of \$94,602, or an output multiplier of 1.35. As expected, crop farming and livestock farming had the greatest indirect economic impacts. These programs directly generated 2.4 jobs, largely complementing or supplementing activities within the traditional purview of the USFS.

Finally, logging programs accounts for only one of WR's programmatic activities; timber pole cutting. The programs of Wallowa Resources focus more heavily on restoration and stewardship than harvesting timber. As a result, only a small expenditure occurred in this category in 2005. While the actual expenditure in the Logging and Forestry category was small (\$7,971), it had a total output impact of \$14,999, almost twice the amount actually spent (an estimated 1.88 output multiplier). The employment impacts were not as great, as only 0.1 jobs were generated or supported by these programs.

Concluding remarks

Although input/output modeling provides a quantitative analysis of the economic impacts of programs, it does not completely capture the value of an organization. Wallowa Resources helps to manage forest land that may otherwise be unproductive economically, create greater fire risk, or, potentially, be converted for industrial or residential uses. Protection, managed use and restoration of this forest land may have a greater value to local residents than that reflected by the input/output model. The impacts of this organization are not limited to the number of jobs created or the total output impact. Wallowa Resources provides job training, environmental education, and community interaction, among other invaluable benefits. These cannot be captured in the model, but are valuable nonetheless.

The intended outcomes of Community Based Forestry may be largely agreed upon by communities who choose to pursue this alternative for economic development. However, the chosen means to the commonly envisaged end vary substantially. Analytically, CBF is not simply an alternative means of producing the same forest products produced by industrial forestry. Rather, it is a distinctly different collection of ways to manage forest lands. These distinct approaches to land management imply different values and objectives of the managers. We hope that this approach will help communities facing similar choices to make better informed decisions appropriate to their needs and aspirations.

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