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THE ROLE OF RESEARCH IN ECONOMIC DEVELOPMENT AND FUNDAMENTALS IN THE ECONOMIC DEVELOPMENT PROCESS

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THE ROLE OF RESEARCH IN ECONOMIC DEVELOPMENT AND FUNDAMENTALS IN THE ECONOMIC DEVELOPMENT PROCESS

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How important has the role of research been in supporting economic development within the state? It would be all but impossible to account for total expenditures and efforts on behalf of all the private and public entities within the state. Rather, as an example, the Department of Agricultural Economic's singular efforts in conducting feasibility studies will be used as an illustration. A total of 18 feasibility studies, each unique in terms of subject matter addressed and the depth of analysis, have been completed during the 18-year period 1970-1987 (Table 1). A combined total expenditure of just over one-half million dollars ($520,000) was expended or an average of only $28,888 per year. Seven of the 18 studies were what is regarded in the profession as full-fledged feasibility studies, costing $398,000 or 76 percent of the total expenditure for an average cost of $56,857 per study.

These studies have contributed to 35 new plants being constructed in North Dakota since 1970 (Table 2). Total capital expenditures for the completed plants totaled almost $232 million and averaged $6.62 million per plant. A potential exists for 13 additional processing facilities with estimated capital expenditures approaching $250 million.

Economic impacts associated with processing plants already constructed in the state have been significant. A total of 528 new direct jobs have been created (Table 3). Secondary employment resulting from the increased economic activity created by those plants resulted in an additional 810 jobs or a total of 1,338 new jobs. Additional total business activity of nearly $65 million was created by the 35 facilities

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TABLE 1. ECONOMIC FEASIBILITY STUDIES COMPLETED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS AND LEVEL OF FUNDING, NORTH DAKOTA STATE UNIVERSITY, 1970-1987

Type of Feasibility Study	Funding Level
	--$000--
Commercial greenhouses	46
Flax shive pelleting	18
Sunflower oil--an alternative energy source	36
Pasta processing	78
Wheat gluten processing	72
Small livestock slaughtering plants	2
Sunflower processing	74
Hog farrowing system	18
Large livestock slaughtering plants	13
Alfalfa pelleting	11
Flax fiber processing	12
Portable seed cleaning units	3
Malt plants	42
Sugarbeet processing	26
Small livestock slaughtering plants	9
Dry edible bean processing	50
Sunflower oil conversion to methyl ester	7
High fructose corn syrup processing	3
Total	520

TABLE 2. TOTAL NUMBER OF PLANTS AND CAPITAL INVESTMENT AND POTENTIAL PLANTS ASSOCIATED WITH FEASIBILITY STUDIES CONDUCTED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, NORTH DAKOTA STATE UNIVERSITY, 1970-1987

Item	Plants		Capital Investment	Percent of Total
	Number	Percent	---$000---	
Completed facilities	35	73	231,594	48
Potential facilities	13	27	248,695	52
Totals	48	100	480,289	100

TABLE 3. ECONOMIC IMPACTS ASSOCIATED WITH FEASIBILITY STUDIES CONDUCTED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, NORTH DAKOTA STATE UNIVERSITY, 1970-1987

Item	Direct Employment	Secondary Employment	Total Employment	Additional Total Business Activity
				------$000-------
Completed facilities	528	810	1,338	64,534
Potential facilities	403	1,947	2,351	125,554
Totals	931	2,757	3,689	190,088

established in the state. An additional 2,351 new jobs and $125 million in additional business activity would materialize if all the potential facilities were constructed and operationalized.

A composite picture showing completed or under construction projects with another category of potential facilities provides an overview of the individual studies and contributions for the entire period (Table 4). What this illustrated analysis portrays is that applied research in the form of feasibility studies has a high payoff for the state. Analysis of the 18-year period 1970-1987 indicates that for every dollar invested in feasibility research, $478 in capital investment resulted (Table 5). The ratio of increased annual total business activity from operation of those plants was 133 to 1, meaning that for every one dollar invested in research 133 dollars in additional business activity was created. An approach from a different perspective tells us that for every one thousand dollars invested in feasibility research, 1.09 new direct jobs were created and 1.67 secondary or indirect jobs were created for a total of 2.76 jobs for every one thousand dollars invested in feasibility studies.

ECONOMIC IMPACTS IN NORTH DAKOTA ATTRIBUTABLE TO FEASIBILITY STUDIES CONDUCTED BY DEPARTMENT OF AGRICULTURAL ECONOMICS, NORTH DAKOTA STATE UNIVERSITY, 1970-1987

Feasibility Study	Investment in Research	Facilities Completed or Under Construction					Potential Facilities				
		Number of Plants	Capital Investment	Direct Workers	Secondary Employment	Additional Gross Business Volume	Number of Plants	Capital Investment	Direct Workers	Secondary Employment	Additional Gross Business Volume
	--$000--		-$000-	number	number	---$000---		---$000---	number	number	---$000---
Commercial greenhouse	46	--	--	--	--	--	1	920	10	9	914
Flax shive pelleting plant	18	--	--	--	--	--	1	412	5	13	761
Sunflower oil as an alternative energy source	36	--	--	--	--	--	1	1,645	18	50	3,493
Pasta plant	78	1	6,600	55	59	3,444	--	--	--	--	--
Wheat gluten processing plant	72	--	--	--	--	--	1	26,268	61	165	8,065
Small scale livestock slaughtering plant	2	2	354	24	42	1,074	--	--	--	--	--
Sunflower processing plant	74	3	111,000	150	333	28,234	--	--	--	--	--
Hog farrowing system	18	24	3,600	24	144	14,928	--	--	--	--	--
Large scale hog slaughtering plant	13	--	--	--	--	--			(not feasible)		
Alfalfa pelleting plant	11	--	--	--	--	--	2	1,101	6	104	2,810
Flax fiber processing	12	--	--	--	--	--	1	300	3	43	1,193
Portable seed cleaning units	3	2	40	2	0	22	--	--	--	--	--
Malt plant	42	1	50,000	40	168	10,912	--	--	--	--	--
Sugarbeet processing plant	26	2	60,000	233	64	5,920	--	--	--	--	--
Small livestock slaughtering plants	9	--	--	--	--	--	3	350	12	9	892
Dry edible bean processing	50	--	--	--	--	--	1	1,567	24	297	15,706
Sunflower oil to methyl esters conversion plant	7	--	--	--	--	--	1	6,132	24	46	4,381
High fructose corn syrup processing plant	3	--	--	--	--	--	1	210,000	240	1,211	87,259
Total	$520	35	$231,594	528	810	$64,534	13	$248,695	403	1,947	$125,554

TABLE 5. RETURN ON INVESTMENT FOR FEASIBILITY STUDIES COMPLETED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, NORTH DAKOTA STATE UNIVERSITY, 1970-1987

Item	Ratio
Investment in research to capital investment	478: 1
Investment in research to additional business activity	133: 1
Direct jobs to investment in research	1.09: $1,000
Total jobs to investment in research	2.76: $1,000

The need is great for a level of funding that will enable the University to carry out these types of studies on a continuing basis. With such an effort comes the need for close cooperation from both public and private entities throughout the state. Forging a partnership becomes important. Allocated research funding on a continuing basis for work in economic development can be leveraged by the inflow of funds from other public and private entities. Economic development with all its many complexities needs the support and ingenuity of both the public and private sectors. Combining the resources of both sectors does two things. First, it serves to leverage local capacities to seek out investment opportunities, and second, it attracts capital and sets in motion this whole process of economic development. As more entrepreneurship discovers and carries through investment opportunities, greater capital formation or accumulation takes place which in turn provides more income from which further savings occur from which additional investments can be made and more economic opportunities and higher real incomes emerge creating more jobs.

Many have searched for that magical formula that would make economic development easy, certain, and successful. Like most worthwhile endeavors, there is no easy or all encompassing approach that guides economic development. At best, there are some fundamentals that serve to guide practitioners of economic development. Key cornerstones of economic development can be traced back to attitude, natural resources, and institutions.[1] The most difficult cornerstone to contend with is attitude for various reasons. First, attitude is very elusive and difficult to define. Attitudes have their own value system which may not necessarily develop along logical and rational mind sets. Attitudes, as a rule, do not objectively determine relationships among relevant variables and thereby help us to better understand the economic development process. Second, the attitude variable is very difficult to quantify for it lacks a common unit of measure.

These shortcomings aside, attitude becomes, in the minds of many, the most important cornerstone of the three economic development ingredients. Attitudes come in many nuances, degrees, and dimensions, but when related to economic development two dimensions become particularly important. The first dimension of attitude deals with the willingness to forego current consumption for some future gain. North Dakota has always had a strong work ethic that has variously been described as a people that are dedicated, conscientious, and willing to give up the "let's acquire now" attitude for future gain or reserve. Without savings, the investment function would go wanting. Savings is the function that provides the

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[1]The three ingredients of economic development are generally attributed to Luther Tweeten and George L. Brinkman as developed in Micropolitan Development (The Iowa State University Press, Ames, 1976), pp. 58-61.

driving force in capital accumulation. The common linkage of attitude moves from influencing saving to influencing investments to influencing efficiency in investments if appropriate information covering technical and economic concerns have been addressed.

Given North Dakota is the most agricultural state in the nation in terms of the percentage of gross revenue derived from the agricultural sector, a historical attribute for the savings function can be singled out for the rural populous. Historical records tell us farmers typically save one-third of their income while nonfarmers save less than one-tenth of their income.[2] This suggests that with a high ratio of farmers to nonfarmers in the state, the combined savings for the state is solid, but good productive investment opportunities within the state are often lacking. Some would contend too much of North Dakota's savings leave the state through investments in stocks, bonds, and other short-term liquid investments. The flow of capital is guided by expected net returns and the level of risk associated with investments. If investment opportunities are lacking, capital will move from the state seeking alternative capital markets. The point is, savings do not appear to be a barrier to economic development within the state, but high quality competitive investments may be.

The second ingredient of attitude focuses on people who are willing to assume reasonable risks, i.e., reasonable risks in terms of both capital and energies in seeking out investment opportunities within the state. This is where university research has an important role to play. Feasibility analyses can aid investment decisions by evaluating if an

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[2]Ibid, p. 60.

investment proposal will have a reasonable chance of succeeding. These evaluations must be made available to potential investors and to those institutions that are called upon to consider financing a part of such investments. Another important condition in the investment process is that investors must be willing to use their capital (savings) to pursue economic gain or no investment can successfully take place.

Two remaining ingredients that enter into the economic development process, natural resources and institutions, are more straightforward and self-evident in the economic development process. North Dakota has natural endowments that far exceeds those of many nations that are currently held as staunch competitors with the United States. Japan, a country with very limited natural resources, has demonstrated a high capacity in development and economic growth. North Dakota by contrast has an enviable land resource, rich energy resource deposits of coal and oil, developing and largely untapped water resources, and a rich heritage that surrounds the human resource component.

The last major ingredient, institutions, is a creation designed by society. This ingredient must be receptive to change if economic development is to move forward with changes that take place over time. Institutions must be able to evaluate substantive changes in the economic landscape and adapt to those changes. If there are private and public institutional biases that tend to discourage economic development they must surface and be altered in accordance with economic factors and choices made by citizens of the state.

When the two words, economic development, are enjoined they conjure up an individualized meaning or vision. Because certain words become popularized as a result of many and varied factors during a given era in

our history, they often become descriptively called buzz words. It is well to pause and reflect on what these words truly convey. Economics is one term that all people can readily identify with for they deal with or are impacted by economics on a daily and continuing basis. Economics is the process by which scarce resources are allocated among alternative and competing wants. Development when reduced to its least common denominator signifies change and that change can be either positive or negative. When we think of change three types of change are possible. Most of us who have accumulated a few years of longevity most likely have witnessed all three types of change at some juncture in our lives. Revolutionary change can come in many forms and only two will be mentioned here as possible examples. Often new discoveries, scientific discoveries for example, can impose revolutionary changes within a given industry. The whole concept of genetic engineering has prospects of certain revolutionary changes for agriculture. These would be revolutionary changes to the extent extraordinary results can be obtained in production or marketing within the agricultural sector.[3] The more common association of revolutionary change has to do with an overthrow of a particular form of government.

A second form of change is evolutionary. As we grow older a form of physical change or evolutionary change is taking place and is unstoppable. Nations, states, communities, organizations, or individuals can and do elect to be either active or passive in their economic development

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[3]Dr. Reichelderfer, Associate Director of the Resources and Technology Division, ERS/USDA posing the question "What makes a new advance a revolution?" has stated, "I believe that a revolutionary set of technologies is one that throws us off the normal trend." As referred to in "Biotechnology: What and Why?" by David Downing in Harvest States Journal, Vol. 8, No. 7, July 1988.

decisions. If, the passive or pocket veto route is taken, which is essentially a decision not to decide, this will not prevent or stop evolutionary change. All entities by virtue of being a component in a dynamic universe will experience evolutionary change.

The key that lets man influence the direction of change deals with the third type of change and that is planned change. Planned change allows the human factor to influence and alter the degree, direction, and in many instances the intensity and duration of a given change. The concept of economic development tells us that we can make a difference as change is visited upon us in our quest to maximize the wants of human beings. Wants are satisfied largely through consumption of goods and services. Goods and services are desired because they possess utility which gives them the capacity to satisfy wants. This is an oversimplified view of human nature for it ignores the energies devoted by man as a producer and ignores the creative activity of man that enters into the equation of creating a purposeful life. Simplification is sought here as opposed to an elaborate analyses in an effort to erect a better foundation of understanding.

Economic development is sometimes offered up as a new found approach. It is often thought of as an approach that will automatically spawn economic activity that will be acceptable and successful. Evidence would suggest economic development was practiced by the Egyptians 2,000 years before Christ. The physical presence of the mighty and formidable pyramids leads us to accept that the many fibers of economic development were present for their creation required timing, plans, organization, savings, leadership, control systems, and much more, just as economic development does today. While economic development is old it carries an element of intrigue and has as many approaches as there are visions and desires.

Crises of one kind or another reach out for solutions and man looks back and reaches out for approaches that can help solve problems. The recent crisis visited upon the two most important basic sectors, agriculture and energy, diminished the economic strength of the state's economy. Real farm and energy incomes declined, financial problems for many in agriculture and other related agricultural businesses became commonplace. These economic events set in motion other forces that create economic, social, and institutional changes. Changes taking place in the state and world economies and their effect upon the state in the current decade presents a challenge and an opportunity for economic development. These events have seen a pronounced escalation in turning to various economic development strategies for diversifying and strengthening the state's economy.

The three ingredients, attitude, natural resources, and institutions, are fundamental to expanding the state's economy (Figure 1). The need to diversify the state's economic base, the need to search out development opportunities that are economically viable, and the need to make sure opportunities sought have a rational linkage to the state's existing economic base is important. The linkage factor is important if benefits from economic development are to be widely difused throughout the state's economy. The benefits, economic and noneconomic, pursued by economic development interests and assisted by the university research and extension components, will see benefits that go much beyond the normal brick and mortar. Local community capacities as well as human resource capacities will be enhanced and placed in a better position to surface development opportunities. The enhanced capacity spawns growth, which in

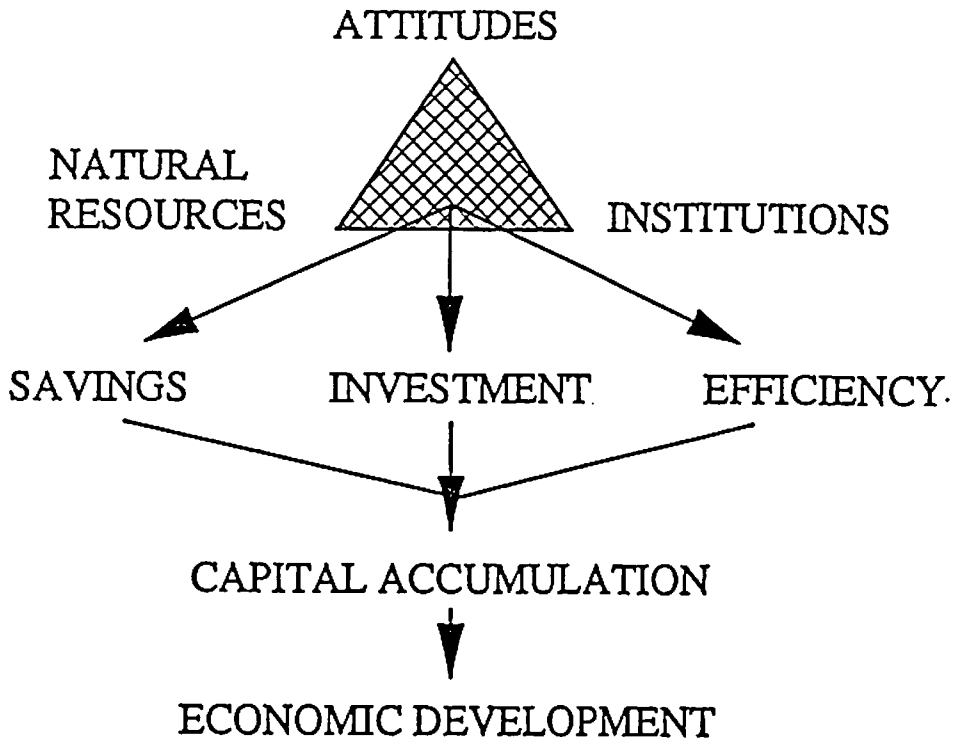

Figure 1. Ingredients of Economic Development

turn has linkages to creating jobs, which increases both income and wealth and ultimately ends in accomplishing the desired objective of satisfying human wants (Figure 2).

A high payoff for the state in terms of economic development accrues from conducting economic feasibility research. Expansion of this research capacity by creating a specialized feasibility center at North Dakota State University would advance the University's role in economic development for the state. The traditional graduate student model does not provide the continuity, timeliness, and the level of research skill and experience needed for this type of research. A more effective model is to employ full-time research associates who have completed advanced degree programs.

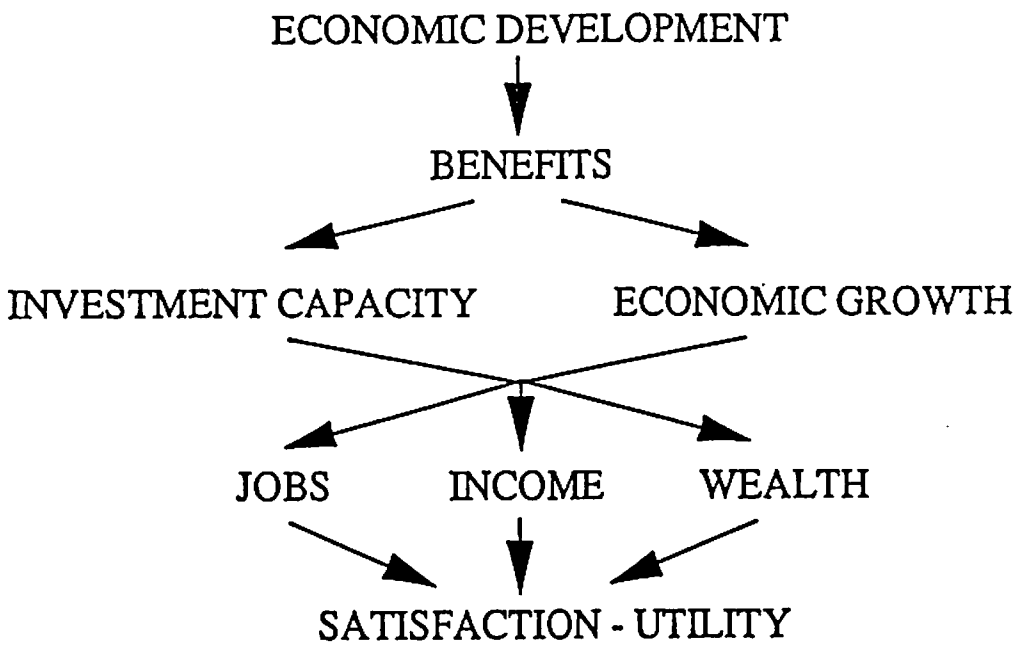

Figure 2. Benefits of Economic Development

This model allows for the concentrated amount of time and the level of expertise required for this type of research.

Support from the state legislature in appropriating funds for the establishment of such a center would enable the University to handle both short- and longer-term research needs and requests that have greatly increased as a result of increased interest and activity in the economic development area. Once this research capacity is in place, leveraged funding with other private and public sources becomes a more realistic possibility.

Crises often sets the stage for action and new beginnings are set in motion. There has never been a better time for this type of research

endeavor in North Dakota. The attitude of the people is favorable for economic development within the state and the need has never been greater. Jobs and prosperity are coveted items held by all. The people of this state, I believe, would like to capitalize on investment opportunities that have a favorable chance of succeeding. Finding and funding new ideas for old objectives, i.e., jobs, increased real incomes, and building to create a greater reservoir of wealth are all needed and desirable goals in economic development.

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