



Diversity of incentives for private forest landowners: An assessment of programs in Indiana, USA

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Abstract

Many government and private programs provide incentives for non-industrial private forest (NIPF) owners. Due to the complexity of this web of programs, the incentives of the programs are unclear. We focus on four specific programs that represent different rule structures—a federal cost-share program, a state tax incentive program, a nationwide private stewardship program, and a local private conservation organization. We perform institutional analysis of the formal and informal rules of the programs based on literature review, discussions with officers, and formal guidelines of the programs. We classify different types of rule structures, and explain them in relation to goals and organizational structures of the programs.

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Introduction

Non-industrial private forest (NIPF) owners own about two-thirds of the forest land in the USA (Deller et al., 2001, Hibbard et al., 2003). They are the primary domestic source for wood products (Rickenbach, 2002) and provide a significant contribution to non-timber ecosystem services of forests such as biodiversity, recreational enjoyment, and scenic beauty (National Research Council (NRC), 1998). Due to the importance of NIPF, programs have long been in place to influence their decisions, most originally designed to promote timber production. A review of the literature evaluating programs aimed at NIPF in the USA concludes that

attitudes of many NIPF landowners have moved away from financial considerations and that government programs especially may not have adapted well to those changes (York et al., 2003). Government-sponsored forestry programs, including cost-share, tax abatement, and certification programs, are found in the USA and in many other countries, so findings from the American context may provide an insight for other countries (York et al., 2003). Within the USA many new NGO programs for NIPF owners have emerged recently, but it remains unclear whether these programs better fit changing landowner preferences.

Institutional analysis may help us to identify the source of the mismatch between the desires of NIPF landowners and activities supported by programs. Institutions are the formal and informal rules that govern interactions between humans and resources. Drawing on the institutional analysis development (IAD) framework (Ostrom et al., 1994), we define the problem of private landowners' providing forest benefits as a given action arena, with individual components that

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combine to create and enforce a particular set of rules. The components of that arena are the action situation and the actors (Ostrom, et al., 1994).

The action arena of today was created by a historical trajectory of changing economic and social–environmental pressures. In Indiana, in the early 1800s, 86% of what would become the state’s 22.9 million acres were forested, which shrunk to 1.4 million acres, or only 6%, by 1920. As marginal farmland was abandoned in the 1930s, fields began to revert to forests. Currently, Indiana has over 4 million acres of forest (Nelson, 1998), 90% of it in the hands of about 150,000 NIPF owners (Tormoehlen et al., 2000). These forested lands are now appreciated for their aesthetic and recreational benefits, as well as their timber production. Indiana is an ideal location to evaluate the potential of NIPF programs to increase the extent of NIPF lands, unlike the Western USA where a larger portion of the forested lands are public or much of the Midwest where a greater portion of the undeveloped, private lands are agricultural.

We investigate forestry programs to access their ability to meet changing landowner needs. There are 101 programs in Indiana; of these programs, there are 76 state and federal government programs and 25 non-governmental programs that may affect a landowner’s decisions (Carlson et al., 2002). Among the 76 government programs, 30 state and federal programs are specifically targeted at creation and maintenance of forest cover on private lands in Indiana (Carlson et al., 2002). Of these government and NGO programs we have selected four: government cost-share, government tax reduction, private certification, and private land trust. The cost-share programs are the Federal Farm Bill Incentives Programs, the government property tax is Indiana’s Classified Forest Program, American Tree Farm System represents private certification, and finally the Sycamore Land Trust represents private land trusts. The programs also represent different geographic scales for private and government programs with the Classified Forest Program administered and funded by the state, while the Federal Farm Bill is federally funded. The Classified Forest Program is the most widely used state tax incentive program targeted at forestry. The Federal Farm Bill Incentives Program is the largest federal cost-share program. The Tree Farm System is nationwide, while Sycamore Land Trust is an Indiana trust that is mainly found within a few counties. The American Tree Farm System is the largest private certification program in Indiana. The Sycamore Land Trust Program is the largest locally controlled land trust in Southern Indiana.

In this exploration of forestry incentive programs, we first discuss general frameworks for the study of institutions for natural resources; then analyze the differences in the types of rules the four programs represent and examine the relationships between the different actors in the action arena, through information

gleaned from official program documentation and discussions with program officers and knowledgeable experts. We explore how landowners make these program participation decisions within a larger social–ecological system. Within the social–ecological system we investigate the program officers’ roles in NIPF creation and maintenance, as well as the role of the NIPF on the landowner.

Governance of social–ecological systems

Individuals who live near a forest, users of a particular forest resource, and those who live at some distance all benefit from the “public good” of protecting forested land. Without some form of intervention, society sometimes faces the problem of the under-provision of a public good (Ostrom and Ostrom, 1999). Ostrom et al. (1994) distinguish between interventions aimed at the “provision” of a resource, such as creation of forest reserves and parks, and those intended to affect the “flow” of the resource, such as those geared toward controlling resource extraction or promoting replacement of extracted units. Anderies et al., (2004) provide a general framework of social–ecological systems that we use here, adapted for the case where land is owned by a private landowner and governmental and NGO programs try to affect the decisions made by the private landowner (see Fig. 1). As defined by the IAD framework (Ostrom et al., 1994), this model represents the action situation within the action arena.

The participants in the action arena related to private forests occupy various positions—the program officer and the NIPF owner in Fig. 1. Actions taken by these participants are represented by the flows (arrows) between them and participants in other positions, land, and the programs themselves. The actions of the NIPF landowner, for example, are represented in the arrow to

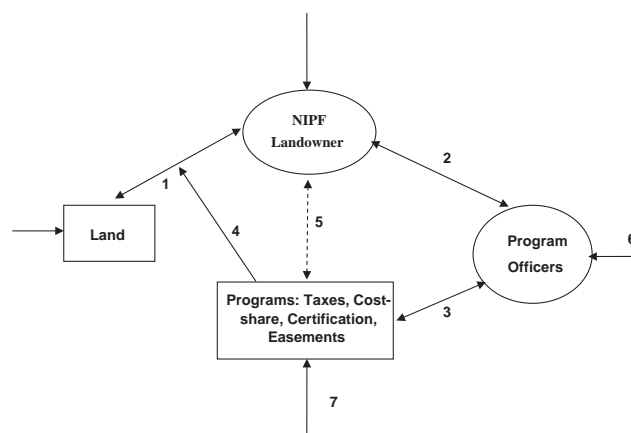


Fig. 1. A conceptual framework of a social–ecological system of forest management of NIPF (adapted from Anderies et al., 2004).

the land (Flow 1), indicating any number and kinds of activities. Thus, the forest owner does influence the condition of the forest. Likewise, the forest condition may influence the NIPF landowner's decisions about forest use. Actions taken by the government or NGO official are represented in Flows 2 and 3. Flow 3 represents the program officer's relationship to the programs. These programs may be aimed at affecting the flow of resource units, by rewarding particular actions, such as tree planting or timber stand improvement (TSI) practices (Flow 4), or at the provision of the resource, by capitalizing on an aspect of the owner himself, like paying him to maintain his land through conservation easement (Flow 5).

Actions taken by any participant are predicated upon several attributes of the individual actor—preferences, access to and ability to process information, making decisions, and the resources available (Ostrom et al., 1994). These too affect the flows between elements within the framework in Fig. 1, whether the participant is a landowner or a program officer. Typically, specialized departments and program officials implement government policies. Political realities or agency biases may prevent necessary changes from being adopted at any level. Flow 4 is largely affected by Flow 3. NIPF owners' preferences for wildlife habitat or preservation may be in opposition to a cultural bias of some foresters who are primarily trained to harvest forestlands. Anderies et al. (2004) mention the importance of the connections between resource users (NIPF landowners) and public infrastructure providers (program officers). A more distant relationship might lead to a decline in taking the demands of NIPF owners into account. The level at which program design occurs is essential here. If programs are developed and altered close to the action arena—for instance, by on-the-ground foresters—they are much more likely to adapt quickly and well to the needs of users. Thus, through Flow 2, different types of programs will vary in regard to the number and strength of various means by which NIPF landowners can influence program officers.

Comparison of four programs

In this section, we examine the rules and interactions between the main program actors in the social–ecological system. Through this exercise we are able to identify potential areas for changes in the institutional structure within each program in order to better serve the overall goal of increasing the NIPF extent.

Classified forest program

The Indiana Department of Natural Resources (IDNR) Division of Forestry administers a program

known as the Classified Forest Program (CFP) adopted by the state (Indiana Code 6 1.1–6), with the goal, according to the Division of Forestry web page, (<http://www.state.in.us/dnr/forestry/privateland/clasfor.htm>) to “keep Indiana's private forests intact.” Classification of a forest results in a reduction of assessed value for state property taxes. The incentive of the program is relatively weak, as it provides property tax relief in a state where property taxes are very low, particularly on forestland. The burden of this tax break is transferred to other local landowners. Thus the actors involved here include the Division of Forestry, the state legislature, the private landowner, local taxpayers, and local tax authorities (Table 1). The timber industry is indirectly involved by its lobbying for incentives that stimulate forest management for timber production.

To qualify for the CFP, land must be at least 10 contiguous acres of forest with no conflicting uses (such as pasture or residential). If native (i.e., natural hardwoods), forests must contain “at least 40 ft² of basal area per acre, or at least 1000 timber producing trees (any size) per acre,” and plantations must have “at least 300 well-established timber producing trees” per acre (Nelson, 1998). Costs to the landowner are basically limited to a professional survey, and those associated with excluding grazing animals. A management plan is required, which is most often done for free by the State's District Forester (Table 1). Plans often recommend active management, but there is no commitment to fulfilling the plan. The program is implemented by a few on-the-ground foresters who have very close interaction with the landowners. Beyond the tax break, participation in the program provides regular access to a state forestry official, which may increase the likelihood of participation in other programs, such as the federal cost-share program discussed below.

The 10-acre size restriction increasingly limits the number of eligible properties, as the average size of forest ownership has been decreasing over time (Birch, 1996). One potential weakness of CFP is the focus on timber, although there is no explicit requirement that timber be cut. The emphasis on timber is not in keeping with the evidence that non-timber benefits are the most important to the majority of NIPF owners, thus we begin to see the mismatch described above. The individuals, or actors, who are key to the outcomes of this program are the IDNR District Forester—who determines eligibility, creates the management plan for the property and conducts periodic inspections, and the NIPF landowner who assists in management plan development and whose actions may or may not be affected by participation. Participation in the program automatically makes one eligible for the federal cost-share programs, because the requirements are the same: a management plan and a minimum of 10 acres. Active management for

Table 1

The actors involved in the classified forest program (CFP), forestry incentives program (FIP), tree farm system (TFS) and Sycamore land trust (SLT)

	CFP	FIP	TFS	SLT
NIPF landowner	Tree planting (1), timber sale (1)	Tree planting (1), timber stand improvement (1);	Active management toward timber goals other goals (1)	Flexible set of possible outcomes including: residential development (1), timber sales (1), hunting (1), non-timber product gathering (1), strict conservation (1);
Private forester		Suggests program (2), approves plan (2), inspects work (2)	Inspection (2), report to state tree farm committee (6) and requests admission (6)	
District forester	Determine eligibility (3), write management plan (2) and monitor activities (2); Suggest other programs (2); Communicate landowner needs and preferences to state forester (6)	Suggests program (2), approves plan (2), inspects work (2)		
State forester	Communicate budget needs to state legislator (6)			
County officials	Changes land valuation for tax purposes (4)			
State legislator	Inclusion rules (7); provide money to administer programs to state forester (6)			
US congress		Provide subsidies (4), defined inclusion rules and supported activities (7)		Income tax reduction (4), create regulation (7)
Local population				Willing to pay for conservation administration (7)
Indiana taxpayers	Willing to pay for conservation (7)			
US tax payers		Willing to pay for conservation (7)		Willing to pay for conservation (7)
Timber industry	Concerned about future timber supply lobby state legislator (7)	Concerned about future timber supply lobby US congress (7)	Concerned about future timber supply and support tree farm system (7)	
Farm service Agency or natural resources conservation service		Receive subsidy (7) and disperses reimbursements (4)		
State tree farm committee			Decision on eligibility (5)	
National TFS board			Define qualifications for being inspector (3) and define rules for good management (5)	
SLT board of directors				Conservation goals (5) and decision on eligibility (5)

For each actor we define briefly the type of activities related to the programs. We identify the flow that each activity is related to in Fig. 1.

timber also brings one closer to the goals of the American Tree Farm Program.

In 1998, there were 8300 properties enrolled in the program, covering 410,000 acres owned by 6300 landowners (Nelson, 1998), which is 10% of private forested acres and less than 5% of the estimated 150,000 forest

owners. A possible explanation for this small percentage is the low small property tax benefit, but recent property reassessments may result in more applications for the CFP. The costs are also low, but potential participants frequently assume there are many restrictions on the use of the land because CFP is a government program.

If the CFP is not very successful in gaining a large portion of the potential participants, why is the program continued? According to the CFP officers, their program is successful. They mention the steady annual growth, but are unable to show whether or how the program has affected management of the participating properties. The CFP might be successful, but we have to identify the indicators on which this is defined. The resources for the CFP are provided by the State, and the resources for IDNR are modest. Although the area of forest has increased during the last century, the number of officers has not, giving no incentive to increase participation rates rapidly. Also, the program officers are evaluated on how they spend their time and money, not whether they affect land-use change decisions for NIPF. Furthermore, there is limited evidence about the actual influence of CFP on landowner behavior. The rules for the program are fairly limited, only requiring fencing to keep out wildlife, existence of a management plan, and ban on development of the property. The landowner is permitted to harvest the timber in any manner, although most allow or promote reforestation after the harvest. Thus the program is fairly flexible due to the lack of formal rules, which is both a strength and weakness.

Within Fig. 1 in the CFP, the NIPF landowner has direct contact with the District Forester, but the program officers defining the rules, the IDNR Division of Forestry Head and the Indiana Legislature have limited contact with the landowners. Furthermore, in conversation with District Foresters, they believe that they have limited power in adapting the rules to meet the needs of CFP participants. The distance between the rule makers and both the participants and District Foresters limits the ability for the incentives to be adapted to meet the original goals of the program, protection of forest resources through increase in the extent of NIPF lands. Thus, if the general public, Indiana Legislature, or IDNR wished to promote particular types of forest management practices, CFP as currently structured would not be an effective means for implementation of the practices. Recently, attempts have been made for communication between the Head of the Division of Forestry and CFP participants. These conversations will strengthen the ability of the IDNR to serve the program participants, although changes are somewhat limited by the legislation. One particular concern with the CFP is recent discussion for an increase in the minimum acreage for enrollment. The proposal stems from the inability of the District Foresters to serve the increasing number of participants with small acreages, near the minimum ten acres. Given the increasing fragmentation of forestland throughout the USA, this particular proposal is of utmost concern. We recommend that more time and money be allocated for field officers in order to enable participation of small acreage NIPF owners.

Federal farm bill incentives

In 1978, the US Congress passed the Cooperative Forestry Assistance Act, which authorized the US Secretary of Agriculture “to establish a coordinated and cooperative federal, state, and local forest stewardship program for the management of non-federal forest lands” (USC. 16 41 2101). As part of this act, the forestry incentives program (FIP) was established, which paid landowners for practices to “provide for afforestation of suitable open lands, reforestation of cutover or other non-stocked or understocked forest lands, timber stand improvement practices, and other silvicultural treatments and protection, so as to provide for the production of timber and other forest resources associated therewith.” Eligible practices under FIP include tree planting, thinning of overstocked stands, and other timber stand improvement activities. Up to 65% of the total cost of the project can be reimbursed by FIP.

The original act set forth requirements for landowners to qualify for FIP money: own a minimum of 10 acres of forestland for which they have a written management plan that has been approved by the state forestry agency. Improvement activities are done first and inspected by a state forestry official, who then files paperwork for reimbursement. Though the state forestry agency has been doing the inspections, the program funds were administered first through the farm service agency (FSA) and later through the natural resources conservation service (NRCS), so there always have been at least two bureaucratic entities placed between the landowner and the money—and there was no guarantee that money would be paid for undertaking the activity. Success of the program, if defined as fair allocation of the monies across a wide variety of landowners, has relied heavily on the priorities of and relationships between the state forestry agency and the FSA or NRCS at the local level. According to a report from the NRCS, over 200 Indiana landowners received \$260,000 to conduct activities on 8600 acres of land between 1997 and 2000. In fiscal year 2000, only 50 applications were received. Thirty-two projects were approved for a total expenditure of \$46,000 in Indiana.

At least in the case of Indiana, the amount of money appropriated and the number of landowners and acres participating in this program seem small. The burden is on the landowners themselves to obtain reimbursement for their activities, and on the state forestry agencies to assure that the money is being paid only for activities aimed at improving timber productivity. Costs to the landowner include a minimum ten-year agreement to maintain reforested or improved areas in forest and, in the case of tree planting, some additional work within three years from planting (funding available), and preparation of the land management plan (Table 1).

The actors involved include the FSA and NRCS, the forestry officials, the NIPF owners, the US taxpayers, who foot the bill, and the US Congress, which enacted the program.

Funding for FIP has always been dependent on Congressional allocation and then on the Secretary of Agriculture's disbursement among the states. Funding levels have decreased greatly over time as other programs have been created and implemented. The FIP program was augmented by several amendments in subsequent Farm Bills in 1990, 1996, and 2002 that created several other forestry-directed federal programs. The 1990 Farm Bill added the Stewardship Incentives Program (SIP), specifically stating that its funds had to be used to "complement rather than replace or duplicate" FIP, and that activities such as tree planting had to be "designed to provide multiple resource benefits not available through other cost-share programs." In 2002, FIP and SIP were both repealed and replaced with the Forest Land Enhancement Program (FLEP). One major difference in FLEP is that it removes the middle man (NRCS) from the equation, and allows funding priorities to be set by a state forestry board. Depending on the state and the board members, these priorities may lean more toward timber practices or more toward promotion of other values. In Indiana, the board consists of a concentration of timber interests and state and private foresters. There is a definite emphasis on forestry professionals, though conservationists (and even preservationists) are present.

Though total transfer payments may be low, as is the case for Indiana, one can argue that the programs are successful, since there is more demand than supply, and the program officers spend all the money they have to allocate. There is a significant distance between those who provide the resources and those who derive the reimbursement, and there is no monitoring of whether the program has any effect on decisions about NIPFs. According to conventional economic theory and empirical studies, cost-share programs should not and have not had any significant effect on decision making by NIPF landowners (York et al., 2003). Thus, cost-share programs may not increase NIPF extent, but rather reward landowners already choosing reforestation or timber stand improvement activities. If we evaluate the program with regard to the general goal of increasing NIPF extent, we may deem these programs ineffective. It may be difficult to improve the effectiveness of these programs because of the great distances between the policymakers and Washington and the program participants. Recently, the IDNR has taken over the allocation of Federal Farm Bill forest incentive monies within Indiana. Under IDNR leadership, district foresters may be able to more effectively target monies at projects that are of high priority and would not be completed without cost-share.

American tree farm system

The American tree farm system (ATFS) is a privately funded institution that recognizes good stewardship of timber resources. ATFS was established in 1941 by the Weyerhaeuser Corporation in response to industry concerns that America's private forests were being cut at unsustainable rates without reforestation. ATFS certification raises the visibility of private landowners who practice long-term forestry management—a pat on the back to the landowner and an advertisement to neighbors to promote good timber management. Until recently, "good forest management" within ATFS meant a maximum sustainable yield of timber. However, due to increased threats to forest from development, changes in the objectives of landowners, and a steady decrease in the longevity of ownership, ATFS purports to shifting toward an emphasis on preserving land in a healthy forested condition—regardless of management objectives or activities. In the past 25 years, the average property in the ATFS has shrunk from 80 to about 25 acres.

ATFS provides no monetary reward or incentive to the landowner. The only explicit benefit of membership is the distinctive Tree Farm sign, which signifies membership, and a regular magazine of the ATFS. Tree Farm status in itself does not garner the owner higher prices for timber than other landowners would receive, but this may change with the growing importance of "Certified Wood Products." ATFS is currently in the process of tightening standards for ATFS membership, so products from ATFS forests may be considered certified. To accomplish this they are formalizing their standards for forest management to comply with those of other US and international certification standards (e.g., Forest Stewardship Council, ISO, National Woodlandowners Association) and requiring the professional foresters who inspect lands for inclusion and retention in the program to undergo formal training in those standards.

The actors involved include the timber industry, which created and funds the program; the federal Tree Farm committee, which makes the rules for inclusion; state Tree Farm committees, which elect delegates to the federal committee and recruit volunteer private foresters who perform inspections of the activities of NIPF landowners, and the NIPF owners (Table 1).

This program is unique in our suite, as there is no government involvement, nor is the program facilitated by any state or federal legislation. Landowners who mistrust government may be more likely to work with a private group—especially an industry. The official logo/symbol of the Tree Farm has changed to reflect changing landowner preferences. This program rewards activities already being undertaken by the landowner, so it rewards a belief system that already exists, rather than

trying to create or influence one. Very few actors are involved, but like the federal program, rules are made away from the landowners. The program relies on private volunteer professionals to implement its rule sets, so its outcomes are dependent on the availability and interest of local foresters, and their beliefs about management. Costs to the landowner are limited to creation of a management plan and undertaking active forest management. The rise in the visibility of Forest Certification programs may provide an added benefit to landowners. As in FIP, the management plan must exist in order to qualify for the program, so a certain group of landowners is already eligible. This program creates an identifiable constituency whose name can be invoked by industry when trying to influence state and federal legislators, thus it allies its landowners with the timber industry.

Sycamore land trust

The Sycamore land trust (SLT) is a private land trust founded in 1990. The SLT was formed and is primarily funded at the local level by citizens familiar with the problems and unique characteristics of the local ecosystem. It is primarily focused in Monroe County in southern Indiana, but does have a few lands in surrounding counties. Like most land trusts, SLT was intended to fill the widening gap between government programs and the needs and desires of many landowners—to provide money to help private landowners realize benefits for land management aimed at creating habitat for wildlife and aesthetic enjoyment. The SLT raises funds to purchase or accepts donations of individually negotiated conservation easements on private lands that preclude specifically mentioned activities—by the current landowner and any subsequent purchaser. To date, no challenge to an existing SLT easement has occurred, but federal courts in other parts of the country have upheld similar agreements. If SLT should dissolve for some reason, the easements they hold would be transferred to another “like-minded” institution. SLT has 500 members (individuals who contribute money and time to aid the mission), owns 22 properties totaling 900 acres, and holds easements on 1740 acres.

Since 1964, conservation easements have provided tax relief through the charitable donations rule in the federal income tax code (McLaughlin, 2002) and have been recognized in most states. The government’s role is quite limited, although both federal and state governments have used the conservation easement tool for forestland protection such as the Federal Forest Legacy Program and the Georgia Conservation Use Tax Policy (York et al., 2003). Land trusts have sprung up throughout the United States as a mechanism to protect forestland without government involvement (McDonald, 2002).

Again, as with the ATFS above, the SLT may attract landowners who mistrust government but are willing to work with a private group. However, SLT uses a combination of several tools, including providing information and technical assistance in the use of government programs. SLT participants are often encouraged to take advantage of FIP and Classified Forest Program.

Within SLT, conservation goals are set on an ongoing basis by the current board of directors (Table 1), and decisions about acceptance of easements is made by them as well. The decision about acceptance depends on the anticipated transaction costs of monitoring the property, which are related to size, distance from the main body of holdings, and the desires of the landowner (level of protection). Agreements are tailored to the landowner and flexible in requirements and activities allowed. Costs to the landowner include a professional survey and appraisal of the property. A conservation easement on land could be seen as an asset or a liability (more likely) for future sale value of real estate.

The continued existence of SLT depends on local financial support and involvement of board members and volunteers. SLT’s ownership of lands increases the likelihood of some type of financial insolvency that would require easements to be transferred to another entity. If an easement is violated the only recourse SLT has is to sue the landowner, which could prove very expensive. SLT must ensure that future landowners are aware of the easement and continue to monitor compliance after a transfer of property. Relationships between those desiring an easement and those on the board may be very important—access, trust, and mutual understanding. In contrast to FIP, infrastructure and providers are one and the same. Key actors include US taxpayers footing the bill for conservation and the US courts that interpret legislation aimed at charitable donations to include donations of rights to land. At the local level, the key actors are the SLT board and membership, and the NIPF landowner.

Discussion

We find that government programs reviewed are generally less adaptive to potential changes in the action arena than their NGO counterparts, mostly due to their bureaucratic structure, although recent changes in the Federal Farm Bill forest incentives may increase the ability of the monies to be effectively allocated. Money is allocated at the federal or state level, where the majority of the rules for inclusion are created. The implementation stage may leave room for the state-level agency or field forester to interpret the rules to better meet the needs of landowners, but there is generally not enough flexibility to make individual rule sets

tailored to the needs of each landowner. Eligibility requirements affect who participates. Those based on a number of contiguous forested acres or existence of a management plan for those acres are likely to exclude landowners whose objective in owning forest is not profit maximizing.

The programs also affect incentive structures for other actors. Wintrobe (1997) argues that bureaucrats are seeking to maximize budget and trying to shape policy. Elected officials may control the bureaucracy through creation of rules for bureaucratic action. The explicit mandates within legislation serve to control the bureaucracy. Officials may also create competition among agencies in order to force one to use funds more efficiently or to implement legislation in the expected manner (Wintrobe, 1997). Furthermore, bureaucrats may be controlled by officials through relationships built on trust and loyalty. Bureaucrats may exert some power created through vagueness in legislation. Since bureaucrats frequently have great expertise in a particular policy area, in comparison to elected officials, citizenry, and landowners, they also might be very influential in crafting legislation. This power may lead to a disjuncture between landowner preferences and policy, as bureaucrats at the agency level, whether the state's Department of Natural Resources or the federal Department of Agriculture, frequently have different preferences from both elected officials and the general public due to education and self-selection for employment in the sector. In the case of the US Forest Service and the IDNR Division of Forestry, their educational backgrounds in silviculture and timber production may bias policy implementation in favor of economically based incentives centered on timber production. We may expect that agency officials will attempt to meet policy goals with the least amount of funds and efforts. For instance, most forest policy goals are measured by acres planted or forest acres protected. Therefore, a rational forester will use secure relationships with landowners to maximize the acreage in the program with the least amount of effort. The official may suggest that a landowner participate in several programs. The agency official then limits the time-consuming work of establishing new relationships with other landowners. Though a new landowner has not been reached through the additional program, the enrollment is viewed as an increase in the success of forestry incentives.

Though individuals who are indirect beneficiaries of forest land may be willing to pay for non-timber benefits, they are not generally targeted with forest policy. On the local level there may be some action in particular communities, but on the state and federal levels these people are not necessarily organized. Olson (1965) indicates that it is difficult for people with limited interest in particular issues to organize for a specific purpose. Therefore, we expect that individuals with

preferences for forest, although not strong preferences, would be less likely to develop cohesive organizations than those with strong preferences like farmers or loggers. This lack of organization may be exacerbated through the electoral process, as timber-interest groups may dominate. In some respects the timber industry also can tap into support from other concentrated interest groups such as the agricultural lobby. In addition, timber interests are frequently more geographically concentrated, specifically in the Southeast and the Northwest. Within the timber industry concentrations, elected officials may receive incentives through campaign contributions from the timber industry to support a pro-industry policy. Elected officials from other areas, where a majority of citizens wish to minimize timber industry impact, may not receive either full electoral support or campaign contributions because the constituency is not solely focused on forest policy. Therefore, we may expect that forest policy, similar to agricultural policy, will favor the timber states with limited input from other areas in the USA (Arnold, 1990). Therefore, the weak links between the disassembled environmental interests and the officials, as well as the different backgrounds of the agency officials and the electoral body may result in policy implementation that does not effectively mirror the preferences.

We find that actors within each of the program have different roles and responsibilities (Table 1). The landowner is involved in all of the programs, although the management activities vary widely among the programs. The CFP and SLT allow the landowner to choose a wide range of activities, while FIP and TFS focus on actively managing timber. Foresters are actively involved with all programs except SLT, although with CFP and FIP the district forester plays a primary role. The citizenry also has differing roles with each of the programs. The CFP and FIP are supported by state and federal tax dollars, while SLT is supported by private donations mostly from area residents. FIP is justified as a means to maintain a national timber supply. Similarly, CFP is focused on maintaining timber resources, although IDNR also argues that CFP land provides habitat for area wildlife. SLT is focused on maintaining the rural and natural local landscape. Thus the geographic region and monetary support are fairly well matched. Overall, these different types of programs allow landowners to choose roles and responsibilities that match their preferences, as well as their preferences for government involvement. There is variation in the flexibility of the programs, but landowners may be able to effectively use the programs in a portfolio manner.

Our analysis led to some interesting questions for future research on land use policy. How do government programs provide incentives to private landowners to change their behavior in line with the goals of governmental policies? How do we evaluate the effect

of policies if the impacts are difficult to measure? And how do private landowners express their demand to program officers? To address these questions more understanding of incentive structures for the large diversity of actors involved in a variety of institutional structures need to be investigated.

To conclude, the current diversity among NIPF landowners creates different niches for programs. Many government and NGO programs were created in a time when NIPF landowners were more homogeneous. Depending on government forestry departments to develop innovative institutions to promote non-timber forest benefits may require a restructuring of the incentives of government officials and the educational backgrounds of those who hold those positions.

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