SETTING THE FOUNDATION FOR REFORM:

THE WORK OF THE RURAL SYSTEMIC INITIATIVES

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April 2001

INVERNESS RESEARCH ASSOCIATES

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An Executive Summary of Conference Proceedings

In the spring of 2000 Inverness Research Associates, with support from the National Science Foundation, organized a conference for the leaders of the eleven projects funded under the NSF's Rural Systemic Initiative (RSI). This Executive Summary[1] is intended to capture the most important themes that emerged from the conference conversations. In addition we include a brief commentary on the conference from our perspective as evaluators of systemic change initiatives.

The following themes and ideas are, we believe, essential to understanding the work and accomplishments of the RSI projects:

1) **The RSI projects serve small, rural and very poor communities.**

   It is critical to understand that the RSIs are attempting to improve mathematics and science education in large regions that are not only rural, but, in fact, include many of the poorest counties in the United States. The RSI communities within these regions are small, widely dispersed, and often inaccessible. And while there are real differences among the regions served by the RSIs, the projects share many common defining features. Most centrally, they all serve rural communities that have suffered for decades from oppression, exploitation and chronic poverty.

2) **Rural communities are ambivalent toward education — and wary of "outside" efforts to improve education.**

   The attitude of many rural community residents toward education is mixed at best. Many people in RSI communities do not hold high school diplomas, and many fewer have higher education experience. They are inclined to distrust the whole process of schooling, seeing it as irrelevant or, even worse, as a pathway that leads to their children choosing to leave families and community behind if the children

[1] For the full report see *Setting the Foundation for Reform: The Work of the Rural Systemic Initiatives* at www.inverness-research.org.

are successful. Not surprisingly, then, community members often share a deep-seated distrust of outsiders who come to their communities with offers of "help," hoping to "improve" existing educational opportunities.

3) The RSIs are working to set the foundation for future reform.

Because of the unique challenges these very poor and rural areas present, the nature of the work that the RSIs are engaged in is inevitably quite different from other mathematics and science reform projects. Much of the work of the RSIs centers around "setting the foundation for reform." Using this term repeatedly, the RSI leaders likened their efforts to building the foundation for a house. While a firm foundation is essential to the strength and integrity of the completed house, building it is a slow, laborious process. Furthermore, participants affirmed, foundation work is not often visible or appreciated once the house nears completion.

4) The RSIs have made sound progress as they initiate the process of educational improvement.

The RSIs are accomplishing the following important elements of "foundation setting" as they work within their rural regions:

- The RSIs are helping local communities to develop an increased understanding of, and even a demand for, improved educational opportunities for their young people, particularly in mathematics and science education.

- The RSIs are recruiting and developing local leaders (teachers, administrators and community members) who are committed to and capable of sustaining future reform efforts in mathematics and science education.

- The RSIs are helping these local leaders develop working relationships with each other, as well as make connections with additional outside state and regional resources.

- The RSIs are also working to initiate and develop a broader supportive community context for improved mathematics and science education, including increased support from parents, school board members and business leaders.

- Finally, as understanding and trust grows, the RSIs are putting in place new curricula, new professional development offerings and new evaluation processes — all aimed at helping local teachers and administrators work together to improve the quality of their mathematics and science programs.

5) The work of the RSIs is, in essence, community development work.

Viewed from the outside, and compared with other NSF projects, the work done by the RSIs may appear slow or inconsequential. This judgment is, however, incorrect. Only when one truly understands the nature and depth of the challenges facing chronically poor, rural communities is it possible to see that the community development work the RSIs are doing is an essential prerequisite to further mathematics and science reform.

6) The RSI projects should be evaluated rigorously but also appropriately.

The RSI leaders are proud of the hard work they have done and of the accomplishments they have achieved. They are certainly willing to have their work evaluated and their projects held accountable for the investment that has been made in them. However, they ask that their work be evaluated in terms appropriate to the nature of the challenges they face, and to the nature of the foundational work in which they are engaged.

Specifically, they feel it is far too early to judge their work in terms of its impact on student achievement. Rather, they feel it more legitimate and useful to assess the degree to which they are enhancing the capacity of the community to initiate and sustain an ongoing process of reform. Appropriate assessments, they argue, would focus on outcomes such as the creation of leadership, the development of a shared vision, and the creation of a supportive community context. It is clear that such assessments would require the use of a range of multiple and creative measures.

In summary, we think the Rural Systemic Initiative illustrates well the depth of the challenges the NSF and others face as they seek to help narrow the "achievement gap" in this country. The discussions at this conference illuminated vividly the very difficult conditions encountered in impoverished, rural areas — the Navajo Nation, Native Alaskan villages, Appalachian "hollers," and Mississippi river towns. These pockets of impoverishment, where people have for many decades been systematically oppressed and exploited, and subsequently forgotten, are not amenable to shortcuts or "quick fixes." These communities have seen many short-term outside projects come and go. The current absence of capacity in these communities is the result of decades of exploitation, neglect and isolation; unavoidably, it will require a long-term steady effort over many years to build up these educational systems.

It is to the NSF's credit that they allocate and target resources to addressing the inequities that exist in these, the most distressed and disadvantaged rural communities in the nation. The projects of the Rural Systemic Initiative are facing very serious challenges as they directly address the core issues of persistent poverty, and as they work to initiate a local sustainable process of educational improvement. What is

needed now is the patience and political wisdom to continue the long-term and steady work that the situation demands. If the NSF and its RSI projects can continue to hold their course, to evolve their work, and to focus their efforts on setting in place a strong foundation for further reform, then the Rural Systemic Initiative will have served these communities well and provided them with long-lasting benefits.

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April 2001

INVERNESS RESEARCH ASSOCIATES

INTRODUCTION

In the spring of 2000 Inverness Research Associates,[2] with support from the National Science Foundation[3] organized a conference for the leaders of the eleven (11) projects funded under the NSF's Rural Systemic Initiative (RSI). The goal of the conference was to bring together the most experienced RSI leaders with those who were in the earlier stages of their work, and provide them a stimulating and safe venue in which they all could reflect upon their efforts to improve mathematics and science education in poor rural communities.[4] Initially funded in 1994 the four most "mature" of the Rural Systemic Initiative projects, which had approximately five years experience, provided the nucleus of the conference discussions by making short presentation of their "cases."[5] (These cases are summarized in Appendix B.) In addition to the goal of mutual learning, we hoped that the participants' discussions would illuminate more general lessons about the nature of the work involved in improving mathematics and science education in poor rural areas.

Our experience of studying other state and local systemic initiatives led us to believe that we would hear about similar challenges and strategies, albeit from a slightly different, rural perspective. Thus, we anticipated that the focus of the conversations would be centered around such issues as selecting and implementing standards-based curriculum, designing professional development programs, and developing teacher leadership. In reality, the conference discussions unfolded quite differently. Although the conference participants did talk, thoughtfully and knowledgeably, about all of the usual dimensions involved in systemic reform, these issues were not foremost in their minds. Rather, the central focus of the conference was on the defining features of the rural communities they were serving — their impoverishment, their history, and their integrity.

Working in Appalachia, Alaska, the Mississippi Delta, the Atlantic southeastern coastal region, and other rural regions around the country, the conference participants described struggling with powerful social, political and cultural forces. The challenges and strategies they shared with each other sounded more like those that would have been discussed at a conference on community development rather than educational reform. As the conference proceeded, it became clear to us that the leaders of the RSIs could not limit the focus of their work to mathematics and science education. Rather, they were forced by necessity to face and address very deep socio-economic issues of poverty, and even deeper issues of historical and cultural isolation in their communities.

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[2] For more information about Inverness Research Associates, please see: www.inverness-research.org.
[3] NSF Award # ESR-9912436.
[4] For a fuller description of the conference and participants, please see Appendix A.
[5] The first funded RSI projects included ARSI (the Appalachian Rural Systemic Initiative), AKRSI (the Alaskan Rural Systemic Initiative), UCAN (Utah• Colorado•Arizona•New Mexico), and TCRSI (the Tribal College Rural Systemic Initiative)

As they described their rural communities and their work, a sense of recognition occurred among the participants, each seeing in the others a mirrored reflection of themselves and their struggles. Although some participants worked in the hills of Appalachia, while others worked in the Navajo Nation, they seemed to understand each other deeply. What came as a surprise, especially to the participants themselves, was how alike, not how different they were. Though the leaders of each RSI had often thought of their challenges as unique to their own situation, they were amazed to realize that the people from Alaska understood the people from the High Plains, who understood the people from rural Georgia and Florida. Why was that so? We believe that their common understanding was possible because they were all facing the same daunting task — the initiation of reform in the most rural and impoverished regions in the United States.

It also became apparent to us, as each RSI spoke about their efforts, that the work the Rural Systemic projects had been funded to do was much more complex than anyone had originally imagined and that the original vision of their work was overly ambitious and overly optimistic in its assumptions. Participants talked at length about the deep underlying challenges that faced them as they sought to find entry points into these communities, to create a shared vision of educational improvement, to develop local leaders and to create a supportive context for the improvement of mathematics and science education. Covering multiple states, and serving many very different isolated communities, many of the RSIs found themselves struggling simply to get a foothold in the counties, districts and schools they sought to serve.

We think it is important to note early on that, in essence, what we heard at the conference was an appeal from the participants. We heard them appeal for us and others to understand the nature of their communities, and the difficult challenges they are facing. We also heard them argue for the necessity and legitimacy of the work they were doing — the "groundwork and "foundation setting" that must occur before they can even begin to address the quality of mathematics and science instruction. Finally, the participants made an argument for reasonable expectations of, and appropriate supports for, the work they are doing. Most especially, they wanted to find accountability processes appropriate to and aligned with the type of "groundwork" they were doing in each of their communities.

This monograph is intended to respond to the appeals that we heard. Our hope is that the people involved in the Rural Systemic Initiatives, who are doing very real work in very real communities, can have a voice through this monograph. We will use their own words as much as possible as we attempt to represent and interpret what they said in a fair and honest way. However, this monograph is not intended to be a literal description of the proceedings from the conference. Rather, it is our attempt to portray the key ideas and issues that define the work of the RSIs. In this monograph, then, we attempt to capture and share not only what we heard, but also what we learned. We

offer the reader our own perceptions and understandings of what transpired at the conference. Thus, this monograph is more of an essay than it is a record of proceedings; it is more a translation than it is a transcription.

UNDERSTANDING THE NATURE OF THE RSI COMMUNITIES

The participants who attended the conference represented all of the RSI funded projects to date, which included four "senior" projects entering their fifth and final year of funding, two "younger" projects only two or three years old, and "brand new" projects transitioning from development to implementation phases.

Year funded	Rural Systemic Initiatives (RSI) 1995-2000 Implementation Sites
1995	—Utah•Colorado•Arizona•New Mexico RSI (UCAN) —Appalachian RSI (ARSI) —Alaska RSI (AKRSI) —Tribal College RSI (TCRSI)
1998	—Navajo Nation RSI (NNRSI) —Texas RSI —Delta RSI
2000	—Coastal RSI (CRSI) —Michigan RSI (MiRSI) —Southeastern RSI (SERSI)
2001	—TCU-Implementation —ARSI – Phase II —AKRSI – Phase II

The projects were not only developmentally diverse, but represented geographical diversity as well — from Alaska and Hawaii in the Pacific, across to tribal lands in the Southwest and North, to Appalachia and the Mississippi Delta in the east. And finally, the participants represented a great ethnic diversity — Native American, African American, Latino, White, Pacific Islander, and Alaskan Native peoples. Threaded through the diversity of regions and people, however, was the strong, common tie of a long history of extreme and persistent poverty — a shared history which bound the conference participants together. Much of the discussion at the conference focused on what it meant to try to assist communities that were both rural and very poor.
In what follows in this section we try to capture the key features that define the nature of the communities served by the RSIs. We came to see that if one does not deeply

understand these features, then it is very easy to misunderstand and therefore to underestimate, all that is involved in bringing systemic reform and educational improvement to these communities.

RSI communities are both rural and poor

The RSIs do not focus their attention simply on rural places. All rural communities are not the same; the participants pointed out repeatedly that there are many rural communities in the United States that are not poor. A key feature of the Rural Systemic Initiative is that it targets rural areas in economically disadvantaged regions of the nation that are characterized by persistent, and widespread poverty. The RSIs work in communities that have a severe lack of economic opportunity and resources available to them. Although the RSI communities do not share the same level of impoverishment, the communities involved in RSIs are, in fact, some of the poorest in the nation. The Tribal College / High Plains RSI participants told the conference audience:

> *The RSIs serve the poorest parts of rural America. The Tribal College RSI is actually serving the very poorest parts. We have within our program the poorest county in America, which is the Pine Ridge Indian Reservation. Right next to them is Rosebud, the 4th poorest county, and we are Turtle Mountain, around the 41st poorest county in the country. So we are serving some very, very poor people. [Referring to a map] the orange color represents populations that have a median income of under $15,000. I think that if we were to reduce that, say, to $7000 or even $5000, what we would see emerge on the map would be the Indian reservations.*

Living in an impoverished community, the participants explained, means having no jobs and having no economic opportunities. It means that the tax base is very low, and community resources are meager. It means that people have moved away, and that towns have deteriorated and been left deserted. It means that there are, perhaps, "…peanut farmers, tobacco farmers and convenience stores"[6] left in the community, but that is all. As a representative from the Appalachian RSI told us:

> *In our region in Appalachia there is no opportunity — people leave if they get an education, or if they are trained to do anything besides teach school… You can almost get no doctors to work in Appalachia; there is a big shortage of medical personnel. We have a*

[6] We taped and transcribed much of the conference, and have included quotes from participants throughout this monograph. The quotes we used are not always literal, direct quotes. Rather, we used our best judgment to edit them lightly to make the participants' words more readable and to convey more accurately what we feel the intent of their remarks to be.

big shortage of engineers, a big shortage of trained people of all kinds… people who get higher education often don't have a desire to go back. Living in Lexington is a whole lot more pleasant than living in Floyd County, Kentucky.

The Counties Served by ARSI

Lacking a diverse economic base, Appalachia has grown substantially slower than the nation in employment and earnings. The region has still not fully recovered from the economic restructuring of the 80's resulting from the diminishing employment opportunities in mining and manufacturing. The Appalachian region has attracted few of the nation's growing high-wage industries and their good jobs (Isserman, 1996) and continues to lag behind the nation in virtually every category.

Within Central Appalachia, even greater disparities exist among counties. The portion of Appalachia served by ARSI includes the most rural counties with the highest poverty. As the table below illustrates, the ARSI target counties exhibit a number of socioeconomic indicators of severe distress. The 66 target counties have improved since the inception of ARSI but, compared to the United States and the Appalachian region as a whole, still have the highest poverty rate, lowest per capita income, highest unemployment rate, and greatest percentage of adults lacking a high school diploma.

	US All Persons	Six ARSI States (233 Appalachian Counties)	ARSI Eligible (66 Counties)
Poverty rate (1996)	13.9%	13.31%	24.12%
Median Income (1997)	$25,288	$22,072	$14,187
Unemployment rate (1998)	4.5%	5.3%	8.4%
Adults with college degree (1998)	24.4%	22.8%	16.7%
Adults not finishing high school (1998)	17.2%	18.2%	24.8%

Data sources: US Census Bureau (1999) and ARC (1998)

The two participants from the Delta RSI described an even bleaker scenario:

In the Delta communities we work with, in Mississippi or Louisiana — in places like that — these are not places that hold any particular attraction. People that live there, live there in large measure because they don't have any choice — they have no mobility. They didn't graduate from high school; they have menial jobs. You see towns that may have once had some viability, but they are now boarded up. Many of our areas are very rural and very impoverished.

Moreover, for many people in poor rural communities economic marginality has persisted for many generations, resisting all efforts of public and private initiatives to reverse the poverty cycle and to foster economic growth. Being poor is seen as inevitable and a deep part of the culture; poverty is often the most salient feature of the community. Not surprisingly, the impoverishment is not just on the material plane.

Participants spoke articulately about the impoverishment of the vision and future hopes of many people living in this area:

> *There is a fatalism that comes along with not having hope… The people in Appalachia are prone to accept their circumstances… they see things as inevitable and they think that they have no control over events and over the future… so there is a deep fatalistic attitude that pervades many communities and families… and this leads to a dysfunctionality that is widely shared….*

The impoverishment of RSI communities has deep historical roots

Poverty is not a random or haphazard occurrence, we learned. Conference participants talked emotionally about the deep historical and sociological roots of the persistent, unyielding poverty that defines their rural communities. These communities are not poor by accident. Rather, they have been impoverished by decades and sometimes centuries of economic and racial oppression, exploitation and neglect.

For example, from the Delta RSI we heard about the legacy of the slavery system and segregation, and its effects on local economic and political conditions today:

> *In the Delta of the Mississippi — this region has 200 or 300 years of getting the existing systems and circumstances embedded there … There was intentionality about repression, and the legacy of that oppression continues. Today it is subconsciously intentional. In other words, it is not legally intentional. It is not legal anymore to discriminate — but still, there are too many evidences of it continuing, to be that way by accident…*

> *Today in the Delta the communities are divided along black and white lines … We have a culture of being divided, and maintaining that culture is important to many— just as many others would want to integrate those cultures. In the Mississippi area, and I speak of Mississippi from direct experience, there are many small segregated private academies that are divided right along racial lines. So in small Delta communities, you may have an actual population of close to fifty-fifty, half African American and half white American. But the public school system is 90% African American… The forces that maintain that depressed status quo still exist — or we wouldn't be having an RSI there...*

Around the turn of the century in Appalachia, subsistence farming was replaced by an industrial economy. According to the participants from ARSI, the major contributing factor to persistent poverty today has been the dominance and subsequent decline of those extractive industries, especially in coal and timber, which boomed almost a hundred years ago. Traditionally held in the hands of a small group of outside-owned, absentee interests, these industries methodically exploited the resources of the area as well as the local people who worked for meager wages, lived in company housing and were required to buy from the company store. These practices radically bifurcated

society between those who were powerful and wealthy, and those who were powerless and poor.

In Hawaii, the RSI leaders described similar historical roots which also, as in Appalachia, still contribute to the local socio-economic dynamics of today:

> *Hawaii is moving away from an economy that was largely agricultural. The agricultural system was set up as a paternalistic system, where the plantation and the company took care of the workers, just like in Appalachia where the coal mining companies took care of the miners. Right now we are in a transition economy, with just a few sugar plantations left … The real challenge we are facing is to prevent ourselves from going from one form of economic dependency to another. What I mean is that today the hotel industry is providing jobs, but those jobs do not provide a living wage, and so many people have to have more than one job in order to survive…*

In spite of the discussions about the historical roots of poverty, there was little overt discussion about racism at the conference. However, for us, racism was a critical subtext to what the participants said about their communities. It became very apparent to us that the persistent poverty many RSI participants described almost always had its genesis in systematic, intentional repression, and in the deliberate, often brutal disenfranchisement of particular groups of people that have occurred in our country's history. Although many of these events had happened in the far distant past, it made us see, very vividly, the repercussions of those actions on people and culture today. As one participant pointed out:

> *The RSI communities are not only rural and poor, but they are really a sociological phenomenon of the United States. They are rural, but also they are places that have historical residues of poverty … so you really need to be honest about what the RSIs are doing… They are addressing some egregious behavior of the United States toward some of these people. So we say Rural Systemic Initiative — but underneath, it's a lot more. It's a whole other ball game, not just rural education…*

Poverty and the Working Poor in Rural Areas

A severe challenge facing rural schools is continuing high poverty and its complex distribution among the rural population…. In 1995, the rural household poverty rate was 15.6 percent, compared to the urban rate of 13.4 percent. This rural-urban gap has remained constant since 1991. Moreover, a large portion of rural residents (26.3 percent) lived just above the poverty line, compared with the urban rate of 18.2 percent. Such a large proportion of the population having a marginal income status makes rural families particularly vulnerable to changes in national and regional economies and setbacks in their personal lives.

Rural Blacks and Native Americans suffer from more prevalent poverty. The groups' poverty rates were 34.8 percent and 35.6 percent, compared with 12.2 percent among rural non-Hispanic Whites. Yet, because of the large White majority in rural areas, almost two-thirds of the rural poor were non-Hispanic Whites. The poverty rate for rural children in 1995 was 22.4 percent, equivalent to 3.2 million children living in families below the poverty line. Among people living in rural female-headed families, the poverty rate was 39.3 percent in 1995. More than 60 percent of the rural poor were in families with one or more working members.

From Socio-demographic Changes: Promises and Problems for Rural Education
by Gary G. Huang
January 1999

RSI communities are isolated in multiple ways

Another important feature of the communities the RSI projects serve is their isolation. This isolation is not merely physical, but occurs in economic, social and intellectual dimensions as well.

Almost all of RSI communities are isolated geographically. Great distances and physical barriers not only separate rural communities from urban and suburban areas, but also from one another. For example, the saying, "You can't get there from here," has real meaning in Appalachia, where the construction of highways across (or through) the mountains is seen by many community leaders as the key to economic growth and development. In Hawaii, the RSI faces similar challenges, trying to connect people on small islands with one another, as well as the islands to people and resources on the mainland. In the huge area served by the UCAN RSI towns and schools are separated by many, many miles of desolate country roads. And in Alaska one

participant, a former school superintendent, told us in order to visit various school sites he had to fly his own plane from village to village to make his rounds. Geographic isolation often results in demographic isolation. The conference participants told us that there is almost no influx of new people into the remote areas that are served by RSIs. It's difficult to get there, and difficult to get out. As a result the populations are small and static, often leading to a "closed" community. An ARSI participant described how, after the influx of migration to the coal mining regions of Appalachia early in the 20th century, the population stabilized and has remained sequestered in the valleys and "hollers" of the mountains ever since.

> *Our population is pretty much homogeneous, about 97% Caucasian, all with very similar backgrounds. In the early 1900's there were Hungarians, Yugoslavs, central Europeans who came to the coal mines. The coal company had brought all of those people in there. But that is all vanished. They even talk Appalachian now….*

The remoteness and inaccessibility of their settings, the lack of mobility, the limited interactions with the "outside," and especially the persistent poverty — all of these features contribute to what the participants described as the cultural isolation of their communities. An aspect of the cultural insularity of poor rural areas is also what might be called intellectual isolation — people in these communities have very limited exposure to outside sources of new ideas.

In fact, in most of the RSI communities there is often a suspicion of and resistance to new ideas and outside influences. Instead, there is a tendency to hearken to and eulogize the past, to hold onto familiar ways of doing things and to preserve the status quo. Correspondingly, there is also a general wariness about "outsiders." Any one "not from here" is a bit suspect. Residents are guarded when they interact with outside agents who come into their communities, purporting to "help" by "improving" or "reforming" things. This guardedness contributes to the strong tendency to resist change — a feature that participants described as one of the characteristics of their RSI locales. One of the ARSI team members said:

> *One of the things that we have found we have to do in order to be effective is to build up a level of trust because we are coming in from the outside. We have to build up some trust, some mutual respect before we can be effective. I think it goes back to the fact that there is that independence, there is that local pride…*

Place, family, community and tradition are core values in RSI communities

Not all features of rural communities are negative. In fact, one very positive quality of the regions served by the RSIs is the strength of the connections and supports that exist within each local community. In spite of, or perhaps because of their isolation, residents of rural communities, particularly those whose families and ancestors have

lived in the area for several generations, feel a strong tie to the place and to the people. Unlike many suburban and urban areas the people living in rural communities have real knowledge of and relationships with almost everyone in their local town. They are proud of who they are, and they define themselves by their membership in the community. They are proud of the culture and heritage that they feel distinguishes their community. As one participant said: "A commonality of rural communities is the important place of the family, and the importance to the linkage of generations in that family that have lived in the same community."

In isolated rural communities where people tend to stay, marry and have children, who in turn stay and have families, many people are, in fact, related to each other. As a result, the extended family is often an important social and political entity in poor rural areas. A participant from the UCAN RSI explained:

> *If you go to the town of Los Montoyas, who lives there? The Montoyas clan, all Montoyas, and they are all somehow inter-related. So your broad-based community support is a family, it is an extended family, literally, through blood relationship.*
>
> *The extended family, especially in the Hispanic community, is quite strong and helps address other social ills that might be there in the community. If a father ups and leaves, there is an uncle, or there is an older brother there for the children.*

Whether the participants came from Tribal or Delta, Alaskan or Appalachian RSIs, they all spoke of the strength of family, the sense of place, and the historical pride in the community heritage in their rural areas. Because of their stability and their connectedness, the rural communities are very different from some of the large urban settings in which many of the Urban Systemic Initiatives (USIs) and State Systemic Initiatives (SSIs) work. In rural settings one often finds a stability of family and community over long periods of time. Pride in place is one of the strongest core values in most of the RSI communities. In fact we learned at the conference that many of the participants themselves have their own deep, long-term roots in the areas they are serving. These leaders have stayed in or returned to their home communities because they too hold the community's values. After listening to the ARSI team present its case study, a Navajo participant told the group:

> *ARSI talked about pride. Well, when we Navajo say "place and people" there is a reference to pride in terms of this, our land, and this is how the land and the culture make up who we are. So there is a real desire in our project to try to get the schools to include a <u>whole</u> curriculum. The place, the people, their language and their culture needs to be at the heart of the school. That seems to be like what you (ARSI) were talking about in the way of pride, place, community. That is like what we are trying to do too.*

People choose to live in RSI communities

Several of the conference participants made a special point to explain that in spite of the drawbacks of living in isolated and poor rural areas, many of the people who lived there had very deliberately chosen to do so. For example, a member of the Navajo Nation RSI told us:

> *If we talk about isolation, it is an isolation that we have selected — and want to stay within. I don't see a lot of Navajos or any of the indigenous people wanting to go out there to Los Angeles and try to survive in that setting — they really do want to stay on their own home ground…*

Another Navajo participant said:

> *We take a lot of pride in our communities, our family and the place as well. On the reservation, we are in essence the majority, rather than the minority. So that makes a big difference in the culture...*

From Alaska we heard that:

> *A lot of people mistakenly think that people only live in remote areas (in Alaska) because they can't make it in a big city… And I think that quite often in a reform effort when you start talking about trying to change things in rural areas, there is sort of a suspicion on the part of the locals that 'You want us to look like them.' 'You want us to look like a big city, and we are here because we don't want to be a big city. We like being who we are and where we are.'*

However, we also heard that the pride in local community and traditions is not entirely benign. According to the conference participants, this aspect of poor, rural culture is more ambiguous than one might think, and several conference participants talked about its negative side. Members of the UCAN project explained:

> *Pride is a plus and a negative in rural communities. It is a plus in the sense that they are really proud of who they are and proud of their history (although interestingly enough they are not necessarily as cognizant of their own history as they think they are). The negative side of pride is that it leads to thinking 'We know we have been doing this for years, we are real happy with what we are doing, we feel we are successful, we don't need any kind of outside intervention.'*
>
> *For a lot of the native communities that we have contact with, it is always okay to come home. You don't have to succeed out there in that other world; you always have this place as home. When I looked at it from the perspective of college retention, and getting students to graduate from college, the acceptance at home was in some respects a negative*

factor, because there wasn't the incentive to push, to stay and to succeed. It was almost too easy to slide out of a difficult situation and simply go home….

RSI residents hold complex and often conflicting feelings about membership in their community

As the conversations about pride in place, family and community evolved, the participants also began to discuss another common characteristic of rural poverty, the complex and often conflicted pattern of feelings residents have about their own communities. On the one hand, poor rural people seek to escape their circumstances. They see leaving their community as a kind of emancipation, the only hope of improving their lot in life. On the other hand, leaving is a denial of the family and the community. "You think you're too good for us." Those who contemplate leaving know they face suspicion and envy, and even the possibility of ostracism if they should decide to return. "You can never go home again." "Moving away" often involves an inevitable and irreplaceable loss. The following excerpt from one of the small group discussions illustrates the conflicts members of rural communities feel about staying in their communities, about leaving them, and about coming home after they have left. A UCAN member pointed out that:

… when a student does return…it is kind of like they are suspect — because they are now a foreigner. They face the same re-entry issues that international people face when they return to their home countries after studying abroad … people return home and they are not prepared to deal with the issue … It is an issue of re-entry, a cultural issue — you have left the culture and now you are going to come back home but you have that other way of looking at life — and you are seen as thinking that you are 'better than us' in some ways.

A second UCAN team member said:

Plus you haven't been here and in essence haven't paid the cultural dues to belong to this community. You haven't gone through our community trials and ceremonies — you don't know this place anymore… So you may come back with a PhD or a Pulitzer, or whatever prize that is valued in your field — and it doesn't have any meaning in this community. You have to go through the rites of passage of the home community...

And one of the two representatives from the Navajo RSI added his perspective:

> *… some of the tribes are dealing with that same issue …People who haven't actually lived on the reservation — they may be Navajo, but they are not <u>really</u> Navajo. Those issues are difficult for communities, but I don't think it is just a Navajo or a tribal issue, I think that is perhaps a more general rural community issue…*

♦

While the RSI participants recognized from the outset of the conference that commonalities among them would naturally exist, they were surprised, as were we, to learn how <u>very</u> similar the issues in their respective communities were.

> *We tend to look at ourselves as coming from the Navajo Nation and because of that we believe we are somewhat unique — and that our problems are unique and different from everyone else's. But after listening to the ARSI presentation I realized that if we took out "Appalachia" and replaced it with "Navajo," we wouldn't know the difference… especially when you talk about a whole lot of little things — like how the school system is the major industry within the area and the biggest employer of people, and then how the local politics fits into that economic fact… Many of our Tribal Council members are members of the school board and so that makes the schools very political… Appalachia is not a whole lot different from the way we are. And then we tend to think of ourselves, as Navajos, as being tremendously rural and tremendously isolated… And now we look, and we see we may not be that different from other rural areas.*

In spite of a wide range of geographical and ethnic differences, the RSIs share a common denominator: persistent rural impoverishment. At the conference, we began to understand the difference between poverty and impoverishment — we learned that impoverishment is different from poverty in that it is more active, and more intentional. Many of the people living in the regions served by the RSIs have suffered from generations of intentional discrimination and repression. Today the legacy continues and includes not only their chronic poverty, but also their geographical and cultural isolation, their suspicion of outsiders and new ideas, and their strong allegiance to family and community.

UNDERSTANDING IMPOVERSHED RURAL SCHOOLS AND SCHOOLING

The RSI conference participants called upon the "outsiders," in this case the researchers from Inverness Research and the program officers from the National Science Foundation, to understand not only the nature of their communities, but also the nature of the issues they must address as they seek to improve the schools in those communities. Defined by the shared issues of rural poverty, the educational challenges RSI leaders face proved to be highly similar from project to project.

The primary focus of the RSI effort is the improvement of mathematics, science and technology education. But, to accomplish anything, the RSI leaders have had to learn how to work within the norms and constraints of their local rural contexts, and as we have seen, these contexts exert powerful influences. Therefore, discussions about the idiosyncrasies of poor, rural schools and schooling — and the particular challenges they pose to the implementation of systemic initiatives — took a central place in the conference.

In this section, then, we focus more specifically on the nature of education and schooling within the rural regions served by the RSIs. First, we discuss the issues of schooling and educational reform that center around the limitations of small rural school systems. Next, we explore other issues that arise from the deeper psychological attitudes which community members hold towards schools and education in general.

ISSUES OF SMALL RURAL SCHOOL SYSTEMS

Students in poor rural areas are typically low achieving

Perhaps it is worthwhile to take some time here to state the obvious: Academic achievement is low in the poor, rural areas served by the RSIs. Even in states that do not do well compared to national norms, the rural regions do even worse than state norms. And, not only do students in the RSI-targeted areas generally score poorly on standardized assessments, they also as a group do not proceed on to higher education.

Participants also told us that their poor rural communities also typically have a history of poor school attendance and high dropout rates.

> *A lot of our students don't finish high school. Usually when a class enters high school, there are approximately 100 kids in that class, but they graduate only 65 to 75, that's well over a 25% drop-out rate.*

The causes for this low achievement are multiple and are, in fact, deeply embedded in the underlying economic and social conditions that prevail in RSI communities. In

what follows, participants point out important educational realities that are an outgrowth of those conditions.

Rural schools and school systems are small

Rural schools and school systems are typically very small, especially in contrast to most suburban and urban districts. Because the population is sparse in poor rural communities, there is an obvious corollary — there are very few students or teachers in these districts. One-room schools, and one-school districts are not uncommon in some RSI areas. Both teaching and administrative staffs are also almost always minimal.

The small scale of things in rural schooling does have benefits however. In particular, everyone knows everyone else, and relationships are already established. But, there are also strong negative effects.

> *…no textbook representatives will send information to our districts because they are so small. They don't send samples… And mail only gets delivered once or twice a week in most of our districts.*

At the simplest level, there just aren't enough people to do the work of running the schools. The greatest difficulty, participants told us, is that because everyone wears so many hats it is hard to find either the expertise or the time necessary for fulfilling all the responsibilities necessary to creating an effective school system.

> *In our districts... people are driving the bus in the morning, picking up students on the way, they are in classrooms the minute they get there. They are in a lunch meeting or fixing lunch, or serving lunch that day. I am including everyone — teachers and principals and superintendents. This is not unusual in the smaller districts and at the end of the day, they get on the bus and drive the kids back, and they drop them off… Or, we can do a workshop with a group of teachers and offer them our resources, but they are only a few teachers.*

> *The same teacher teaches math and science, either K-12, or 7th grade through 12th grade, and when we asked the district to align the curriculum, then she is spending her time trying to do that, maybe driving the bus, and all of these other issues. There are just not enough people. She can't do it all. Then, by the same token, we say, 'Oh by the way, we need to do it for math and science.' And, again, she is both the math and science teacher, and, then we say, 'Oh, you are on the textbook committee too.' And so it goes.*

Rural schools have very limited capacity and resources

Not only are people stretched thin as they seek to run the schools, but there is also negligible capacity for improving the schools. Districts, and even counties, are unable to garner the critical mass of resources or expertise to be able to provide assistance to the local schools and teachers, and state departments of education tend to focus on areas of greater population density. Hence, the regions served by the RSIs not only are isolated, but they are also too isolated and too small to have the resources and expertise needed to improve themselves.

The conference participants also told us that rural schools have very limited resources they can draw upon. First and foremost fiscal resources are very modest. Schools in poor, rural areas are themselves poor. The low tax base and depressed economy typical in these communities mean tight finances, lower salaries, and limited availability of materials and supplies. One participant explained how these circumstances played out in his community:

> *We had a commitment for a couple of thousand dollars one year for a program, but just before the school year started, one of their portable buildings ended up in the Pecos River. And by the time they got that fished out, repaired and started up again, there went the few thousand dollars they had committed to the program. Obviously we couldn't hold a school to its commitment under those kinds of circumstances…*

Frequently complementing the shortage of resources in poor rural schools is a mindset that says: without "new" money from the outside, innovation is impossible to achieve locally. Participants pointed out that this mindset is an outgrowth of the "poverty" or "dole mentality" of the community itself, reflecting a feeling of being powerless to change existing circumstances. The RSI leaders told us that these attitudes in particular pose difficult challenges when they are trying to recruit districts to participate in the RSI and to help sustain fledgling efforts over the long term.

Secondly, human resources are also limited. On top of having very few people to begin with, many small, poor and rural districts suffer from a kind of "brain drain." For example, faced with competition from more affluent suburban areas, rural schools often face difficulties attracting and retaining qualified teachers. "In Mississippi the teacher salaries are so low that if you find promising teachers coming out, they often get attracted by better offers in Tennessee." In Hawaii, beginning teachers work in the rural villages for a year or two before moving back to the suburban and urban parts of the islands. Knowledge and expertise in mathematics, science and technology is especially at a premium in poor rural schools and districts. It is even more difficult for them to recruit and keep qualified teachers who have subject matter knowledge in these areas; graduates in mathematics and science are highly sought after and can earn substantially more in non-teaching fields. One participant said:

> *I assume there is a common problem for all of the RSIs, the problem of finding certified teachers in math and science. We have more than one district that does not have even one certified teacher in mathematics, K-12.*

Even more importantly, many small rural schools and districts lack leadership that is knowledgeable about mathematics and science and about systemic reform. The absence of strong instructional leadership at the administrative level poses a tremendous challenge to the RSIs. Quality administrators, like quality teachers, are at a premium because of the isolation and insularity of schools and districts. One participant cited the following example to illustrate the lack of sophistication that was prevalent among school leaders in his state:

> *They did a study about staff development in our state. They found that many of the rural schools were not spending their allotment of professional development money. They just gave it back to the state because they didn't know what to do with it! …it does come back to leadership in a way, in terms of understanding the 'Do's and Don'ts' of federal dollars, and making the most of them. It also comes back to schools who simply do not do a good job of identifying need. They do not use good self-assessment to identify where their needs are. Therefore when the monies do become available, they really don't know how to utilize them, and if they do end up using the money, it is often in a haphazard way…*

The conference participants stressed that a prerequisite to successful systemic reform is having the local ability to decide "what needs to be done and how to do it." Even when capable administrators are available, principals and superintendents are administering budgets, supervising staffs, driving the school bus and more. There is little time or interest left for them to engage in the necessary envisioning, thinking, or planning for reform. Furthermore, even when RSIs had time to deliberately invest in and develop prerequisite local leadership capacity, or to help them with planning, they were frequently faced with the frustrating problem of the rapid turnover of key leaders, often the result of the siphoning effect whereby smart, ambitious people tend to leave. One participant described the problem as follows:

> *Our biggest problem is the turnover rate. We can put all of the resources we can get into bringing the current staff of the schools, teachers and administrators, up to speed. We could get them culturally sensitized, and all of those things you need to do, and in three years, if not sooner, we have to start all over again.*

Moreover, we learned both at the conference and later on as we have continued to communicate with the participants, that turnover in the leadership ranks is a problem for the RSIs themselves. Since the conference in the spring of 2000 and the time of the writing of this monograph, several key leaders in the RSIs have moved on, either directing new RSIs or taking positions elsewhere.

Rural schools are highly at the affect of local politics

In the poor RSI target areas, where unemployment is high and good jobs are at a premium, the school system is often the major employer in the community. A classroom teacher's job is considered a "plum." As a result, schools are frequently seen to be as much sources for patronage and political power as educational establishments. From the ARSI team we learned:

> *You can see cases in school districts where it is all about power, ultimately… school leaders have established power, they use that for their own benefit, not necessarily for the benefit of the kids… The biggest job program in the region is the school, and so they start using it as a jobs program, rather than as an educational program.*

When schools become pawns in community politics, it becomes very difficult for RSI leaders to convince those in power to cooperate with one another or to re-focus their time and money on difficult substantial goals, such as the improvement of mathematics and science education.

Rural schools and districts are not only isolated, they are often politically fragmented

Like the communities which they serve, rural schools and districts are isolated. Conference participants told us that the barriers imposed by distance and geography severely limit interaction between school districts, as well as between districts and higher education institutions, which are usually located near more populated areas. Sometimes these isolating barriers even limit the contact and communication between schools in the same district. For the most part schools in RSI target areas are severely limited in their access to knowledge and new ideas from the outside, as well as those that result from familiar and frequent collegial interactions and cross-fertilization.

Compounding the issue is the fact that the regions served by the RSIs are fragmented. For example, the counties served by ARSI may include only one school district, but it is not uncommon to find complete lack of communication, and even long-term conflicts or rivalry existing between towns that are only a few miles apart. In the High Plains we heard about Native communities and reservations that were completely isolated and disconnected from each other by many hundreds of miles. Similarly, in the Delta, we heard about the cultural and economic divide that separated the private academies from the public schools. Hence, not only are these communities small, but they often also suffer from significant fragmentation and division within.

The isolation of the schools, and the fragmentation of these small communities, especially when coupled with the very small size of teaching and administrative staffs, represents a significant challenge to RSI leaders. They told us that it is very difficult to

muster a critical number of people with a shared vision and with at least some expertise to initiate and sustain reform activities.

The jurisdiction and governance of rural school districts is surprisingly complex

In working with schools the RSIs are also challenged to figure out very confusing issues of formal jurisdiction and governance. The governance issues are not simple for many rural systems. Almost all of the RSIs with the exception of Alaska and Hawaii encompass multiple states, with not only separate, but also often conflicting rules and regulations. We learned that jurisdiction and governance issues are particularly complex in those RSIs which serve tribal populations, where an Indian reservation can easily contain a mixture of public, private and parochial schools, as well as schools operated by the Bureau of Indian Affairs. A representative of the UCAN RSI described the following tangled web:

> *I come from a place that is 6 miles by 12 miles, and within that 6 by 12 mile area there are four different districts… and we can't get one district to agree with another district in that small area, and we are all the same tribe. I know there are some dynamics that make Alaska different than us. Alaska Indian education is controlled by the state…. In our area though, we don't really know who is in charge. Is it the Indian bureau? Is it the state? The federal government? The tribe? So, we are dealing with those kinds of issues...*

In these kinds of situations then it is very difficult for RSI leaders to identify first who to talk to and then how to work with them.

PSYCHOLOGICAL ATTITUDES TOWARD SCHOOLS AND SCHOOLING

It is not only the limitations and complexities of rural school systems that make it difficult for RSIs to do their work. There are also deeply embedded attitudes towards schools and schooling that the RSI project leaders must acknowledge and address.

Residents of poor rural areas are generally not highly educated

One of the most salient features of rural poverty is the low level of education of the people who live there. The great majority of RSI community members have minimal schooling. Many are high school dropouts. Among those who hold high school diplomas, very few have gone on to complete college educations. Because they themselves were not successful in school as students, as adults they are often either not at all involved in their own children's school, or limit their involvement to non-

academic areas. In the following comment participants from the Delta RSI mirrored what many others also observed:

> *The kids' parents haven't been connected to the educational system… Typically the parents of children we work with are not the ones involved in PTAs and that kind of thing. They kind of stay away, don't feel comfortable going into the school…*

Poor rural communities have ambivalent attitudes about the value of education

A very important feature of schooling in rural impoverished areas is the ambivalence that local residents feel toward education. Conference participants told us that most people who suffer from rural poverty have deeply conflicted attitudes about the value of education. Although many of the rural poor pay lip service to "getting a good education," their own lack of educational success, and especially their impoverished living conditions, often drives both adults and children toward valuing a "good paying job" much more highly than a good education.

> *…Even though unemployment is high in our county, they know they can get work if they quit school, because of the heavy equipment operation in the county…. Stay in school? Or go work in construction? They know they can get a job and a very well paying job too…*
>
> *We have people in the subsistence communities where being a fishing guide — or being a person that chops a little bit of lumber — is very important to them… and that is what they want their children to be.*
>
> *There is a movie about Appalachia called American Dream… It is deeply telling. There are two things in that movie that are very interesting — one is when one of the sons in the family says, 'I seem to recall that they put a man on the moon… but I ain't got running water…' The other part was when they showed the mother, who was 80 years old, and she said: 'Well I guess I didn't do such a bad job as a mom. I had 13 kids and all of them had a job…'*

Rural communities and teachers often have a very traditional view of education

The rural schools served by the RSIs often adhere to notions of "schooling" that have not changed for many decades. The isolation from outside influences, the lack of innovative curricula or materials, and the stability of the community all lead to a vision of education that focuses on the "3 R's" ("Reading, Writing, and 'Rithmetic"). The fact that these communities do not generally do well on state assessment leads superintendents and principals to further emphasize "The Basics."

Educational success often leads to personal dislocation and trauma

Striking profoundly into the psyche of the community, is the reality that when their children do, in fact, succeed in obtaining a high quality education, success almost always results in that child leaving the community.

> *The other delicate piece that we are working with from a rural perspective is breaking up a family, breaking up a community, because rural parents know that, as their children have more and more education, there won't be opportunities for them at home, they won't be happy staying where they are, they are going to leave, and that is a real concern…*

One of the participants from the Navajo RSI remembered that his own father wept as he insisted on sending his son away from the reservation to attend "Indian School" in Lawrence, Kansas. Similarly, another participant from Appalachia, told the group:

> *Centuries of tradition and culture... impede a lot of the things that we try to do in school reform... I myself was told, do not go to college, we want you here ... you are needed here.*

Still another participant added:

> *You get students graduating out of these schools with high grades and what do they do? They don't want to leave their community, right? So we leave a lot of really intelligent young people between a rock and a hard place. They want the opportunity that their education has now given them, but that means they have to give up who they are and where they live…*

The net result of such mixed attitudes about education is that support for the schools is not whole-hearted. Rather, community ambivalence, which was echoed by participants across the projects, leads to a very confused set of attitudes toward education, and a very mixed community mandate for educational improvement and reform.

Rural schools face deep psychological issues of ownership and control

Beyond governance issues, the RSI participants described the challenges they face when they try to deal with what might be called the psychological issues of ownership and control. Because many of the residents of poor, rural communities are actually historically disenfranchised people, their relationship with public schooling is often ambivalent or even outright antagonistic. One of the Navajo RSI leaders described how Navajos view schools on or near the Navajo Nation:

> *… we as a Navajo people have never really had control over the education of our children, nor have we had any real opportunity to have any influence on the education of our children because it has always been in the state's hands in terms of public schools, or in*

> *the Bureau of Indian Affairs' hands, or in the church's hands in terms of parochial schools or private schools, but never in our hands…*
>
> *The Navajo term for a public school is bilagáana 'a³chíní bí 'ólta' (white children's school). There may be three white children in a public school that has a predominantly Navajo enrollment but that public school is seen as the 'white children's school.' The Navajo term for a Bureau of Indian Affairs (Federal government) school is Washindon bí 'ólta' (the Federal government's school); for a parochial school, it is 'éé' neishoodii bí 'ólta' (religious people's school), but never Diné bí 'ólta' (Navajo people's school) — our school.*

RSI leaders must navigate through the very turgid waters of how community members, particularly indigenous people, perceive that public schools recognize and respect local culture and heritage.

> *The way the Navajo people envisioned school systems before was as a system that takes away and supplants. Schools take away a language and a culture…and supplant a new history, a new language, a new way of looking at things. As a result, for those that wanted to maintain their culture and their tradition, they saw the school system as the enemy if you will… As a result of that, you have this polarization… you hear comments from grandparents who say 'Well, I kept one or two of my children and I gave away one or two of my children to the government or to the state.'…Just that concept of, I allowed them to go to school and as a result of that…I knew they were going to lose their culture…*
>
> *In terms of my own experience with growing up… and observing my dad's desire for us to really become educated…you know, he prayed for my education and wanted me to be educated and at the same time he cried… I never really understood that, for a long time. And then finally one day it dawned on me. He was saying, 'I want you to be successful and I want you to go to school, but in doing so, I know that you are going to be leaving this place and you are going to be losing your culture.' That saddened him and it made him cry. So the Navajo people saw the school system not as a system that enhanced their own language and culture, they saw it as the enemy.*

The community's relationship with its schools, as well as its perceptions of how and how much schools actually represent the values and mores of the local population, also greatly affect other key aspects of local education.

In particular, how the community views its schools affects the nature, quality and stability of the local teaching force. In Appalachia, for example, where the rural, homogeneous population tends to believe that the public school system represents them and their values, the teaching force is markedly stable. Most teachers are from Appalachia, and tend to stay there. In fact the stability of the teaching force in Appalachia presents problems of its own — teachers who have taught in one place for a

very long time, with colleagues who have also taught in the same situation for many years, can easily become complacent and reactionary, closed to innovation or reform. As one ARSI superintendent said, referring to his aging, recalcitrant teaching staff, "Nothing's going to change around here until you hear the singing from the cemetery up on the hills."

In other RSIs however, notably Alaska and UCAN, "native" teachers are very difficult to attract and retain. Therefore the majority of "imported" teachers must confront very difficult issues of belonging (or not belonging) to the community, and of truly understanding (or not understanding) the values and expectations of the native residents. A member of the AKRSI explained how difficult it is for new arrivals, and how he would engineer a more workable system to help initiate newcomers into the culture where they will teach:

> *When those young new teachers fly in on that airplane and their belongings are put in the airstrip and the plane leaves. And then it's, 'Oh my gosh, I am the only non-native in this whole community ... .I can't get in my car after work and drive home. I live here...' You are not anonymous anywhere. You are the teacher and you can't even make a mistake in the social graces in that area to survive, so the pressure of all of that contributes to the turnover. I admire those that stay for 18 or 20 years, like some have, and really learn how to work in the system... I would like to develop a scenario, it happens in some places in Alaska, when the teacher gets off the airplane, they are greeted and met by the villagers as a welcome, here is who we are. These three people are your mentors, so you won't screw up culturally and socially in this community and here is our curriculum. Here is what we want our kids to know and be able to do. We will give you a few years to learn how to do that. I think if a teacher was approached in that way, rather than snickering about them making the mistakes, I think you would retain more.*

♦

These important characteristics of impoverished rural communities and their school systems — the ambivalence toward education, the small scale and isolation, the paucity of both financial and human resources, the lack of reform capacity, the "small town politics," the complicated governance issues, and finally, the difficult psychological relationship between poor rural communities and the schools — all combine to contribute to systems that are strikingly unready to engage in reform. At least what we have come to associate with typical "readiness" for reform — things such as having a vision of quality mathematics, of science instruction, or having leaders with knowledge and expertise who serve as advocates for change, or having cadres and networks of teacher leaders — do not yet exist in the regions the RSI participants described. Moreover, achieving a solid readiness level in RSI areas is proving to be considerably more challenging than what anyone might have expected.

UNDERSTANDING THE "REAL WORK" OF THE RSIs

When we first began to understand that the landscape for reform in poor rural areas of the country was much more barren than we had expected, and therefore much more challenging than we had realized, we were perplexed about what, then, the real nature of the work of the RSIs might be. Given the difficult circumstances the conference participants described, what could a systemic initiative in math, science and technology improvement do? Where does such a project begin? How do they gain permission to work in the community? And how could a relatively small initiative, such as a typical RSI, develop readiness for systemic change across vast and isolated regions? Thus we wondered, what is the real nature of the RSI work and what does it look like?

Participants told us that the essence of what they do is "groundwork." The conference participants called it "the real work." "It is the work that doesn't even look like work to other people who don't understand what we are facing…." They said that although "it doesn't look like" what one would expect; the RSI work is the effort that occurs at the "…substrata, often invisible to the naked eye, but absolutely necessary."

During the course of the conference a metaphor emerged that seemed to capture well the nature of the work the RSIs were engaged in. One of the participants compared the work he was doing in constructing a new house for himself to the reform work he was doing with the RSI:

> *To use an analogy, I just recently began the process of building a new house… and one of the first things I had to do was to dig the trenches and pour the footers for the foundation… this work takes a lot of time and in a sense it is the foundation for the foundation…One digs into the ground and makes molds and creates a supportive structure for the foundation… and when all that work was done, all the work that went into the footers was invisible. Only the upper parts of the foundation were visible. And according to law I could not do one other thing until the inspector came out and looked and said that the footers made code. Once that was done, I began to build a foundation… and then that had to be inspected… and then I could begin my framing, and at every step along the way there was somebody that said, 'yes-that meets code and you can go to the next step…' so in thinking about this, if you use that analogy, it seems like systemic reform efforts … are somewhat like building a house over time…*
>
> *There are a series of steps that must be taken, with each step a pre-requisite to the one that comes after it. Good footers are necessary but they don't make the house. The foundation is necessary, but it doesn't complete the house. The other thing is, the people who do the footers might be different from the people who do the foundation, who might be different from the people who framed the house, who are yet again different from the people who do the electrical work… And there are different kinds of assessment at each stage of the development… Perhaps the RSI work we are doing is very much like putting*

> *the footers in… And we then should complete, inspect, or assess that work, appropriately …before we try to go on to the next stage…*

Both we and the participants found this analogy very useful. It helped them and us understand the nature of "the real work" that RSIs were engaged in. The setting of the foundation — the "putting in of the footers" for reform is not yet, participants argued, a task that is understood or valued.

Also, as we listened to the RSIs describe the sequence of challenges they faced, and the tasks they engaged in, we began to perceive a kind of implicit order and logic to their efforts. The work they were doing was very much like the work that is done in locating the site for the new house, digging the trenches for the foundation, pouring the footers, and in general, preparing the foundations so that later work would be possible and would be well supported.

We see the RSIs engaging in four different steps as they begin pouring the foundations for reform. First, they have to position themselves vis-à-vis the communities they want to serve. Second, they have to work with local communities to create an understanding of the need for — and a shared vision for the direction of — educational improvement. Third, the RSIs focus much of their early work on developing a small number of local leaders who are both inspired to, and capable of, leading local reform efforts. Fourth and finally, we see the RSIs working to create what we call a "supportive context and a local reform infrastructure" — a set of capacities that will allow the local community to take on the work of improving their own programs.

1) POSITIONING THE RSI

There are several tasks that RSIs undertake to position themselves to work with the communities they wish to serve.

RSIs work on adjusting their own stance and attitude toward the communities they serve

Given how poor rural communities view outsiders, and how wary they are of yet another "outside project" designed to "help" them, the RSI conference participants told us that they must spend an enormous amount of effort in establishing working relationships in the communities they serve. Such relationships in these small communities are personal and specific in nature, and must be forged before more substantive work can begin. In order to ensure that these relationships are authentic and viable, RSI leaders told us that they must first and foremost examine and adjust their own project's stance and attitudes toward the communities they seek to serve.

It is imperative, for example, to both have and show true respect for the community and its leaders. Several of the participants described how necessary it is to understand and honor the community traditions as the project seeks to be invited into the community.

Participants also described how they strive to avoid a "deficiency orientation," the subtle attitude that the community lacks something which should be "fixed" — some failing for which the project, and its outside expertise — will compensate. In contrast, the stance many of the RSI projects seek to have is one where they acknowledge the strengths in the community and work to build on them. One of the best illustrations of this stance was the work AKRSI described. The team explained:

> *… in Alaska, we had to relate through our tribal groups, where their way of looking at the world is very different from ours. So the AKRSI challenge was to put the two worlds (of tribal and non-tribal points of view) together. In the past we reformers have taken our way, the Western way, and we have tried to infuse other cultures into our Western paradigm — we do cultural awareness and cultural relevance kinds of things, but that's just an add-on. We look at it always from the Western perspective, instead of saying, nope, let's take the cultural base that exists in the community and see what fits in from the West. It's a very different way of dealing with it.*

Many of the conference participants described how important it had been for them to learn to listen to the community. They said that they deliberately bring people together in order to listen, more than to speak, and to demonstrate in actions their desire to understand the community and its values. Almost every RSI participant told us about scheduling dozens of meetings and conversations — in schools and diners and office buildings — to listen and learn from the people in the community. Those who had short-shrifted this process regretted that they had:

> *… if we had it to do over again, I would have organized it in such a way that we had a more direct connection to more people — so they could identify with the RSI mission — so that a broader number of people could identify with it. Our organization now is very much school oriented. We have teachers and administrators — and, yes some of them are the parents of the kids in school… but we haven't reached out to the elders in the community — it is not the farmers, it is not the rural guy that is worried about his community dying, who also happens to be the major voice on the school board or whatever. We need the hidden voices. The businesses and community organizations should have been at that table as we began the first cohort of the first RSI meeting. I think a lot of times we forget about the community leadership, or the business leadership, being a part of that conversation… For sure, they affect your success — and, if they want to do it, they can create a real reverse undertow to what you are trying to do….*

RSIs work to overcome fragmentation and divisions which exist in their communities

Given the isolation of most poor, rural schools and districts, the fragmentation that exists in even the smallest communities, as well as the complex issues of power and governance, the RSIs told us that one of their first roles is to act as "connectors." As connectors, their aim is to forge links among the various isolated elements of a fragmented system and to work for "coherence." Almost every RSI team at the conference told us their initial efforts concentrated on bringing various community groups together to discuss what was wanted and needed for their community. Acting deliberately in the role of listeners, facilitators and network-builders, rather than in the role of leaders or standard-bearers, the RSI leaders convened conversations among groups, who are meeting with each other, often for the very first time.

> *… a really important strategy as an outsider is to bring all of the different factions in, to invite them all, because if you are an insider and a part of one faction, you can't do this. You are restricted as an insider. So that, to me, is one of the values of being outsiders, we are not always bound by some of those rules, so we can invite everyone in at the same time…*

Several of the RSIs made special efforts to reach out to traditionally excluded sectors of the community, hoping to bring them into the process of educational improvement in meaningful, not perfunctory ways. Those who attempted such deliberate outreach efforts told us how important it was to have a "translator," someone with stature and credibility among members of both groups, who could "translate" from one culture to another, and be particularly sensitive to the group that had been previously excluded.

> *… the native elders were a wealth of information. It was important to use them, and to use them wisely. For that, I have to give a lot of credit to a man named Oscar Quagley who articulated a way to bring the elders together with university experts and help each understand the other. Oscar can articulate to both western ears as well as native ears. You need someone who can be a translator between the worlds you are trying to bridge…*

Much of the work of the RSIs, then, consists of "mending fences" in situations where conflicts and misunderstandings from the past have prevented collaborations among different groups. Later on, as battered relationships are mended and new relationships are forged, the RSI leaders focus on establishing coalitions of existing groups, agencies and organizations.

RSIs work to develop local "buy-in"

Because of the prevalent suspicion of outsiders, conference participants told us they must devote much of their initial work to establishing credibility and legitimacy in the communities they wish to serve. Although being good listeners and "networkers" goes

a long way toward establishing acceptance and credibility, it is not enough. At some point, leaders told us, the RSI project must establish real "local buy-in."

But given the reluctance of their communities, the RSIs are loath to require substantial commitments from schools and districts "up-front" for fear that they would be refused outright. Rather, many RSIs attempt to develop local interest in their work. The "front loading" strategies they use to attract the attention and approval of the locals run the gamut-from offering mini-grants and financial incentives, to activities that demonstrate quick success and feasibility, to working with "early adopters" in order to generate an even broader "market" for their services.

"Sometimes it takes success or proof before people will buy into it." An ARSI participant explained more fully how their project had deliberately hoped to develop a few visible examples of success, so that local leaders would be impressed and would want to ask ARSI's help to support them in achieving similar results:

> *I think the places where we have probably influenced policy is to be found in those places where we have done the Program Improvement Review process-where, as I told you, we give the school improvement report to the principal and the principal doesn't have to do anything with it. But then, when other schools see what happened, then that gets to the superintendent level and you begin to see some changes in policies there. Then you begin to see some changes in the other places and in the utilization of resources, and I think that happens purely by example… You develop some schools that are very successful, and it means that (others will take their school) and do the same thing. In other words, you do by example…*
>
> *You prove it can be done — and then they can't sit around with their negative attitude, fatalistic, or whatever — but rather, if the school in this poor county down here is showing that they are getting their grades up, then they can't say, 'We can't do that…'*

RSIs work to develop a "leading edge" strategy for their project

Finding an entrée into poor, isolated communities is a formidable challenge for RSIs. Moreover, participants told us that the need to focus a "critical concentration" of their resources on achieving the RSI outcomes is constrained by what they reminded us is their very large, spread out, and often very diverse geographical service area. RSI leaders fear that their efforts can very quickly become diluted, with resources spread across too many places, foci and tasks.

> *Some things that feel like you are making progress turn out to be Band-Aid solutions. Like we improved this part of the curriculum and have a lot of great ideas about how to use our local resources, but I am worried that it is just going to be a whole lot of Band-Aids. What glues it together? The usual answer is, standards-based education, it all has*

> *to relate to the standards, but I am still worried, even if they are lined up with the standards, there still may be areas that aren't covered. Does it impact the whole educational experience, or just isolated pieces?*

Systemic reform is so complex that communities can become overwhelmed and back away. The participants told us that they are challenged to balance the multi-dimensional complexities of systemic reform with the need to have a well-focused and relatively simple point of entry for their efforts.

Therefore, RSIs strive to identify one or two "leading edge" strategies for their work. These are strategies that create a toehold, that yield short term and tangible benefits, while still working toward the bigger, long-term goals of the initiative. They are focused activities with immediate, visible results, which are also aligned with and important to overall systemic change. The idea is to find strategies and activities which operate in the foreground, while readiness is being built in the background.

For example, ARSI's "leading edge" is their focus on the development of catalyst schools, and through that work, the development of "indigenous" leadership. This strategy involves the identification and support of "teacher partners" and "district liaisons," who in turn, aim their efforts on the development of "catalyst schools." By contrast, AKRSI's leading edge strategy was to build a strong political coalition by bringing together groups which had previously remained separate.

> *The question for us was how to get the knowledge base that is in the community at the table on equal footing with the one that has had all of the weight of the system behind it. We spent the first two years mostly in the community building that relationship…*

Out of the new cooperation and understanding that was deliberately nurtured evolved one of the major thrusts of AKRSI work — the development of a place-based science and mathematics curriculum and Alaska-based cultural standards intended to supplement the pre-existing national and state standards.

> *One of the first things that came about, and not because we planned it, was the development of cultural standards to counteract the primacy of national and state standards which were written with other people's agendas in mind, not the agendas of those communities. It is not that they are rejecting those, it is saying that those standards alone are not serving our needs, they are not adequate — that they are not going to address our problems.*

The RSIs look for an appropriate "niche" in the system

Because the educational systems in which the RSIs work are complex, multi-layered and often over-lapping, it is a challenge for the RSIs to find an appropriate "niche" within those systems. They need to find a home or a base for their work — an institutional setting that will support their interaction with the communities they wish to serve without imposing a new set of constraints. Ideally, the participants told us, the institutional and political base for their work should have visibility, occupying a central position with power and leverage potential, but not too much prominence, so that it does not incur competition or jealousy.

Several of the projects that were still struggling to find the optimal niche found it easier to tell us about those they had tried but rejected. For some at least, the university, a traditional home for special projects such as an RSI, had proved for the most part to be disappointing.

> *It seems like universities don't understand rural education. Most of the faculty don't, in the colleges of education. Rural sociologists maybe and people of that sort, but when you get into the college of education, there is a limited number of them that really understand rural education and understand what is necessary to prepare teachers to go into rural education ... We are trying to work with them to see if we can't get them to understand.*

In Alaska the RSI has worked hard to engineer a niche for itself in the State Department of Education. It has relied not only on its important alliances with an influential group in the state, Alaska Natives' organizations, but also on positioning itself in such a way as to use its resources to "buy" a place in the system.

> *When collaboration with the Alaska State Department of Education happened, they just didn't volunteer ... it was due to the high profile of Alaska natives and the Alaska Federation of Natives, a very powerful entity in the state. The governor and... other elected officials understand that ... for AKRSI positions within the Department of Education, the Alaska Rural Systemic Initiative ... has memorandums of agreements ... and we pay for people to be in those positions... We share the expenses of those people to stay on the curriculum development, work with science in forming standards — part of the commissioner's liaison person, the coordinator of student affairs, all of those are paid for by the project, so in a way, they are obligated by contract to maintain that agreement and that communication. So it has had the effect, but we paid for it to get it to happen.*

Finding a successful niche for an RSI is a tricky business. There is no "one size fits all" rule. In some situations, such as in Alaska, an alliance with the State Department of Education is beneficial, whereas in others it is not necessarily so. It can, in some rural contexts, even be detrimental.

I liked what I heard this morning as far as being cautious about who you 'sleep with,' because it could come back to cause distrust. In other words, I think we are very well-aligned in our state departments, but how the rural systems view those state departments as accountability is pushed in both states, may not serve us well. So that just means we need to be careful in our approach, so we are all working to help the schools build the capacity to address the accountability push.

2) DEVELOPING A UNIFYING VISION FOR THE IMPROVEMENT OF SCHOOLS

As the RSIs near the completion of the "trench digging" or groundwork phase of their initial efforts, they proceed to what we think of as more "traditional" readiness-building activities.

Almost all the RSI participants explained that a critical, first order piece of establishing a strong beginning for the RSI reform is creating a clear and widely held vision. The participants spoke about the need to develop a common vision of quality math, science and technology education in their communities. Everyone agreed that "shared vision" is not just a phrase …

Changes in rural schools won't happen if the community isn't behind them…Everyone has to have the same purpose and vision, from all of the way to the top down, not just the school people)… And you can't bring them in later. You could probably try, but it is very difficult… As I go out to businesses and talk to them now — and as I explain to them that we have these 14 districts involved — and it is all very good stuff, and we want you to play with us… They look at me and say, 'As an afterthought?' It should have been included from the very get-go.

However, building a shared vision, and creating community "buy-in" is rarely a straightforward task. The conference participants pointed out the thorny issues that almost immediately arise as they seek to help improve mathematics and science teaching in the schools. A series of very difficult questions arises for all the RSIs: How does the RSI project, which promotes a vision of teaching and learning based on national standards, square itself with a local vision of teaching and learning that is likely to be far more traditional? If communities are fixated on improving their state test scores, how can RSI projects promote a "higher order" vision of quality teaching and learning? And, if the RSI exerts some control and influence over the local programs it sponsors, how can ownership of project-related activities and outcomes be transferred ultimately to the local community?

We have a very vocal group of parents and some other community activists that will fight tooth and nail against anything that they think is not direct instruction and has phonics as its major emphasis ... In fact, they actually got a statute changed to require phonics ... Reform in the abstract is fine… but when you start identifying particular curricular

> *programs ... some consider a specific program to be the next best thing to sliced bread and others think it is the worst thing in the world to do to kids.*

As already mentioned, the major thrust of AKRSI was to bring together various, previously un-reconciled groups in the community. The leaders of AKRSI then worked very hard to forge a common vision which took the form of new standards.

> *The issue in Alaska is that there are multiple publics. The native public is very different from the [predominately white] public that is running the show right now. That is why the Alaskan native cultural standards came about and they are now part of the public standards. The cultural standards came from a very different point of view than the mainstream standards.*

3) DEVELOPING LOCAL LEADERSHIP

Participants pointed out how the rural communities' acceptance of new ideas in education depends very critically on the leadership of a few key people. "It comes back to leadership … in a lot of our schools, the leadership for reform is not there." In poor rural communities where experienced and knowledgeable educators are in short supply, a key to the RSI improvement efforts is the development of what might be called "indigenous" leadership. Thus, a very important dimension of the work the RSI projects do is centered around identifying and developing local leadership — administrators, teacher leaders, key community members — who "own" the vision and will guide local reform efforts in effective ways.

> *One of the things that struck me in ARSI's presentation is that at the time they began work, there really wasn't a keeper of the vision for math and science in those districts. There wasn't someone to lead the charge… there were no — and still are no — math or science supervisors; everyone is a generalist… The 'central office' staffs tend to be very small and so the ARSI-supported "teacher partner" became the standard bearer for math and science reform in those districts…*

ARSI provides a good illustration of a deliberate focus on leadership development. Their "leading edge" strategy is to develop indigenous leadership so that reform can take hold and grow in local Appalachian communities. They begin with the teacher partners as central nodes, and expand the leadership circle outward. One of the ARSI participants explained why and how they engineer specialized strategies to develop multiple and re-enforcing levels of local leadership:

> *In ARSI we have teacher partners and what we found out early on was that the teacher partner didn't always have support of the school principal. By that I mean, we had support, they helped select the teacher partner, but then they sort of forgot. So we decided there was an issue of leadership that we really needed to address. That was the*

first thing. Then the second thing we found out was that the principals really didn't understand what standards-based curriculum was, they didn't understand curriculum alignment-even though the state says you have to do all of that. That is when we invented our program improvement review-we go to schools, we write up a report, and we give it only to the principal. It doesn't go to the superintendent, doesn't go to anybody that is connected with power. If the principal doesn't want to use it, he could throw it out the window. If they wanted to use it, then they could… We just saw we weren't making progress without the leadership of the principal-if you are going to do standards-based instruction and inquiry and so on, the principals have to understand why and how all this needs to be done.

As another leadership development strategy ARSI also teaches principals how to "read" state test score data more insightfully and use it more effectively.

We just passed a law in Kentucky that says ... you can't just look at test scores in general; you have to disaggregate them and look separately at the data in three categories-economic, gender, and race. The state law ... says we've got to look at the data more carefully and a lot of our schools aren't prepared to do that. That has been one of our focal points in the ARSI project and it has helped tremendously. We have taken principals and sat down with them and said, this is how you look at test scores, this is what this means, here are the kinds of changes you got to make to start moving this thing forward.

However several of the RSIs, with communities that were less stable than ARSI's told us how frustrating it is to expend energy and resources on leadership development only to have those leaders move away, taking with them the investment that has been made.

You may go in and deal with the leaders that are there right now… but when you talk about the turnover rate, one school district has 80 something teachers in it, 48 of them are new this year and you can look at that rate of change as being a kind of constant thing... You have to look at the fluidity. It really does make a difference. Appalachia, to make a point, compared to us… has a good deal more stability….

These RSIs, especially the newer ones, also struggled to identify which individuals to invest in as leaders.

The issue of the leadership changing-and the people with whom you have developed agreements with always leaving… and when that happens, it takes the whole project back to ground zero…. Maybe it should be teams, the buy-in should be by the community as well as (maybe even instead of) administration. We are still at the stage of figuring out who do we work with… who can we rely on for the long term?

What also emerged as the participants discussed leadership development was consensus around the idea that in order to mitigate against the effects of high transience rates the best strategy was redundancy. Participants spoke about the efficacy of such strategies as working with leaders in teams.

> *The leadership teams in our RSI are taking on a tremendous amount of responsibility and are actually having the most impact in our schools. Once we started those teams two years ago, we saw marked changes in the way things were developing in the schools, because you have more than one person being involved, even though none of them have really much release time, the fact that they are working as a team and they find the time to come together to do work at the local level… and then we also bring them together on a large scale once or twice a year. We had our leadership institute in February, we had over 400 people from the four states and it provides them all with a chance to share what they have been doing. That has paid off very well…*

Similarly, RSIs work to build networks that can provide support to leaders in local settings and make the work far more effective than having many different isolated individuals playing leadership roles without any contact with each other.

> *…if you are trying to achieve systemic change and not just some individual initiative that does something as long as one person happens to be in a particular place-if you are trying to influence a system, you have to have a critical mass of leaders…if you have lots of good people but they are all isolated in their own system separate from each other… they are not going to be able to achieve a whole lot. But if they are part of something larger-and you create a critical mass of such people that are connected together, and they are networked in some way, then they have each other to draw upon…then they can build structures together… and use each other to find options when they are stuck… and so on. Then, I think there is the potential, even with turnover, to still retain some continuity in the effort that is under way.*

In spite of the challenges, investing in the development of local leadership seemed the strategy of choice for most of the conference participants. The RSIs argued, both explicitly and implicitly, that when all their work was done, it would be the individuals — the local leaders — that would be left behind to sustain the reform. Hence, the RSIs focus much of their work on the development of the knowledge and skills of local people, placing a heavy bet that it is their enhanced capacity that is most likely to have a long-term effect.

> *It seems to me like the big issue for all of us is building capacity, however you want to define capacity…If you have a strong person working with your project, they remain as a residue even after you are gone…. Our work leaves a residue…And if in that person you have put capacity in the district, then the district can continue to build on that legacy...*

4) DEVELOPING A SUPPORTIVE CONTEXT

In addition to working toward articulating a community vision and developing local leadership, the RSI participants told us that much of their work involves what they called "developing a local infrastructure and supportive context." For them the infrastructure is what supports and sustains the changes that are initiated and implemented in the schools through the work of the RSI. "Infrastructure," as one participant said:

> *… is the second strand of our program. It is the creation of a local context which supports and sustains the implementation of new curricula and new teaching methods. Of course, this context has both administrative and community elements; it also has higher ed elements and so on. So it is possible to say our primary focus was teachers, but at the same time, we are always working to create the infrastructure, the supports, the context so that they can do their job well and with support…*

For RSIs the creation of a supportive context may mean aligning the resources that already exist in the district and community. In poor rural communities in particular, much of the infrastructure building efforts of the RSIs consist of identifying assets and capacities that exist, but which communities do not recognize they have.

> *A lot of the rural communities that we work with have internal capacity, internal resources that they don't even recognize and…we spend a lot of time trying to help them recognize what they do have. But it takes time, all of it takes time…I think that is where the critical part of a long-term successful strategy lies — putting that initial investment into the community…bringing in those outside resources, if needed, and making sure it is all coordinated and going in the same direction. That lack of alignment is a tremendous waste in all communities — but in rural communities, whatever resources are there, they tend even more to go off in different directions…. Rural communities, in particular, need aligned acts of improvement, rather than random acts of improvement.*

As we have described, ARSI expended time and effort in helping school administrators with self-assessment. AKRSI helped surface and promote the wisdom of native elders, which in turn contributed to a fuller set of state standards. UCAN has helped districts and schools to understand their Eisenhower funding and to use those monies more effectively. Each of these activities when taken in isolation appears at first to be almost invisible and inconsequential, a mere drop in the bucket of all the work that is needed to achieve systemic reform. And yet when taken together over time, particularly when they stem from the same vision and purpose, these efforts to build a supportive context add up to an important cumulative achievement. A supportive context — and an infrastructure for improvement in math, science and technology education — is perhaps

the key outcome of the work of the RSIs. Conference participants told us over and over again that in small rural communities, local support — as manifested in shared vision backed up with real resources — was absolutely critical to the growth and sustainability of real educational change.

♦

SETTING EXPECTATIONS AND CREATING SUPPORTS FOR THE RSIs

As we have said, the work of reform in impoverished rural settings appears to be very different than what either the project leaders or the NSF program officers originally envisioned. The RSI efforts do not appear to be a case of simply translating the theory and processes of systemic change from the city to the country. Understanding the early work of the RSIs, as described in this conference, is clearly useful to both the projects and to the designers of the overall initiative in terms of learning how to foster educational improvement in rural impoverished regions.

The mismatch between initial theories of action and field realities is not, in our minds, a mistake or an embarrassment, but rather an expression of an important and natural process of organizational learning. This process of "ground-truthing," — comparing and contrasting the realities in the field with theoretical ideas or images — is a very sound improvement strategy. As such we see the challenges and insights presented at this conference as an opportunity that can be used to improve the design and operation of the overall Rural Systemic Initiative — both at the project and the initiative level. (And we note that already this process of adjustment is now happening — between the time of the conference and the completion of this report, the NSF has already considered and revised the design of the RSI in response to the realities that have surfaced in the field.)

On the final day of the conference, the conversation turned toward some of the more significant discrepancies between theory and reality. As we have seen, much of the actual work done by RSIs centers around the building of a foundation for reform. The RSIs have been working hard to position themselves, to develop a shared vision and community buy-in; to develop leadership, and to put in the first building blocks of a sustainable infrastructure for future reform efforts. The conference participants agreed that everyone needed to re-conceptualize the nature of the work that was called for — and that the RSIs were actually doing. This reconceptualization, they pointed out, had strong implications for the expectations that the NSF and other funders hold for rural reform initiatives, as well as for the types of supports the initiatives would require along the way. More specifically, participants pointed to the need to reassess timelines and accountability models that currently do not adequately address the challenges, complexity and richness of RSI work.

Redefining RSI target regions

As originally conceived, most of the RSI target areas were enormous, both geographically and demographically. Moreover, the very large regions that were to be served were filled with districts and schools that themselves were very small and very isolated. Thus, RSIs were asked to serve large regions, with not only small but often

times diverse communities. Typically RSI "target" schools are spread out geographically, often across state and other jurisdictional boundaries, and include very different cultures and community contexts. ARSI, for example, encompasses 66 eligible counties in six different states. UCAN includes parts of four huge rural states. And Tribal College RSI aims to provide support to rural areas in math, science and technology in six different states, spreading from Montana to Minnesota. Even those RSIs, such as Hawaii or Alaska, that focus on single states include a wide and diverse target population. In Hawaii, groups are divided by water, distance and island culture. In Alaska the RSI is divided into five different cultural regions, and the project initially worked with as many as 16 distinct cultural and linguistic Native Alaskan tribes. In Texas the RSI seeks to work with the poorest counties which are literally scattered all over the state.

The participants pointed out the obvious — the original RSI regions were too big and too diverse. Not only do large regions necessitate spreading thin the RSI's efforts, but equally important, they force RSIs to work in communities that are very diverse, disconnected and even at times hostile to each other. The NSF has already responded, since the conference in April, 2000 and the writing of this report, by readjusting and "downsizing" the scale and focus of many RSI target areas.

For example, in applying for Phase II funding, both UCAN and the TCRSI had smaller sites within their vast regions apply for developmental and implementation grants. As a result, ten sites within the TCRSI region have been given implementation grants of their own, three have received a development grant, and two others are currently waiting to hear about their funding. Within the region that the UCAN RSI encompasses, two sites were awarded implementation grants, one site was awarded a developmental grant, and two additional sites will be applying for funding in April, 2001.

Other newly-funded RSIs (e.g., the Coalfields RSI which serves the poorest counties of West Virginia) appear to be more limited in their geographic scope, targeting more specific communities, and therefore locales that are frequently more homogeneous demographically and culturally. This adjustment is bound to make the initial work RSIs must do toward building community, vision and consensus much easier.

Revising the expectations vis-à-vis the timeline of RSI work

"There's a saying about transformation, that you can't make a butterfly by sticking wings on a caterpillar." Everyone at the conference — RSI leaders, researchers and the NSF participants — all agreed that extending the overall timelines for Rural Systemic Initiatives made sense.

By its very nature work in chronically impoverished communities requires a serious long-term commitment. This is true not only because community development is time

consuming, but also because the appearance of a short-term commitment will lead to distrust and lack of interest on the part of the local education and community leaders. What was once considered "start-up" and "readiness-building" work, and expected to take not much more than the first year of the projects, has in fact proven to be the major work of the first phase of many of the RSIs. As such, the "foundation building" needed for mathematics and science reform in chronically impoverished, rural areas takes many years.

We think it is important to say clearly that the problem is not one of "inefficiency:" the process of foundation building and groundwork can not be short-circuited. To extend the metaphor, we find that too often reform efforts seek to build a completed house in a few years. But without the foundation firmly in place, and without local expertise and ownership, we discover the house is not stable or permanent, and falls down almost immediately after the contracted construction crew leaves.

We are not suggesting here that the RSI projects can not improve the quality and impact of their work. It is clear they can and should. But we are suggesting that investments made by the NSF and others, to be taken seriously, and to make a significant contribution to education in impoverished rural regions, will require a timeframe on the order of a decade or more.

Re-assessing the assessment of RSIs

The topic that generated the greatest emotion at the conference was the assessment methods and measures that have been used thus far to measure progress made by the RSI projects. The RSI leaders discussed at length what they viewed as the mismatch between using student outcomes (as measured by their state standardized tests), and the nature of their work. Again, they pointed out that the inspectors who check the foundation work at a construction project use different criteria and look at different things than does the realtor who checks the value of the completed house. As primarily capacity-building efforts, using student test scores to judge the effectiveness of the RSIs was not, from most of the participants' perspective, an accurate or appropriate assessment.

> *I would like to ask a question, based on pure ignorance…of political processes, but one of the things that I find frustrating is that someone on Capitol Hill, a congressman, asks a question, 'What are your data gains? What is your student achievement?' And, that filters down into a huge amount of energy and time and effort being spent at the local level, our level, trying to gather that information. This is not helping us get our real work done… Isn't there an opportunity for the National Science Foundation or the Department of Education to help congressmen, legislators to ask the right questions? Why do we keep being driven by the wrong questions?*

RSI leaders did not question the need for accountability; nor were they denying that their ultimate aim was to improve student learning. But, given the nature of their "foundation setting work," they questioned the legitimacy of the current measurement system.

> *Here is what I am battling with — a moral issue: We are asked to show changes in some data — whether it be standardized test scores, individual testing or whatever ...so that we can continue our National Science Foundation funding... But our major concern is not getting money, but improving education for all the children who live at these low economic levels... And with this poverty you are not going to get good test results… and therefore, I am not sure if we should put the test scores or the children first — is a horse leading the cart, or the cart leading the horse? … It is a dilemma.*

Moreover RSI leaders, as both members of and advocates for the poor rural communities they serve, feel a deep frustration and even anger over the ever-increasing political demands placed on their students, students who are traditionally and persistently excluded from educational success because of their race, their poverty and their low achievement on standardized tests:

> *... So even if we are successful in getting our 8th grade students to take algebra at the 8th grade and they get C's and B's, then it "raises the bar" to the next level. Then you have to have geometry, or some kind of a higher level. It just seems like the societal norms go up higher every time: The middle income used to be $25,000, now it is 45 or $50,000 — so you never reach the economic level you are supposed to… So, I wonder if there is something inherent in this system that rises, and when poor people try to meet that goal, the bar goes higher… it becomes a new standard that excludes you ... the standard hops all over the place just to exclude you…*

Those participants who did not summarily reject the notion of standardized testing still showed a genuine ambivalence about the use of test scores to communicate to funders, legislators and the public at large. These RSI leaders are politically sophisticated and understand the political necessity of showing evidence of success in ways that are easy for the public and legislators to understand. On the other hand, knowing and understanding the realities of their work, they reject such simplistic answers to the dilemma of accurately assessing their project's efficacy.

> *I think the issue I struggle with is the issue of honesty about using state test scores to report on our work… I think we are intellectually dishonest here… we go into one group discussion and talk about their invalidity of such tests… and then we turn around and in the next group discussion we start using bar charts to validate the success of what we are doing-which isn't honest… But we justify our schizophrenic behavior as a means to an end: If we really believe we are making a difference, we argue that we need to use test scores to do a sales job to the constituents from whom we receive money… That allows us to continue our work…*

> *So we are talking then about two aspects of evaluating our work — one aspect is the need for political ammunition… and the other one is a genuine effort to answer the question: are we really making a difference?*

Even among those few participants who were more optimistic about the use of student outcomes to assess the value of the RSI initiative, there was the opinion that "results" in student outcomes would not appear immediately.

> *... if we do what is supposed to be done, test scores will improve — and I believe in that. I have had a lot of experience in working on school change — and if we do things in a systematic way and if we identify the needs of schools, and if we focus on those needs effectively, then I think achievement will improve... I know that is a very broad and bold statement, but over time-and I don't think you can do it in one or two years… but over a long period of time, I think, perhaps, you could look at student achievement …*

Developing alternative indicators of success

While it was frustrating for the participants to be judged on the basis of a single measure (student achievement), it was also difficult for them to articulate the kinds of measures that would be more appropriate for assessing the value of their work. As an outgrowth of the discussion about the conference participants' dissatisfaction with current assessment measures, stemmed a conversation focused on the need for developing indicators of success that accurately reflect and measure the kind of work that RSIs actually do.

Again, the "foundation building" metaphor was used. How do we assess the quality and value of the work of the people who pour the foundation? Certainly, we do not do this by assessing the quality and value of the completed house? Participants insisted that it was important to try to assess dimensions that are <u>hard</u> to measure — things such as changes in "readiness," the growth of indigenous leadership, the increased vision of and commitment to improvements in education, or the development of enhanced local capacity and infrastructure. A member of the UCAN team described the difficulties their RSI had in attempting to show growth through student achievement scores in mathematics and science:

> *We have been struggling with how do we show progress when the states that we have been working with have continually changed the state assessments. In New Mexico, we have two data points now, in Colorado we have one data point and in Utah we have one data point and in Arizona we have two data points, and we have been working out there for five years… and those data points are not comparable to the baseline data that we have on student achievement. Everyone is focused on state data. We have to focus on something much broader and richer than that.*

Another participant described a similar feeling of frustration, as well as the same inclination to look at dimensions of change that are more closely aligned with the nature of the work RSIs are actually doing.

> *….if you focus only on the gap in student achievement, then you feel like you are playing catch-up on a measure that is a long way away from your work….and you are not paying attention to other relevant issues in your local community… you are just playing catch-up. Then you run the risk of becoming a too tightly focused intervention that has no systemic impact. We have to also look at gains on interim measures — things like parental involvement in the schools….*

Participants went on to describe how only one set of indicators was not sufficient to accurately capture the progress of the RSIs which themselves bridge a wide developmental spectrum. That is, some RSIs were just starting their work; others were more "mature" and had developed strategies involving focal schools, teacher partners or the implementation of new curricula. Rather, they saw the need for sets of indicators that change as the projects mature, and as the nature of their work changes over time. For this reason, as well as the others described above, one of the strongest pleas we heard from the RSI participants was for appropriate and rigorous assessment of their work.

Re-designing the assistance and supports RSIs need

In the waning minutes of the conference the RSI leaders focused on the kinds of supports and assistance they would like to have in the future. First, hearkening back to the discussion about readjusting the timeline, participants said that they would like a long-term commitment from funding sources. Such a commitment would recognize the realities of the circumstances surrounding most impoverished rural communities — that they are very far from being ready to engage in a process of systemic change in mathematics and science education. A long-term perspective is needed to develop that readiness before pursuing the project's ultimate goals of improving the quality of teaching and learning.

Second, the RSI leaders asked for the NSF to provide additional support and learning opportunities for their projects — and their project leadership. They were especially interested in technical assistance and access to expertise during the planning phase of an RSI, to ensure that project designs are sound, and consistent with the most current knowledge from the field.

Since the RSI conference over a year ago, the NSF has responded to the need for planning by expanding the number of developmental grants (typically $100,000 to $200,000 for up to a one year period) used to research resources in the region and to plan the reform effort prior to applying for implementation funds.

The conference participants also advocated for a strong network of RSI projects, aiming to establish and maintain a learning community centered around rural reform. "When we get together, we realize we are very much alike." They wanted regular opportunities to learn from one another, seeing those kinds of interactions and relationships as an important source of professional development for RSI personnel. (Again, since the conference the NSF has supported several subsequent gatherings of all the RSI projects.)

Finally, the RSI participants reiterated the need to use the emerging lessons learned to develop reasonable and appropriate indicators of success. They wished for these indicators to more accurately reflect the real work that RSIs must do, and to change over time, along with the developmental nature of the work.

♦

CONCLUDING REMARKS

We believe that the RSI conference served as a fruitful venue for an important "ground-truthing" process. It offered all those involved in the Rural Systemic Initiative an opportunity to use honest feedback and reflection gleaned from the field to critically examine the fundamental assumptions underlying the initiative. These assumptions, which had heretofore remained invisible and unquestioned, were then compared to the realities of working in impoverished rural communities. The comparison of theory and reality allows both the NSF and the projects to readjust their thinking and their designs accordingly. Assumptions about the scope and size of RSI target areas, about the overall timeline, about the nature of the work that is required, about the appropriate indicators of success, and about the types of assistance and supports for the projects - all of these were examined. Some of the initial design assumptions of the initiative, such as the dimensions of target areas, and the emphasis on supporting initiatives in their planning stages, have already been adjusted. Others — project assessment in particular - remain as challenges to be addressed in the future by the NSF and the RSI community.

We think the RSIs illustrate well the depth of challenges the NSF and others face as they seek to help narrow the achievement gap in this country. The discussions at this conference described well the very difficult conditions encountered in rural impoverished areas — Navajo communities, Native Alaskan villages, Appalachian "hollows," and Mississippi river towns. These pockets of impoverishment and historical oppression are not amenable to quick fixes. It is to the NSF's credit that they allocate and target resources to addressing the inequities that exist in these most distressed and disadvantaged communities. What is needed now is the patience and wisdom to do the long-term and steady work that is needed. If the NSF and its RSI projects can continue to evolve their work, and focus their efforts on setting in place a strong foundation for further reform, then the initiative will have served these communities in appropriate ways and provided them with long lasting benefits.

APPENDICES

A. The Rural Systemic Initiatives "Lessons Learned" Conference

B. The Four "Senior" RSIs

C. History of the National Science Foundation's Rural Systemic Initiatives

APPENDIX A

The Rural Systemic Initiatives "Lessons Learned" Conference

In April 2000, Inverness Research Associates organized, conducted and documented a Rural Systemic Initiative "Lessons Learned" Conference. The conference, which was held in La Jolla, California and lasted four days, had three main purposes: To help RSI projects document and share their accomplishments; to allow project leaders to talk with and learn from each other; to use the conference as a vehicle for generating and capturing insights about the unique nature of rural regions, as well as the strategies that are most effective in promoting mathematics and science reform in those settings. Representatives from the then eleven funded RSIs were invited to attend. A grant from the National Science Foundation made the conference possible.

Structure of the Conference

The conference was divided into two parts with an overall aim of collectively exploring the theories, strategies, realities and challenges of systemic reform in rural areas, and doing so from the perspectives and experiences of those who had been and continued to be engaged in that work.

Part One — In the first part of the conference the four "senior" RSI projects — Alaska, Appalachia, Tribal College / High Plains, and Utah • Colorado • Arizona • New Mexico — made relatively informal presentations of their projects as "cases" of systemic reform in rural contexts. For their presentations the senior RSIs were asked to outline features of the rural contexts in which they worked, the strategies they had employed, their most significant accomplishments, their toughest challenges, and the more general lessons they had learned about doing systemic work in rural regions. Inverness staff spoke with the four projects beforehand to help them structure and shape the presentation of their cases.

During this first part, representatives from NSF — Dr. Costello Brown, Acting Division Director; Dr. Jody Chase, RSI Program Director; Dr. Gerald Gipp, RSI Program Director; and Ramona Lyon, Senior Program Assistant — attended and participated in the conversation, adding the funder's perspective to the discussion. Inverness Research Associates facilitated the conversation with the goal of helping all involved learn as much as possible from the work and experience of the four oldest RSI projects.

Part Two — In the second half of the conference participants were asked to examine more closely the strategies and challenges that emerged from the cases in Part One. Working in small groups participants shared their perspectives and experiences around particular issues such as the role of teacher leadership; working across multiple states;

the fostering of community involvement; and the implications of the rural setting for the design of systemic initiatives. Inverness researchers carefully documented the conversation with the aim of eventually disseminating the RSIs lessons learned for NSF and other outside audiences. NSF participants were not present for the discussions in Part Two.

The Participants

Representatives from the then 11 active RSI projects were invited to attend the conference. The senior RSI projects were asked to bring three participants to the conference. All the other RSIs were asked to bring two participants. The projects were asked to select participants who could both benefit from and contribute to the conversation on doing reform work in rural contexts as well as being knowledgeable and articulate about the theory, strategy and realities of their project. Twenty-seven RSI project representatives were present in all. In addition, NSF representatives and Inverness researchers were also present.

The following is a roster of the RSI Lessons Learned conference participants and the projects or organizations they represented.

Alaska Rural Systemic Initiative
Ray Barnhardt, Co-Director, Center for Cross-Cultural Studies
Frank Hill, Co-Director, Center for Cross-Cultural Studies
Nanci Spear, Mathematics Specialist, Alaska Department of Education and Early Development

Tribal College Rural Systemic Initiative
Carty Monette, Turtle Mountain Community College
Jack Barden, Turtle Mountain Community College
Patrick Weasel Head

Appalachia Rural Systemic Initiative
Wimberly Royster, Principal Investigator
Stephen Henderson, Project Director
Sarah Campbell, Teacher Partner

UCAN Rural Systemic Initiative
Vicente Llamas, Principal Investigator
Roxann Morris, Eastern New Mexico Education Resource Center
Betsy Yost, Project Director

Coastal Rural Systemic Initiative
Chuck Blanton, Principal Investigator / Project Director
Manly Midget, Associate Director for Field Activities
Henry Johnson, Assistant State Superintendent for North Carolina

Hawaii Rural Systemic Initiative
Vicki Kajioka, Principal Investigator
Dan Suthers, Co- Principal Investigator, Assistant Professor

Michigan Rural Systemic Initiative
Stan Delidow, Program Director / Principal Investigator
Michelle Johnston, Co-Principal Investigator, Associate Dean - College of Education, Ferris State University

Delta Rural Systemic Initiative
Charles Alexander, Principal Investigator
Alfred Hall, Project Director

Navajo Nations Rural Systemic Initiative
Anselm G. Davis, Jr., Principal Investigator
James Tom, Jr., Project Director

Southeastern Rural Systemic Initiative
Marsha Reed
Tom Reed

Texas Rural Systemic Initiative
Judy Kelley, Project Director
Marylin Leasure, Deputy Project Director

National Science Foundation
Costello Brown, Acting Division Director
Jane Stutsman, Deputy Assistant Director
Jody Chase, RSI Program Director
Gerald Gipp, RSI Program Director
Ramona Lyon, Senior Program Assistant

Inverness Research Associates
Mark St. John
Barbara Heenan
Mike Howard
Ana Becerra
Sue Sharp
Samantha Broun

APPENDIX B

The Four "Senior" RSIs

Appalachian Rural Systemic Initiative (ARSI)

While the Appalachian Mountain range officially runs from New York state to Mississippi, the region that is commonly referred to as "Appalachia" exists in mountains and valleys of Tennessee, North Carolina, Kentucky, Virginia, West Virginia and Ohio. Many of those who live in Appalachia have done so for generations. There is a palpable sense of pride among Appalachian mountain people, as well as a commitment to community and family. Nonetheless, poverty, isolation, and a lack of resources lead to low expectations and fatalistic attitudes. Conditions are further exacerbated by deeply entrenched class distinctions, where the "*haves*" control the "*have nots*'" access to the limited resources. In 1996, the poverty rate in the neediest counties in Appalachia was almost twice that of the rest of the country (24.12% vs. 13.9%).

The majority of jobs available in this region have historically been either hard labor (i.e., mining) or seasonal labor (i.e., farming). In recent years, advances in machines and technology have left most of these laborers unemployed. School districts are now the #1 employer in many rural Appalachian communities. However, due to the fierce competition for jobs, it is said that many employees of school districts are forced to be more concerned with job security than they are with the field of education.

Based in Lexington, Kentucky, the Appalachia Rural Systemic Initiative (ARSI) works with school districts in the heart of Appalachia. Prior to the Appalachia Rural Systemic Initiative (ARSI), educational reform efforts that had worked in and around Appalachia, such as PRISM, V-QUEST, and the North Carolina SSI, had little success in reaching school districts in the most remote, and arguably most needy, mountain communities. Five years ago, when ARSI began looking at these regions, they found that schools played a central and positive role in many of these communities. On the other hand, they also found fragmented resources within the districts, little connection to outside resources (such as large universities, regional and/or national organizations, etc.) and, despite the positive connotations associated with the schools, they found a lack of family and community involvement.

With this knowledge, ARSI set as its goal to "accelerate improved performance in mathematics and science for all students through high-quality, standards-based teaching supported by aligned, coherent local and regional systems." Over the past five years, ARSI has worked to create capacity for sustainable change within districts by organizing and supporting local leadership teams. At the center of these local leadership teams are Teacher Partners — experienced mathematics and/or science teachers who become closely identified with ARSI and with mathematics, science and

technology reform. Teacher Partners serve as a resource for other teachers in their district providing them with everything from curriculum and materials to professional development. Other members of local ARSI leadership teams include a District Liaison, School Principals, and Superintendents. ARSI has also worked to identify "catalyst" schools within the 50+ districts it is working with. As the unit of change, catalyst schools take the lead in improving student performance in mathematics and science while serving as a model of change for other schools in the district.

In addition to developing school leadership, ARSI also works with community members and regional partners to build the support that is necessary for long term improvement in education. It is with these resources and support systems that ARSI is able to reach another of its goals — creating effective learning environments for students through developing the knowledge and skills of K-14 teachers. On a regional level, ARSI has created five resource collaboratives. Based out of local universities and colleges, each resource collaborative provides training, resources, and guidance to the teacher partners and district liaisons within their region.

The greatest challenge for ARSI may be the sheer size of the area it serves, as well as the difficulties it has in working with six different states and six different state level departments of education. Despite these challenges, ARSI has made progress in identifying, training and supporting leadership capacity within districts; in working with schools to align curricula, improve teaching strategies and implement standards-based curricula; in uncovering, building, and strengthening resources within districts and across the region; and in increasing learning opportunities and student achievement for students in rural Appalachia.

Alaskan Rural Systemic Initiative (AKRSI)

Approximately 40% of Alaska's 555,000 residents live in small, isolated, rural communities scattered around the state. These communities have populations that range in size from 25 to 5,000 and are composed primarily of Native Alaskans. Simply traveling to these communities can be extremely difficult as some are so remote that they can only be reached by snowmobile or airplane. With very few permanent job opportunities, the vast majority of those who live in these small communities rely on subsistence hunting and fishing to make a living. However, many rural inhabitants maintain that they prefer living off the land to life in the city. And, despite the fact that 15 to 57% of the people living in rural Alaska are considered to be living below the poverty line, they don't think of themselves as poor.

In 1994, the Alaskan Native Commission reported that Native Alaskans felt the need to develop public school curricula that met the needs of Native Alaskan students. More specifically, they stated that they wanted their children to learn the skills required to survive in the modern world as well as the skills they would need to survive in subsistence situations. This request, pointed to a larger, long-term source of tension between Native Alaskans and non-native Alaskans — namely, the Native Alaskan population's alienation from the formal education system in Alaska. This feeling of alienation stems from fundamental aspects of the current system. For example, Native Alaskans view all aspects of the world as interdependent, as opposed to a Western perspective which separates out various aspects of the world into "subjects" such as history and science. Moreover, 80% of public school teachers in Alaska are non-Native and/or from out of state, which contributes even further to the distance between the educational system and the children it serves.

Compelled by the need to give Alaska Native students a "reason to feel connected" to their formal education, in 1995 the Alaska Rural Systemic Initiative (AKRSI) took on as a task to "systematically document the indigenous knowledge systems of the Alaska Native people and develop pedagogical practices that effectively integrate indigenous and Western scientific knowledge in educational programs." Over the past five years, AKRSI has taken on this task by using NSF funds to focus on areas related to science, mathematics and technology, as well as additional funding from the Annenberg Rural Challenge to look at areas of language arts and social studies.

While AKRSI's goal of integrating Native and Western epistemologies in math, science and technology is humane, it is also intended to improve future job opportunities for rural students. In order to work with the 16 distinct cultural and linguistic systems that exist in these rural areas, AKRSI has divided Alaska Natives into five regional groups — Aleuts, Athabascan, Inupiaq, Tlingit-Haida, and Yup'ik — groupings which take geography and cultural similarities into consideration. Regional coordinators — one for each of the five regions — typically come from the area they are working with and speak the language of the region. Each region also has a council of elders that serve as

cultural advisors.

The larger AKRSI framework has been structured around implementing six major initiatives within each of the five regions. The six major initiatives include: Native Ways of Knowing and Teaching; Culturally Aligned Curriculum and Adaptations; Indigenous Science Knowledge Base; Elders and Cultural Camps; Village Science Applications; Educational Technology Infrastructure. At the same time, AKRSI staff, regional coordinators and the councils of elders have worked together to document Native ways of knowing through oral histories, video tapes, biographies, language materials and other resources. These resources have then been used to develop lessons based on Native ways of knowing that can be used in the formal education system. Instead of simply supplementing lessons with cultural activities, AKRSI consciously works to integrate Native ways of knowing into lesson plans, curricula, and state standards, always with the goal in mind of creating schools that recognize Western and Native ways of knowing.

Tribal College Rural Systemic Initiative (TCRSI)

Some of the country's poorest counties are located in the high plains area of the United States. This vast region — which includes parts of Minnesota, Montana, Nebraska, North Dakota, South Dakota, and Wyoming — is also comprised of dozens of reservations where Cree, Lakota, Chippewa and other Native people live. Although these are disparate tribes, each with their own traditions, culture and language, these reservations have in common high unemployment rates, as well as problems with drug and alcohol abuse, teen pregnancy and gangs.

In 1995, when the Tribal College Rural Systemic Initiative was implemented, it found schools where over fifty percent of the students were dropping out as well as communities that were sorely in need of Native doctors, nurses, scientists, teachers and other professionals. When TCRSI took on the mission to "provide support and advice needed for communities and their schools to take charge of the educational processes that their schools and colleges use for mathematics, science and technology education," their aim was as much to change the conditions in the communities as it was to the change conditions in the schools.

TCRSI focused its efforts around four basic goals: 1) Implementing mathematics and science standards-based curriculum for all students; 2) Implementing mathematics and science standards-based assessment for all schools; 3) Implementing mathematics and science standards-based professional development activities for teachers, school administrators and community leaders; and 4) Integrating local native culture into mathematics and science standards-based curriculum.

Centered at Turtle Mountain College in Belcourt, North Dakota, TCRSI works with 17 tribal colleges and 27 distinct bands of Native Americans. TCRSI has divided the expansive high plains area into three smaller regions, each with a regional coordinator. Key to TCRSI's success is its affiliation with the tribal college system. These colleges, which do not receive federal funds and which are also autonomous from tribal governance, have become "grass roots" change agents within Native American communities. Affiliation with the tribal colleges validates the initiative's efforts in the eyes of the community. In addition, it provides TCRSI with access to college students — exposing them to the ideas of the reform effort and allowing them to take these ideas back to their own communities.

TCRSI works with a variety of school sites — public schools, tribal schools, Bureau of Indian Affairs schools, private parochial schools and jointly operated schools — which also means that TCRSI must address a wide variety of standards, both formal and informal. TCRSI's overall strategy is that the tribal colleges provide these local schools (K-12) and school districts with resources, information and assistance in making changes in math, science and technology curricula, assessment of these changes, as well as professional development for teachers and administrators. TCRSI has also worked

to help local schools to secure funding and develop policies that support their standards-based reform efforts. To date, 23 school systems with which TCRSI works with have adopted policies which direct schools to use standards-based curricula with aligned assessment and professional development. This number is expected to increase.

Also important to TCRSI's work has been the engagement of Native American community leaders. TCRSI staff has met with these leaders to discuss TCRSI's work, the significance of systemic reform for Native students, and how the reform curricula that TCRSI promotes is more similar than dissimilar to traditional Native ways of teaching and learning. A key accomplishment is that many of the tribal governments which they work with have now passed their own ordinances which place a high priority on science, mathematics and technology education.

Utah•Colorado•Arizona•New Mexico Rural Systemic Initiative (UCAN)

Based in Las Vegas, New Mexico the UCAN Rural Systemic Initiative targets students who live in small, rural communities in Utah, Colorado, Arizona, and New Mexico. In total, UCAN's targeted area covers 100,000 square miles which extends over 450,000 square miles.

The population in this region has been described as extremely independent, self-reliant, and resilient. Of the 170,000 students within this rural region, 43% are Native American and 27% are Latino. 30 to 70% of the students live below the poverty line. The Native American population is diverse in itself, representing multiple sovereign nations each with its own culture, language and social structures. The Latino population is equally diverse and includes descendents of Spanish settlers along with families that have migrated north from Mexico. Both the Native American and Latino families are characterized by powerful extended family structures. Some families live where their ancestors did over 300 years ago.

The schools are as disparate as the students who attend them. There are 44 Tribal governments within the four states that UCAN works with, as well as public, parochial and Bureau of Indian Affairs schools. Local politics are high stakes, most frequently concentrated in the hands of the local school boards and driven by the increasing interest in self determination among the Native American tribes.

Poverty is evident in the poor infrastructure of the region. Unpaved roads and problematic waste management systems are common. The lack of a communication infrastructure also contributes to a sense of isolation.

UCAN has been working with selected schools in the four state region since 1995, with the goal of providing them with "support for comprehensive programs that broaden the impact, accelerate the pace and increase the effectiveness of improvements in standards-based science, mathematics, and the appropriate application of technology." Central to this goal has been UCAN's commitment to "building capacity through education, community engagement and through the integration of spirituality, language, science, mathematics and technology."

UCAN has chosen to focus its work around the needs of the community — however community is locally defined. The communities UCAN is working with fall on a continuum of "reform readiness" — some who are just beginning to think about and talk about math, science and technology reform in schools and others who are preparing to implement standards-based curricula. By building a network between the wide variety of groups it works with, UCAN has found that these communities can teach, learn from and support each other.

UCAN's overall strategy has been to develop six regional coalitions — Arizona Tribal

Coalition, the Southern Colorado County Coalition, the Ute Four-Corners Coalition, the New Mexico County Coalition and the Navajo Nation Coalition (now its own separate RSI). Each of these represents various political, cultural, and geographic areas. Through these coalitions, UCAN has worked with existing local and regional organizations to converge resources and develop community leadership teams who support UCAN's goals. UCAN has also worked to build the capacity within the coalitions to carry on mathematics, science and technology reform work in local communities after the UCAN RSI is gone.

APPENDIX C

History of the National Science Foundation's Rural Systemic Initiatives

The history of the Rural Systemic Initiatives began in 1990, when the National Science Foundation (NSF) first started funding large-scale, systemic reform efforts. It was at that time, in response to a growing domestic awareness of the importance of mathematics and science education, that the NSF put in place its Statewide Systemic Initiatives program. Through these far reaching, state-wide mathematics and science education reform efforts, NSF "provide[d] funding that would help states develop the capacity to move from independently devised science and mathematics educational reform measures to state-developed efforts."[7] NSF hoped that through Statewide Systemic Initiatives (SSIs) they could create a mechanism whereby they might influence multiple aspects of the "system" — ranging from political consensus to teacher preparation to student performance — ultimately effecting mathematics and science education throughout the country.

Three years later, the NSF found that while the SSIs were meeting some success, in general they were not reaching all school districts, and therefore, not reaching all students. In particular, they found that students of color and students who lived in less affluent areas of the country continued to not do as well on standardized tests as their white and more affluent peers. In 1993, in response to this disparity and with equity issues in mind, the NSF created the Urban Systemic Initiatives (USIs). The USIs targeted school systems in 28 of the nations poorest urban areas. The mission of the USIs was to "[reduce] the performance gap while simultaneously supporting an upward trajectory of achievement in science and mathematics for all urban students."[7]

In 1994, the NSF extended its investments once more, this time focusing on rural regions of the country where poverty levels were also extremely high and where mathematics and science education, which had been virtually left untouched by previous reform efforts, was desperately in need of improvement. In turn, the rural projects came to be called the Rural Systemic Initiatives (RSIs) with the stated goal of "promoting systemic improvements in science and mathematics for students in remotely located and impoverished locales, especially those that were under-served by the previously established SSIs and USIs."[7]

That same year, the NSF awarded development grants ($100,000 to $200,000 for a one year period) to six rural sites to explore, through workshops and other activities, the

[7] See the NSF publication: *The National Science Foundation's Rural Systemic Initiatives (RSI) Program: Models of Reform of K-12 Science and Mathematics Education*, March 1999.

ways in which they might influence systemic reform in mathematics and science education in their designated regions.

In 1995, four of these sites — Alaska, Appalachia, Utah-Colorado-Arizona-New Mexico (UCAN) and Tribal College — were awarded implementation grants (up to $2 million per year for up to five years). The implementation grants were intended to provide these particular rural regions with funds to implement science, mathematics and technology reform efforts. They were given with the stipulation that: the funding be regarded as catalytic not permanent; that the funding be largely used to finance the establishment of partnerships with educational institutions, businesses and other organizations; and that the projects be monitored through annual reports and program evaluation reviews (PERs).

Ultimately, the NSF did not prescribe what the RSIs should do to affect change — this was purposely left open so that each project could implement change according to the idiosyncratic needs and the strengths of the regions in which they were working. However, each of the RSIs was expected to hire external evaluators, analyze student data, and to be visited by NSF staff. NSF also stipulated that the annual reports required of the RSIs focus on specific process and results "drivers," including dimensions of reform such as standards, curriculum, teacher development, policies, financial resources, community support, student achievement, and reduction of the differences between under-served K-12 students and their peers. They also stipulated that program evaluation reviews be structured according to nine indicators aligned with the drivers: student impact, teacher impact, policy change, resource change, management change, data initialization, learning infrastructure, student performance and partnerships.

Over the last five years, the NSF has continued to invest in similar RSI projects in other poor and remote rural regions of the country. In 1997, a RSI development grant was awarded to the Southeastern region (Florida and Georgia) of the country and an implementation grant was awarded to the Delta region. In 1998, the Coastal region (near the Carolinas) received a planning grant and Texas, and the Navajo Nations (which covers 25,000 square miles formally covered by UCAN) were awarded implementation grants. And in 1999 Michigan was given an implementation grant and Hawaii was given a planning grant.

The year 1999 - 2000 marked the last year of funding for the four "senior" RSIs — Alaska, Appalachia, UCAN and Tribal Colleges. While all four of these projects applied for Phase II funding (which totals about half the funds the projects received for Phase I) only ARSI and AKRSI were given these awards. Both UCAN and TCRSI had smaller sites within their vast regions apply for their own developmental and implementation grants. As a result, ten sites within the TCRSI region have now been given implementation grants, three have received a development grant, and two others are currently waiting to hear about their funding. Within the region that the UCAN

RSI encompasses, two sites have been awarded implementation grants, one site has been awarded a developmental grant, and two additional sites will be applying for funding in April, 2001.