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**Key Note Address**

**Agricultural growth and poverty reduction –  
the rapidly increasing role of smallholder livestock**

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Here we are at the front of experience with smallholder dairy development. The place where massive numbers of very poor women have been directly lifted out of poverty into lives of hope for themselves and their children. The base from which Dr. Kurien won the World Food Prize for his seminal contribution, starting here in Anand, to solving the worlds problem of hunger and poverty through large scale development of smallholder dairy. What can I add to the self-evident truths that surround us in this location?

Unfortunately there is reluctance by governments to allocate resources essential to achieving the Kaira district success on a worldwide basis, or even adequately in India itself. Unfortunately, the influential foreign assistance community has been part of the problem not the solution as it once was. All too often livestock is seen as something prosperous people consume, not something that poor people produce. Dumping of dairy products from high-income countries has put a further damper on the smallholder livestock sector.

Perhaps I can be helpful by stepping back from the wonderful Kaira district example and laying out the nature of the smallholder livestock contribution and the policy needs for enlarging it. Along the way I may make some contributions that enlarge on the Kaira district experience. The basic argument is simple and therefore too often passed over.

It is agricultural and rural growth that increases employment and reduces poverty; the contribution to poverty reduction of industrial and urban growth is minimal at best. The importance of agriculture is not fully understood for two reasons. First, agriculture's declining share of GDP is most noted, while unnoted is agriculture's far greater contribution to employment growth and poverty reduction. Second, the effect of agricultural growth on employment growth is substantially indirect and thus often understated.

The impact of agricultural growth on employment and poverty reduction comes from its stimulus to the employment intensive, non-tradable, rural non-farm sector. That impact is potentially immense. However, it requires agricultural growth much more rapid than population growth. That rate is not easy to achieve even though many countries have succeeded in attaining such growth rates (Mellor 1992.) Further, large-scale agricultural operations, such as those so common in much of Latin American, do not have this favorable effect on employment growth and poverty reduction. It is small farmers that must be brought to rapid growth. That is a complex task.

High value commodities, of which livestock are the largest element, are now the prime drivers of high agricultural growth rates. That is because in this increasingly prosperous world people demand much more of these commodities as their incomes rise. Demand

grows rapidly and the base soon becomes large, with an immense aggregate impact. Demand for and production of high value agricultural commodities can grow at a 6 to 8 percent rate, whereas it is difficult to sustain growth rates in the heavily land based commodities such as cereals at more than 2 ½ to 3 ½ percent.

But, that elastic demand for high value commodities has a down side; high-income consumers also have the discretion to spend on other things. If a poor job is done in reducing the cost and prices of livestock and other high value commodities, consumers will switch to other goods and services that are becoming relatively cheaper. In general though, alternate goods and services provide fewer stimuli to employment growth than the high value agricultural commodities.

Thus, it is important that the cost of smallholder livestock production be constantly reduced. That requires increasing expenditure on physical infrastructure and on research and extension. Globalization and resultant competitive pressures reinforce the need for cost reduction.

The policy issues involved in livestock growth are more complex than for cereals growth. Smallholder livestock requires a rapidly expanding agribusiness sector and finance in addition to infrastructure and technological development.

Another point derives from the importance of demand for livestock products. Smallholder livestock will play its role best when industrial growth is also contributing to rapid increase in incomes. It is those rising incomes that provide the demand base so necessary to rapid livestock growth. The synergies from balanced growth are immense.

Thus, if poverty is to be reduced and employment is to grow we must get across to policy makers in low and middle-income countries that they must allocate more to agriculture in total as well as to reallocate those funds. We must also bring foreign aid to playing a lead role in that process, not a foot-dragging role as at present.

## **Agriculture and Poverty Reduction**

### Statistical Relationships

We now have massive statistical evidence to support what many of us have been saying for decades – it is agricultural growth that reduces poverty. And we also have a more sophisticated view than before as to why and how agriculture reduces poverty. That more sophisticated view leads to important policy recommendations.

Martin Ravallion and Gaurav Datt (2002) of the World Bank have analyzed the virtually unique data on poverty numbers collected across states and over time in India. These data show clearly that agricultural growth and rural growth reduce poverty drastically, while industrial and urban growth reduce poverty little or not at all. They also show a few years lag between agricultural growth and poverty reduction.

The Ravallion/Datt study follows a distinguished Indian literature from Montek Ahluwalia (1978) and Dharm Narain (published in Mellor and Desai 1985) that showed that when agricultural production grows poverty declines and vice versa. Those data covered a long period when there was little overall growth in agriculture. Thus the data were based largely on weather-based fluctuations. The Ravallion/Datt studies covered periods with

rapid secular growth due to improved technology, at least in some states. Ravallion and his colleagues duplicated the Indian results for several East and Southeast Asian countries, most notably for Indonesia.

Peter Timmer (1997) carried out a large cross country analysis of data and came out with similar findings, but adding the point that agriculture's impact on poverty reduction was negligible when agriculture was dominated by very large farms. Thirtle (2001), amongst others, confirmed these results with still another set of data.

### Why Agricultural Growth Reduces Poverty

What the data show then is that it is agriculture that reduces poverty, that there is a lag in its effect and that it doesn't reduce poverty when dominated by large farms. Those facts fit with agriculture's role in poverty reduction being indirect. It is prospering farmers, spending their increased incomes in the rural non-farm sector that is reducing poverty.

The rural non-farm sector includes on the order of half the rural population. It is highly labor intensive and produces goods that for quality and transaction cost reasons are not salable in international markets – it produces non-tradables that require local demand to grow if it is to expand. The rural non-farm sector produces increased housing, a major expenditure of prospering farmers, local furniture, local garments, and a host of services from transport to household services to educational services.

The demand for the goods and services from the rural non-farm sector is elastic with respect to income. That is as farmer's incomes rise their expenditures on the rural non-farm sector increase far more than proportionately. Thus, as agriculture grows the rural non-farm sector grows faster than agriculture and increases its weight in the rural economy. That agricultural growth reduces poverty through its impact on the rural non-farm sector fits the facts.

There is a lag in impact because it takes time for farmers to spend on the rural non-farm economy, but more important, much of the effect of farmer's expenditure comes from income multipliers. The rural non-farm economy uses some of that extra income from farmers to buy from each other, providing multipliers that double the effect of the farmer expenditure. It does so over time, not instantly.

Rich farmers spend their added income on imported goods and capital-intensive urban goods and therefore have little impact on the rural non-farm economy and hence on employment and poverty reduction. And, farmers tend to be prosperous. They are not the poor, so it is their expenditure on the rural non-farm sector that has the big impact.

### The Special Situation of Smallholder Livestock

The poor tend to be more important in smallholder livestock production than in crop production. Smallholder livestock production is also more labor intensive than crop production. Both those tendencies cause growth in smallholder livestock production to have a more direct impact in poverty reduction than the same increase in crop production.

The gini coefficient is the standard measure of the equality of income distribution. The lower the gini coefficients the more equal the distribution of income. A Gini coefficient of

around 0.30 represents a relatively equal distribution of income by world standards. The gini coefficient for income from crop agriculture in India is 0.65 – a quite unequal distribution of income (Sarma and Poleman 1993). That is not surprising. After all crop farmers have income from both their labor and their land and land is quite unequally distributed. That is why the impact on poverty from crop agriculture growth is largely indirect – depending on the expenditure of farm incomes. The indirect effects are of course very powerful and account for the bulk of poverty reduction.

Smallholder livestock is a different story. The gini coefficient for income from smallholder livestock in India is an extraordinarily low 0.16 (Sarma and Poleman 1993.) Not only is the income distribution quite equal among smallholder livestock producers but they also tend to be quite poor. Smallholder livestock is a substitute for land not a complement. Thus increasing income of smallholder livestock producers has an immediate and direct impact on poverty. The indirect effect is less than for crop farmers because low-income smallholder livestock producers spend much of additional income on increasing food consumption. However, as their incomes rise they spend more and more on the rural non-farm sector further reducing poverty.

Livestock production has its analog of the very large farmer who spends incremental income largely in urban areas and not on goods and services produced by the rural non-farm sector. Very large-scale livestock farms are not uncommon in low-income countries. They are most common in poultry, but where conditions are unfavorable for small farmers they may become important evening dairy production, the livestock sector least suited to large scale operation.

Not only are the large scale livestock producers obviously not poor, but their expenditure also is urban oriented and has little direct impact on poverty reduction. Thus, poverty reduction depends on smallholder livestock. Policies that favor the large-scale livestock sector are inimicable to poverty reduction.

The distinction between smallholder and large-scale is a distinction not of modest differences in size but the difference between the very large who are largely absentee owners whose consumption patterns are not those of rural village people. Thus, for smallholder livestock farmers to increase their incomes by increasing their herd size from one or two animals to 5, 10 and even more does not remove the poverty reduction effect. It simply swings it from direct poverty reduction to the indirect through expenditure patterns. That favorable effect is there as long as those livestock producers are resident in the village and spending like prosperous village people – enlarging their house, buying local furniture, and expanding their use of local services.

This is an important point because, as will be elaborated below, it is important that the efficiency of livestock production increase and the cost of production be reduced. That may occur substantially through expansion by the most efficient of the smallholder farmers. That should be encouraged on income distribution grounds as well as efficiency grounds. That has important policy implications.

### The Commodity Sources of Agricultural Growth

The key to poverty reduction is rapid growth in agricultural production and farm incomes. Since it is farm income that drives poverty reduction, it is the agricultural growth rate per capita that matters. Thus, the agricultural growth rate must be substantially faster than

the population growth rate. Fortunately most Asian countries have their population growth rates headed down, many having dropped below 1.5 percent. It is notable however that a 4.5 percent agricultural growth rate is only 50 per cent faster than 3 percent; but on a per capita basis, with 1.5 percent population growth rate, it is twice as fast.

Picking up the agricultural growth rate to a 4.5 percent rate has a tremendous impact on poverty reduction. Such a growth rate is not sustainable in cereals production. Yields simply cannot be sustained at such high growth rates and the land area devoted to cereals cannot increase greatly. In domestic markets, demand for cereals grows slowly and eventually declines, further reducing the potentials for continuous high growth rates based on the cereals sector.

### The Rising Role of High Value Commodities

What makes possible a growth rate in the 4 to 6 percent range achieved by the high growth rate countries (Mellor 1992) is the high value commodities. These are livestock, horticulture, and in some countries, tropical export commodities. These commodities produce a large value on a small area of land. It is possible to push the area devoted to these commodities up rapidly without large decreases in cereal area.

Livestock can of course be increased rapidly with no increase in crop area by importing feed, which has been standard in high growth rate Asian countries such as Taiwan and increasingly so in China. High quality roughage crops such as berseem or alfalfa can be increased at the expense of lower valued cereals. The following exposition will emphasize livestock production partly because I am addressing a livestock oriented meeting, but also because livestock is substantially more important in aggregate than the other high value commodities. It also offers the most substantial potentials for poverty reduction.

The bulk of the demand for livestock and horticulture is domestic. In a low income country domestic incomes are too low to support a large high value commodity proportion. But as incomes rise the relative weight of these commodities increases rapidly. Thus, in Indonesia, only two decades ago livestock comprised only 5 percent of agricultural GDP. With rapid growth in income that proportion is now 15 percent. It has the potential to increase to 30 percent in the next ten to 15 years and in a few more decades to 50 percent. In India, livestock has traditionally been more important than in East and South East Asia, so the proportion has increased from 15 percent to well over 30 percent.

When incomes are growing rapidly, say at 5 percent per capita, as India is close to achieving, the demand for livestock products grows at between 6 and 8 percent per year. (1.5 percent from population growth and 4.5 to 6.5 percent from income growth.) If production matches that growth in demand, livestock will account for on the order of half of incremental agricultural growth.

In Indonesia, the high value commodities account for a little over half of agricultural GDP (with livestock about one-third of the total), but since the growth rate for these commodities can be twice that of cereals, they would account for 80 percent of growth in a high growth strategy.

Of course these relationships do not hold if growth in the high value commodities does not keep up with demand growth. Later sections of this paper deal with the problems in achieving that objective.

### Price elasticities

There is a down side to the highly responsive demand for livestock products. The demand is also highly responsive to price. If the price goes up consumption will drop rapidly as consumers switch to other goods and services. Thus, production growth cannot be achieved through rising prices. That only chokes off demand. Of course, the converse is true as well. If livestock production can be made more efficient and productive, then prices can decline while incomes remain the same or increase and consumption will increase and production will grow faster than the income and population determined demand.

Thus, as rising incomes rapidly increase demand, production must be increased at similar or preferably declining prices. The poverty reducing impact of increased livestock production can be greatly increased by decreasing the cost of production. That must be a major objective of government planning for the smallholder livestock sector.

### Investment Issues in Agricultural Growth

Measures to reduce cost of production can be seen as investment issues and are so treated in this section. It is important to recognize that the first burst of the green revolution, the period of accelerated agricultural growth and poverty reduction, was based on cereals. Cereals dominated the area and agricultural production. The policy issues and investment issues were in general simpler than for high value commodities and livestock. These commodities are high value but perishable, that places a heavy burden on improved infrastructure as well as other investments. Technology generation is also more complex, involving interactions between the private and public sectors and national and international research.

#### Physical Infrastructure

In most countries, the most serious constraint to expansion of smallholder livestock is poor physical infrastructure. Large-scale livestock, produced under highly intensive conditions may grow rapidly within the infrastructure shadow of large cities. Smallholder livestock is likely to occur on more scattered smallholdings amongst medium and small sized peasant farms. To gain high levels of output substantial area must be covered. That requires all weather roads on which trucks can ply at low cost. That investment is of course valuable for other parts of agriculture and is essential to effective provision of social services.

It is notable that social services as well as the key institutions of agricultural growth require that educated people live where farming occurs. Educated people in general will not live in places without good all weather roads. Thus, while infrastructure can be justified on the transport grounds of intensive smallholder livestock it is essential for all aspects of rural development. There must be a plan for bringing good all weather roads to all areas with potential for smallholder livestock production. In passing, rural roads are labor intensive in both construction and maintenance. Thus they contribute greatly to

poverty reduction as they are constructed as well in the productive activities they encourage.

## Research

In agriculture, cost reduction depends substantially on improved technology. For livestock that means scientific breakthroughs in disease control, in feeding efficiency, in breeding, and in management. There has been a tendency to underinvest in livestock research and for that research to be excessively concentrated in disease control and breeding at the expense of nutrition and management.

Animal husbandry research needs to be associated with the full range of agricultural research so that synergies between feed production and feeding of animals can be developed.

In the modern era, with rapid growth in all aspects of private sector research, particularly in the international realm, it is essential that synergies be developed between public and private sector research.

Livestock research is expensive because of the high costs of maintaining experimental animals. However, it is essential to livestock playing its full role in growth and poverty reduction that expenditure on livestock research be at least commensurate with the importance of livestock in overall agricultural production growth. Normally, low and middle-income countries spend a much smaller proportion than that on livestock research. Keep in mind that very few low and middle income countries devote anywhere nearly the 3 percent of agricultural GDP to research that is generally considered a reasonable target. It follows that under spending on livestock research is immense.

## Agribusiness

As is readily apparent from observation of the growth of the smallholder dairy industry in India, a whole set of new agricultural businesses are essential to growth of the smallholder dairy sector. These include processing, provision of feed, and provision of veterinary supplies. I will not dwell on this since you can see the full picture by simply observing what has been done here in Anand.

It is important to recognize that a public sector or quasi public sector input in the livestock supporting agribusiness is needed to bring about diagnosis of the needs, deal with intervening problems, and to find the solutions. The private sector alone is not likely to come up quickly with the massive expansion needed for a major aggregate impact on growth and poverty. One of the important questions to ask at Anand is what was required of the public sector for Anand to play its full role and similarly how likely is it that the private sector will play the full required role on its own without intercession from the public or quasi public sector?

As for livestock production, the supporting agribusinesses must be constantly improving technology and reducing costs. It is those process that lead to rapid growth.

## Credit

The credit requirements of both small farmers and the supporting agribusiness sectors are immense if smallholder livestock is to grow at the 6 to 8 percent rate that can have a major impact on poverty reduction. In addition, much of the credit required is intermediate term credit, the least well developed of all the credit instruments in low and middle-income countries. Similarly the agribusinesses require large quantities of intermediate term credit, particularly if the more efficient ones are to expand rapidly.

The large credit requirements have two important implications. First, a vast institutional structure must be developed and must grow rapidly. Rapid growth implies that administration of the system will be somewhat lax which in turn creates problems of repayment. At the height of the green revolution not much concern was shown about this problem. Now, however, the concern from major government and international backers of credit systems is great. The result is likely to be a far slower pace of credit expansion with a consequent restraint on the smallholder livestock sector and its serving agribusinesses. It must be emphasized that the current slowdown in spread of rural financial outreach is very deleterious to the smallholder livestock industry and to poverty reduction.

Second, the price of credit is also a concern. It is currently fashionable to emphasize that interest rates should be held high to encourage saving. Unlike the situation in high-income countries, however, the supply of savings seems to be inelastic with respect to the interest rate, whereas borrowing is highly elastic (Desai and Mellor, 1992.)

With average inflation rates typically in the 4 to 6 percent range, nominal interest rates are often in the 15 to 20 percent range. Of course, the average inflation is not what is relevant to a particular industry. For Dairy farms and processors, the relevant inflation rate is that of the livestock output, principally milk and meat. That inflation rate may be lower than the national average across all commodities and services. Thus the nominal interest rate may be close to the real interest rate for a specific sector. With an interest rate of 15 percent and a rate of return to investment of 30 percent, by no means a particularly high number, then interest is taking off half the return to capital. Only half of the return is left for absorbing risk and as return on the entrepreneur's capital. That is likely to discourage borrowing to achieve high growth.

Interest rates are high in part because of large-scale government deficit financing with credit constrained to offset the government dissaving. Central Banks may also keep interest rates high to strengthen the banking system; which is often weak because of massive uncollectable loans in the industrial sector. While overdues in agriculture, which are often collectible, are deeply criticized, large loan losses to the industrial sector are often accepted as normal and contribute to high interest rates to the smallholder livestock sector.

When the smallholder livestock and its complementary agribusiness suffer from lack of credit and high interest rates agricultural growth and poverty reduction suffer greatly. This is an issue deserving of more attention from those concerned with poverty reduction and smallholder livestock growth.

## Policy and Strategy

The Green Revolution, based on high yielding varieties of a few dominant field crops, was quite simple in its investment, institutional development and policy requirements. For the future it will be possible to attain substantially higher rates of agricultural growth than those achieved in the Green Revolution. However, the faster growth will depend substantially on high value commodities, particularly livestock and horticulture, for which demand grows rapidly. But the investment, institutional development and policy requirements are much more complex for these complex products that are perishable and require processing.

To be sure that the complex requirements are met requires a strategic plan that focuses on the few priorities essential to success. For livestock that requires first class physical infrastructure, policies that encourage large private investment in processing and marketing facilities for complex perishables, and development of complex institutions such as those here at Anand. Key is recognition of the potentials in livestock and the requirements for meeting those potentials and then setting priorities and sequences for meeting those requirements.

## International Trade Issues

Many low and middle-income countries have a comparative advantage in producing livestock for the domestic market. The basis for that comparative advantage is low labor costs in labor-intensive types of livestock, particularly dairy production, but to some extent pigs and poultry as well. It is often argued that livestock production is extensive, requiring high land to labor ratios and is therefore unsuitable to high population density countries.

Three points need to be made in response. First, the direct labor requirements for most forms of livestock production are very high. Second, high quality roughage, such as alfalfa or berseem, produces a high value of output per acre and can compete with high value commodities for land and labor. Third, the concentrate feeds can be imported. Indeed globalization should lead to cheaper feed and thus more competitive livestock production in low labor cost countries.

Particularly in the case of dairy products, high-income countries are major producers. Since these are relatively labor-intensive systems there is strong political pressure to protect incomes of dairy farmers. Heavy subsidization of exports of dairy products follows. Europe is the primary offender. Subsidized exports of dairy products may help upper income consumers but clearly hurt large numbers of smallholder producers. Subsidized exports of dairy and other livestock products to low and middle income countries must be seen as a major force increasing poverty in the receiving countries.

Subsidized exports of cereal are mixed in their impact. They hurt farmers who are net sellers of cereals, but benefit low-income people who spend a high proportion of their income on cereals. They also benefit smallholder livestock producers by providing low cost feed.

In India a creative path was followed in taking dairy products received under the food aid program sold to farmer cooperative dairy unions on market prices and then spending the proceeds to in effect develop the domestic dairy sector.

However, in the long run low and middle income countries need to recognize their comparative advantage in labor intensive livestock production, invest to bring down the cost of production, and appeal to the WTO to stop dumping. Low and middle-income countries need to pull together on this issue. High income countries need to eliminate subsidized exports, and make income support payments in a manner that does not provide an incentive to increase production. Income payments along with production quotas would be one way of doing that.

### Strategy for Donors

Foreign aid donors claim a special interest in rapidly reducing poverty and low and middle-income countries. For that purpose the smallholder livestock sector is the ideal mechanism. It is small farmers who are short of land and long on labor who benefit the most from expansion of smallholder livestock producers. There is a great need for technical assistance to smallholder livestock, including development of improved, low cost feed, developmental veterinary services and analysis of low cost diets. Unfortunately in an environment of widespread naivete about agriculture in the donor community, the ignorance about the smallholder livestock sector is especially great. It will not be easy to dispel that ignorance.

Thus, the foreign aid community should give special attention to understanding the smallholder livestock sector, and to assist in developing policies favorable to that sector, provide technical assistance in veterinary, nutrition, and management issues, and encourage investment. A major donor focus on the smallholder livestock sector would bring greater understanding of the harm from dumping livestock products into low and middle income countries and would perhaps help end those practices.

### **Conclusion**

Rapidly rising income in low and middle-income countries results in demand for livestock growing at 6 to 8 percent per year. If the domestic livestock industry meets that demand growth it will double in size every 10 years and its share of agricultural GDP will also grow rapidly, soon accounting for over half of agricultural GDP. That will make possible an overall growth rate in agriculture of 4 to 6 percent.

If the growth is in the smallholder livestock sector it will contribute directly to poverty reduction and employment growth and over time provide much of the effective demand for the employment intensive rural non-farm sector.

If the smallholder livestock sector is to grow rapidly it must constantly reduce its cost of production. Rising costs will choke off demand; which in the face of higher prices will shift to other goods and services. Reducing costs will allow the real price to decline and production can grow even faster than the 6 to 8 percent rate stated above.

Decreasing cost of production requires constantly improving physical infrastructure. That is especially important to the producers of perishable products. Cost must also be reduced through rapid technological change based on world-class national research systems. Concurrently the agribusinesses providing mixed feed and marketing output must expand rapidly. The combination of producer and business expansion will require rapid growth of financial markets serving them and attention to maintaining low interest rates.

If the immense benefits from smallholder production are to be realized additional attention must be given to education of farmers and their children including the technically competent extension services that link research with small farmers.

The role of government is critical to success. Governments must have a strategy for developing the smallholder livestock sector. That must include the sequencing of physical infrastructure investment, setting of priorities for research and extension, and appropriation of adequate financial resources. There must also be diagnosis of the agribusiness needs and attention to supplying their needs, including research, infrastructure, financial markets, and market intelligence.

The smallholder livestock sector is not playing its full role in employment growth and poverty reduction because governments are not diagnosing the critical needs for public goods to complement private activities and ensuring that the critical needs are met. The loss in welfare from this neglect is immense.

I hope that this conference will have a major impact in mobilizing national governments, international financial institutions, and bilateral donors to correct these deficiencies.

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