Pakistan-India
Legislators and Public Officials Dialogue on
Sharing of Experiences on Governance and Democracy
November 20, 2016
Dubai, UAE

Background Paper

Developments in the Livestock and Dairy Development Sector Punjab, Pakistan
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Developments in the Livestock and Dairy Development Sector Punjab, Pakistan
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Printed in Pakistan

Published: November 2016

ISBN: 978-969-558-657-0

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CONTENTS

Preface
Abbreviations
About the Author

Introduction

Contribution of Livestock Sector in GDP

Major Challenges

Paradigm Shift

Methodology Adopted

Conclusion

Endnotes

List of Pictures

Picture 1: A Ram with 240 Kg weight prepared for breeding purpose from the South of Punjab
Picture 2: Nili Ravi Buffalo milk competition 47.565 Kg in 36 hours with 9% fat content
Picture 3: Grazing-Biggest cost reducer for both the Livestock & for Agri Harvesting Operations
Picture 4: Women Engagement in the Livestock Sector (Pakistan)
Picture 5: Slaughtering of Breedable females Banned
Picture 6: Digital Access
Picture 7: Mobile Composite Platform (9211)
Picture 8: Traceable Meat-An initiative METRO adopted to satisfy its customers in Lahore
Picture 9: One Health Concept adopted by the Punjab
Picture 10: Alternative Sources of Milk

List of Figures

Figure 1: Statistical Capacity of Pakistan
Figure 2: Access to Credit and Vertical Market Linkages
Figure 3: Agriculture Farmers
Figure 4: Pakistan's Import from India and India's Export to Pakistan
Figure 5: Paradigm Shift
Figure 6: Methodology Adopted
Figure 7: Livestock Policy Ingredients
Figure 8: Livestock Asset Manager
Figure 9: District-wise Registered Farmers
Figure 10: Livestock Profile of a Farmer
Preface

Developments in the Livestock and Dairy Development Sector Punjab, Pakistan is a Background Paper authored by Mr. Muhammad Irfan Khalid, Deputy Secretary, Livestock and Dairy Development Department, Government of Punjab, Pakistan for the benefit of participants of the Pakistan-India Legislators and Public Officials Dialogue on Sharing of Experiences on Governance and Democracy scheduled to take place on November 20, 2016 in Dubai, UAE.

This author talks of the current situation of the Livestock and Dairy Development Sector in Pakistan and the major issues it has faced over the years. The author tries to identify the initiatives taken by the Government of Punjab, Pakistan and the limitations it has encountered during the process. Additionally, he also identifies the solutions to combat the current issues being faced by those concerned in the sector.

Disclaimer
The views expressed in this paper belong to the author and do not necessarily represent the views of Pakistan Institute of Legislative Development and Transparency (PILDAT).

Islamabad
November 2016
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>Agri</td>
<td>Agriculture</td>
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<tr>
<td>ATM</td>
<td>Automated teller machine</td>
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<tr>
<td>BRICS</td>
<td>Brazil, Russia, India, China and South Africa</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GSM</td>
<td>Global System for Mobile Communication</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>KG</td>
<td>Kilogram</td>
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<tr>
<td>OPD Services</td>
<td>Out-Patient Department Services</td>
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<tr>
<td>PKR</td>
<td>Pakistan Rupee</td>
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<tr>
<td>TFP</td>
<td>Total Factor Productivity</td>
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<tr>
<td>USD</td>
<td>United States Dollar</td>
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<td>USSD</td>
<td>Unstructured Supplementary Service Data</td>
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<td>VPN Tunnels</td>
<td>Virtual Private Network Tunnels</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
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Mr. Muhammad Irfan Khalid belongs to the Provincial Management Service (PMS) of the Punjab (Pakistan). He joined the service in 2004. With a Bachelor of Science Degree and Master of Arts Degree in Business Administration in Marketing and LLB from the Punjab University, Lahore Mr. Khalid has contributed extensively to Newspapers like the Daily Business Recorder, a leading Financial Newspaper of Pakistan on Development Economics and Taxation. He has to his credit various field and secretariat assignments ranging from being an Assistant Commissioner in two sub-divisions of the Punjab to a Deputy Secretary (Consolidation of Holdings) with the Board of Revenue Punjab, Registrar Board of Revenue Punjab, Director Excise & Taxation Department, Government of Punjab. Additionally, he has also served with the Local Government & Community Development Department Punjab, Finance Department Punjab and City District Governments of Lahore and Faisalabad, respectively. Mr. Khalid has 12 years of public sector experience and several years of private sector experience where he worked with a Pharmaceutical Multinational Company in Malaysia. Additionally, he is on the visiting faculty of Management Professional Development Department, Government of the Punjab; taught MBA at Government College University, Faisalabad and has been a Member of PMI USA since 2005. He commissioned the first successful project of Computerization/Online Availability of Land Revenue record at City District Government, Lahore in 2005. Furthermore, he had been a technical consultant with the PMU, Board of Revenue Punjab on the World Bank funded LRMIS Project and designed the Services' Delivery Mechanism and has been a consultant with Urban Unit, P&D Department, Government of the Punjab and designed “The Punjab Urban Land Titling Registration System”. Moreover, Mr. Khalid has to his credit the creation of ICT based 9966 Vehicle Tax and Identity Verification System of Excise & Taxation Department, Government of Punjab through which citizens have been able to collect tax and identity related information of vehicles through the use of simple SMS's. Presently, he is working as Deputy Secretary Livestock & Dairy Development Department, Government of the Punjab. He has authored the first Livestock & Dairy Development Policy of the Punjab and invented the coveted “9211 Virtual Governance System” of the Punjab Government. He has delivered many lectures on the 9211 Virtual Governance System at various National and International fora, including Australian Center for International Agriculture Research (ACIAR) Canberra, University of Queensland in Brisbane; Victoria Institute of Strategic Economic Studies of Victoria University in Melbourne, Australia; National Livestock Breeding Center (NLBC) Japan and Kyungwoon University, South Korea.
Introduction

The economy of Pakistan is the 25th largest in the world in terms of purchasing power parity (PPP), and 38th largest in terms of nominal gross domestic product. Pakistan has a population of over 191 million (the world's 6th largest). However, Pakistan's undocumented economy is estimated to be 36% of its overall economy. Some non-conventional estimates put this figure at a much higher level, a fact, which is substantiated to some extent by the external shocks the economy has succeeded to bear. Pakistan is one of the 'Next Eleven', the eleven countries that, along with the BRICS (five major emerging national economies: Brazil, Russia, India, China and South Africa) has a potential to become one of the world's large economies in the 21st century.

Pakistan's average economic growth rate in the first five decades (1947–1997) had been higher than the growth rate of the world economy during the same period.

The World Bank (WB) and International Finance Corporation's report on “Ease of Doing Business Index 2015” ranked Pakistan the highest in South Asia, higher than China and Russia.

Agriculture accounted for about 53% of Pakistan's GDP in 1947. While per-capita agricultural output has grown since then, it has been outpaced by the growth of the non-agricultural sectors. The share of agriculture has dropped to 21% of Pakistan's economy in 2016. In recent years, the country has seen rapid growth in the industrial and services sectors, with the latter crossing half the total GDP output.

Punjab is the largest province, population wise (both human and animal), of Pakistan. By 2011, Punjab had a GDP of $104 billion, which was growing steadily. It was featured well within the list of country subdivisions with a GDP over $100 billion. It was the biggest contributor to the national GDP with 59% share in 2014. It was especially prominent in the Services & Agriculture sectors of the economy with a thriving private sector.

As per the 2006 Census, Punjab dominated Pakistan's livestock sector. Reportedly the Province had 49% of Pakistan's cattle, 65% of the buffaloes, 24% of the sheep, and 37% of the goats. In value of product, it was producing 62% of milk, 43% of beef, 32% of mutton and 75% of poultry of Pakistan.

However, livestock productivity and standards of preventive health were far below world benchmarks. The reasons were inextricably not linked with the genetic potential of the breeds but with wider market distortions.

Contribution of Livestock Sector in GDP

The Livestock sub-sector has contributed to 11.6% of the National GDP and 56.8% of the overall Agriculture Sector GDP of Pakistan. It employs 46% direct labour force that comes from 67% of the population. The share of livestock in developed countries' Agriculture sectors ranges between 59% - 79%; for India, it stood at around 25% and 28% for Pakistan in the 1990s.

Additionally, the Livestock sector is the biggest cost reducer of the Agriculture sector through harvesting operations in Pakistan.

Livestock's value exceeded the combined value of all the major and minor crops by about 6.1%. The share of livestock products in the generation of foreign exchange is about 13%. More significantly, livestock is...
as an integral part (30-40%) of the livelihood of about 30 to 35 million rural farmers. Presently, the reported gross value addition of livestock stands at PKR 1,172 billion, whereas the livestock share in export is 8.5%.

Picture 3: Grazing-Biggest cost reducer for both the Livestock & for Agri Harvesting Operations

The Dairy sector in Pakistan consists of three types of producers; 80% small farmers raising more than 50% of total milch animals (herd size less than 5 animals), 14% medium-sized farmers/producers, raising 29% milch animals (herd size 5-10 animals), 3% large-scale producers sharing 21% of milch animals (herd size more than 10 animals). Animals are raised on agricultural lands and almost 1/5th of this land is used as pasture land to raise animals including milk-producing animals. Medium and large size producers are mostly located in peri-urban areas having better farm-to-market access.

Picture 4: Women Engagement in the Livestock Sector (Pakistan)

In the Punjab Province, the livestock sector has the largest women engagement in any economic activity as a rural woman spends 59% of her daily life in livestock related activities.

Major Challenges

Historically, the private sector was restricted from entering areas of business dominated by the government, with limited incentive to develop markets, create demand, and increase economic activity. The consequences were dysfunctional markets, with the resultant erosion of the competitive edge of businesses, rendering them resorting to either shrinking or slipping into informal folds of economy with resident evils.

Pakistan, like India, has traditionally followed a “top-down” approach in its analysis of economic development i.e. there is no fashion to break up national GDP statistics into provincial and subnational units. Thus, many accounts of provincial GDPs have usually been projected estimates made by economists, based on the likely percentage of contribution of the respective province to the national GDP and some yearly studies. This led to a perception trap regarding productivity and production both of livestock, rendering the development trajectory array off the mark.

Figure 1: Statistical Capacity of Pakistan

Statistical Capacity is calculated as the average of the score of 3 dimension of:
- Availability
- Collection
- Practice

Despite chiefly contributing to Agriculture GDP, livestock farmers would barely use less than 7% of the Agriculture credit annually, showing the strategic loss this sector was bearing in the form of wastage of potential as 89% livestock farmers were landless and at subsistence level through ages. Moreover, price capping on raw milk and fresh meat, both traditional items of daily consumption in the Sub-Continent, had devastated the primary production systems, which
were no more willing to provide ‘subsidized’ milk and meat out of their own pockets to the consumers, who were bearing the ultimate brunt of this injustice as ‘genuine’ livestock products were fast becoming a thing of past due to above said factors coupled with absence of vertical marker linkages, a gap filled by the middle men.

The absence of any policy on livestock in the past took the biggest toll on the sector.

**Figure 2: Access to Credit and Vertical Market**

![Access to Credit and Vertical Market Linkages](image)

**Linkages**

The health sector governance comprised of two components of the preventive and curative regimes. When it came to the livestock sector where animals did not have socio economic value in the older age and as such were rarely allowed to exhaust their natural age, the predominant focus would have been on the preventive side of sector governance. The intrinsic components of preventive regime were essentially the vaccination in tandem with de-worming, besides quality breeding services for production enhancement for obtaining milk, meat and skin & hides.

However, due to a policy vacuum, all the public sector development remained confined to the curative side only on the pattern of human health sector without realizing the fact that livestock sector health management would have been livestock asset management and not cultivating the role of livestock department as disease attendant. This historical anomaly resulted in the invention of disease and development of human resources that were designed for the treatment side only with inherent deficiency in animal husbandry practices, which focused on economic management of farmers’ ‘live-stock’. Hence, the quantitative shift in Universities from producing Animal husbandry graduates to those of Veterinary Medicines: the DOCTORS and not the “LIVES-STOCK” ASSET MANAGERS.

The static infrastructure (both physical and operational) developed in the past 68 years comprising of 572 Civil Veterinary Hospitals, 1503 Civil Veterinary Dispensaries, 1505 Veterinary Centers, 800 Artificial Insemination Centers etc., severely compromised Punjab’s ability to stimulate the production systems through mobile husbory services’ delivery at the doorsteps of vastly scattered subsistence level livestock farmers for optimizing the productivity, which coupled with non-access to credit, lost their chances to gain economies of scale and transform the sector into a value proposition for stakeholders. This Governance model rendered all schemes doomed to fail, which were aimed at any of the components of preventive & production regimes mentioned earlier.

The farmer was thus left on the perpetual deficit with growth indicators becoming inherently skewed.

**Picture 5: Slaughtering of Breedable females**

![Slaughtering of Breedable females](image)

**Banned**

The biggest game changer came in the wake of the 18th Amendment to the Constitution of the country, in 2010, that eliminated the “Concurrent List” and devolved Livestock development functions to the provinces, akin to their regional needs. The stage for customized set of broader structural reforms was thus set for the Punjab.

The Punjab Government in the Livestock and Dairy Development Department moved swiftly to undertake, perhaps, the biggest transformation in organizational posture in its recent history: transforming the role of Provincial Livestock & Dairy Development Department from “Disease Attendant” to “Livestock Asset Manager” by inducing a complete paradigm shift initially from curative to preventive to set a stage for
making the whole sector competitive, for ensuring food security; improving live of stakeholders and for ultimately generating exportable surpluses for domestic and international markets.

The semi-arid and arid climatic conditions of the country coupled with shrinking water resources due to varied reasons have severely undermined the future prospects of crops, if practiced as per the prevalent model.

Statistics from the Punjab Agriculture Census, 2010 were quite significant from the perspective of devising a strategy for the agriculture development as land holding size in the Punjab rendered it relatively unfeasible economically unless deployed for horticulture or livestock rearing.

Figure 3: Agriculture Farmers

Moreover, it revealed huge numbers (68.6%) of absentee land holders out of 90% less than 12.5 acres' holders, which on one hand showed demographic transition (migration) from rural to urban side and on the other hand competing cost for agriculture labour market with urban markets with the resultant relative shrinking supply of labour in the rural areas, thus putting extra burden on the already fragile Agri ecosystem, historically witnessing price shocks.

Livestock was axiomatically the only rescuer in this backdrop, which had the tremendous potential to climb the ladder of value addition as well, while ensuring food security. However, the livestock sector had been affected with some apparently inexplicable phenomena that were preventing the whole economy to gain socio-economic benefits of what could be attained through growth in livestock sector, having very strong dimensions along gender as livestock sector is the largest women engagement in any economic activity; nutrition, school attendance and reduction in the relative poverty are other associated benefits.

A one-pound increase in birth weight led to 7% increase in lifetime earnings in the US. For Pakistan this estimate stood to the tune of USD 11 billion per annum. Protein energy malnutrition led to very high productivity losses and a 1% loss in adult height in Pakistan led to a 0.3% decline in rural wages.

Countries with low nutritional indicators suffered huge costs in terms of lost productivity and growth in GDP. In Pakistan, if the nutritional gap in protein energy, iodine deficiency and iron deficiency was eliminated, it had the potential to increase the level of GDP by 4% per annum. Moreover, 86% children between the ages of 10-14 years consume less than the recommended calories. It implied that Pakistan would need Rs.64 billion per day to bridge this nutritional gap, of which Rs.39 billion would be required for the rural poor. About 70% to 75% urban and rural population consume less milk than the estimated milk poverty line. The highest proportion of population below this benchmark belonged to children in the age-group of 10 to 14 years.

Recent studies have established that better nutrition and child health affects child school performance and post-school productivity. Specific evidence from Pakistan suggests that there is a positive effect of pre-school height-for-age z-score on school enrollment for girls. The direct relationship between per capita milk calories consumed on school attendance rate is positive if an average household consumes 153 milk calories per capita. Holding all else constant, an increase in per capita daily milk calories by its sample mean of 153.1 increases the probability of school attendance by 0.95 percentage points. Moreover, the probability of school attendance initially increases with per capita milk calories and reaches its maximum point at 770 milk calories per day, which is much higher than the mean calories. By implication, these results suggest that there is a huge gap between the present level of milk calories consumed and the desirable level.

According to an estimate there is a deficit of 12.50 million liters per day in the country, which comes to 4.57 billion liters per annum and that is equal to 10% of the (reportedly) total milk currently available for human consumption. To bridge the gap in milk consumption would require Rs. 275 billion per annum.

As per the official statistics, the number of dairy animals in the country is 76.8 million. About eight per cent of dairy herd is admissible as in lactation, which
comes to 6.1 million dairy (buffalo and cattle combined) lactating animals at a given time. If 6.1 million dairy lactating animals are producing 6.5 litres/animal, on an average, per day for 300 days, then it comes to 11.9 billion liters annually.

On the basis of 260 ml average demand per person per day\(^{11}\) for a population of 191 million, the production should be around 18.1 billion liters per annum. However, the availability as per another estimate is no more than 131 ml per day,\(^{12}\) which comes to no more than 9.1 billion liters putting the gap up to staggering 50% of what is available. Rs. 306 billion are required to bridge this gap at farm gate price @ of Rs. 34/ Kg, being practically given to the farmer, on an average. If calculated at the consumer side @ Rs. 80/ Kg, on an average for loose and packed combined (packed is less than 4% of total market), this amount crosses the double, coming to the tune of Rs. 720 billion per annum and Rs. 1.97 billion a day.

Interestingly another projection shows production around 50 billion liters per annum\(^{13}\) which puts the average milk yield of dairy herd around inexplicable 27 liters per animal per day and total production about four times higher than “actual” availability.

Another very interesting proposition that is historically suggested is that it is the lack of use of modern technology that is hampering growth of the livestock, particularly the dairy sector. In Pakistan, corporate farms use state of the art technology and high quality fodder for preparing livestock feed.\(^{14}\) But both subsistence and landless livestock farmers have performed better than corporate farms.\(^{13}\) An estimate puts this performance difference better than about 38% along a single count of fodder cost, putting aside the labour cost.\(^{15}\)

Surprisingly, in 2005, returns (excluding cost of family labour) to dairy farmers who were selling milk to milk processing industry were 32% more relative to farmers who were selling to informal milk collector.\(^{16}\) However, by 2015, the dairy farmers selling milk to milk processing industry were earning 12% less than others.\(^{17}\) Reportedly many commercial and corporate farms have stood knocked out. The procurement of milk has gone down by the processing industry, while the sale has gone up manifold.

In the very context, reducing the cost of production through bringing competitiveness and value addition, while focusing on 89% of livestock farmers, who are subsistence level, landless; and never focused before for development is the only option left with the policy makers.

Thus, credible data collection became imperative before even thinking to streamline the livestock and dairy sectors in the country. That is how the Punjab Government erected the state of the art ICT based 9211 System for real time data collection to induce the much needed strategic correct.

Figure 4: Pakistan's Import from India and India's Export to Pakistan

The need was to create a conducive environment, which increased efficiencies in business processes; for benefiting the stakeholders involved in the livestock and dairy sectors; to help create value chains by augmenting the financial condition and competitiveness of primary production systems along supply chains; by linking markets vertically to additionally reduce the middleman drag (who though invariably providing essential financial services well in time and keeping the buoyancy to some extent at subsistence level but in the long run due to inherently lacking economies of scale, added to the overall cost of production, in the long run, which in turn detered to some extent the farmer to incur the cost of innovation as the Total Factor Productivity (TFP) calculation as per an estimate for subsistence level livestock farmer\(^{18}\)); and to make for the biggest missing element of return on investment for the subsistence level livestock farmer.

Additionally, livestock and livestock products’ marketing and trade faced several constraints and challenges including:

i. Faulty market infrastructure;
ii. Costly transportation proposition;
iii. Poor or little knowledge (inadequate information) of the markets (domestic and export);
iv. Non-existent livestock producers’ organizations
due to varied socio-cultural problems, compromising the bargaining power of farmers and no economies of scale in marketing of livestock and livestock products, leading to high transaction costs, wastages and inefficiencies;
v. Weak vertical linkages or coordination amongst actors in the livestock supply chains, preventing its conversion into value chains;
vi. Inadequate incentivization and business skills especially amongst smallholder resource-poor livestock producers;
 vii. Non-compliance with international quality standards.

The production framework is facing many issues that are keeping the livestock & dairy sectors away from attaining the desired level of growth and development as per the potential and resource base. The traditional role of supply of milch and beef animals to other provinces and some neighbouring countries requires augmentation of efforts to produce extra livestock. The increasing commercial use of wheat straw, other crop residues and inputs used by livestock requires proactive policy with regard to the silage and hay making for which the potential of Punjab is still untapped.

There are two prevalent models of livestock production in Punjab. The economic model is one which many call the corporate farming. The other one is the conventional model, where costs of inputs are heavily subsidized from inside the inner system of the farmer in the form of family labour and grazing.

While the economic model has almost been knocked out of the market due to varied reasons, cost of production being the biggest, as described above, the conventional model, which primarily caters to the subsistence farmer, is still struggling to survive but with inherent limitations for production multiplication and gaining economies of scale.

The gap between the requirement and availability of feed and fodder for livestock is increasing primarily due to decreasing area under fodder cultivation and reduced availability of crop residues as fodder because of above stated reasons. There is continuous shrinkage of common range lands leading to over-grazing in the remaining grasslands. It is imperative to arrange sufficient good quality feed and fodder for efficient utilization of genetic potential of the various livestock species and for sustainable improvement in productivity.

The breeding services despite consuming a major chunk of the budget did not produce desired results. Rather they added to the distrust of the farmers due to off the mark outcomes. The reasons are many, chiefly being the absence of a direction and linkage of breeding activities and goals with holistic development of the livestock sector. It is unfortunate that this has been subject of unchecked growth of unregulated activities with free license of playing with health of animals without fear of accountability. The results are devastating for what has been purported not only with the animals but with the breeders. The economic losses of A.I. done by ill-trained A.I. technicians can never fully depict the agony and misery of the animal and the farmer. Besides the A.I., natural services also proved insufficient due to acute shortage of breeding bulls.

The breeding factor is an important reason of late maturity and long intervals of calving. Shortening of service period by one day yields an increase of 5 to 7 litres milk and one estrus cycle results in additional 105 to 147 liters milk. Reproductive disorders in females lead to significant economic inefficiency. Studies show that Punjab is losing about 11.57 million tons of milk each year on account of this reproductive disorder. When converted into monetary figures, this loss comes out to be about Rs. 120 billion in buffalo only.

There are state of the art laboratories with the Livestock Department Punjab with equipment, chemicals, kits and trained Human Resources but they could not contribute to the sector as per their capabilities. The same was the fate of demand based applied research.

The concept of extension as capacity building of production and supply chain systems of various types was non-existent. It was rather considered as provision of treatment through a plethora of static hospitals and dispensaries.

The fragmented structure of supply chain of milk posed serious problems, with high collection costs due to dispersed supply sources, poor supply chain infrastructure and absence of cold chain resulting in substantial losses and poor quality of milk, adulteration by middlemen and others. Lack of dairy supply chain resulted in high losses up to 15%, especially in the summer. The geographical dispersion of the large number of smallholders in the dairy sector and use of conventional transportation, inappropriate storage and inefficient calving practices resulted into wastage of almost one-fifth of the milk collected.

These factors, coupled with price capping on milk and meat besides heavy use of whey powder and other undesirable material for synthetic milk production adversely affected the feasibility of keeping dairy animals at all, putting the very existence of dairy farmer at stake. This upheaval had directly affected the use of concentrates and supplements due to which the
reproductivity had sharply declined. The ever-growing panic sale of animals was thus witnessed increasing the percentage of slaughtering of female animals of reproductive age.

**Paradigm Shift**

A complete paradigm shift was thus required to make the whole sector competitive and feasible.

**Figure 5: Paradigm Shift**

What was the way out? Retire the existing static infrastructure - one generation's work; rebuild the requisite mobile infrastructure- another generation's work; optimize the correct positioning of the sector governance- yet another generation's work.

Public Policy formulation was inherently a process whereby “Expression of Popular Will” was synthesized through basic political organizations and institutionally shaped up through public representative “institutions”. However, in any other scenario, an extremely important challenge was to generate enough empirical evidence along dimension of availability, practice and collection, to frame appropriate sets of policies and interventions.

**Methodology Adopted**

**Figure 6: Methodology Adopted**

Punjab adopted a unique approach to solve the set of problems encountered. There was a need to enormously enlarge the surface area of interactions with the vastly scattered livestock farmers, living across 25892 villages of the Punjab. Internet was not universally available in rural areas and was definitely not an option due to literacy reasons and cost of computers. However, 73% teledensity was one of the largest in the world but android was less than 30% which the Livestock Department Punjab decided to market. What was practically available was a simple feature phone on which no application installation was possible. The customize solution to address some of the crucial challenges of organizational transformation in history whereby complex performance phenomena and communication barriers were tackled through a composite business solution with interlocking of GSM platform for data collection and dissemination on a colossal scale without incurring any capital cost on developing the physical infrastructure.

Hence, a 9211 Virtual Governance System was created through a unique ICT based dynamic communication platform that used the simple GSM network and chiefly Unstructured Supplementary Service Data (USSD) to transfer huge amount of data sets right from the field through a simple feature cellular phones already in use of 7000 plus field staff of the Livestock Department Punjab, without using any apps, computers, androids, smart devices or internet for data entry, resulting in a low-cost but high-end database.22

Virtual Governance operated on the concept of the Government being more virtual in nature than physical in existence, just like self-serving technologies e.g. like through ATM machines, public services can be made available 24/7 instead of 9-5. With the help of this system the Punjab Government generated a good deal of empirical evidence that helped formulate the first ever Livestock & Dairy Development Policy of the Punjab in January, 2016.23

**Figure 7: Livestock Policy Ingredients**
Each service that is delivered by the Department is not only mapped on the 9211 System but a system generated Urdu SMS is also delivered on the mobile of the farmer for confirmation of delivered service (for instant social audit), backed by 24/7 Call Centre accessible through a toll free number. The System comprises of 7000 plus field staff of Livestock Department Punjab the largest data entry machine in the world. The data entry cost is 340 times less as compared to a conventional computer based system with no possibility of hacking as DB is accessed through VPN tunnels only. In the system all 25,892 villages of the Punjab are codified. The system has created a live database of 6 million livestock farmers and their 65 million plus livestock. All services delivered by the Department like 48 filed services, 50 OPD services; 296 different types of tests, Breeding services like Artificial Insemination etc. are fully digitized with 360 degree performance view along specie, service delivery, farmer, village, target area, disease, intervention, employees’ performance and public access through multiple channels like web-interface or through business data sets by using simple SMS or through retrieval of information by using USSD by the field staff, making it the most versatile and dynamic solution ever customized for livestock sectors around the world.

The system helped Provincial Disaster Management Authority (PDMA) to transmit flood related alerts to thousands of rural families along the flood belts of different rivers. Recently 4.8 million targeted robo calls were another addition to the already basket of multiple communication channels, including the website of the Department and social media.

**Figure 8: Livestock Asset Manager**

Livestock: 65,130,021

The same has not only helped effect the requisite paradigm shift but has completely transformed the role of the Department into that of a “Livestock Asset Manager” of the poor farmers by bringing them the benefits, which have been long overdue. A newly created highly mobile platform of services' delivery in the form of 5000 plus customized medical kit mounted motor cycles and 251 mobile veterinary hospitals linked through 9211 Virtual Governance System are delivering 364 services at the doorstep of livestock farmers with an additional benefit of creating a profile of the farmer that could then be used to determine credit worthiness of the landless livestock farmer.

It has put the control of service delivery initiation into the hands of the public by leaving the ICT based autonomic system mapping the quality and quantity of services delivered with inbuilt escalation of alerts, if there occurs any compromise along these parameters. It has created a much needed breathing space for the Human Resources of the Department to focus on the diversification of their engagement with the public, tremendously enlarging the opportunity to earn public trust for furthering the sustainable performance optimization. The Punjab Government has succeeded to complete multiple rounds of free mass vaccination of animals in the Punjab with preparation of disease profiling up to the village level besides erection of disease surveillance system with the help of the 9211.
System.

**Picture 7: Mobile Composite Platform (9211)**

![Mobile Composite Platform (9211)](image)

It has tremendously enhanced the canvass of availability of services to the poor farmers as a force multiplier while reducing the cost of operations as a unified platform is used for multiple services’ delivery. One of its modules “9211 Meat Tag Enquiry” proved so powerful that even big players like METRO adopted it to satisfy its customers in Lahore.

**Picture 8: Traceable Meat-An initiative METRO adopted to satisfy its customers in Lahore**

The absorption capacity of the Department has been thus enhanced manifold to materialize a broader set of development options. The 9211 Virtual Governance System is perhaps one of the biggest “Extension Services’ Plus” model of its kind in the world. The performance of the System is so impressive that it is now included in the export basket of the Punjab Government being a unique livestock product.

FAO, World Bank, KOICA, JAICA, USAID, Australian Aid, ILRI, ACIAR, besides academia from across the world like Queensland University (Departments of Business, Economics & law and Information Technology) in Brisbane, Australia and Victoria Institute of Strategic Economic Studies of Victoria University in Melbourne, Australia have recommended for adoption of 9211 Virtual Governance System in different jurisdictions. Additionally, requests of all Federating Units of Pakistan to the Punjab Government are under process for extending the 9211 System to their respective jurisdictions for business optimization of their development activities in their respective livestock and dairy sectors.

The huge data coming from 9211 system assumes special importance when plotted against two facts: 73% of the potential banking market in Pakistan, as stated earlier, does not have access to banking products; there are 4.7 million Branchless banking accounts in Pakistan by close of Financial Year, 2013-14, that moved an amount equivalent to 3.6% of National GDP. The 9211 System database has crossed that number of accounts as 6 million livestock farmers (business accounts) and their 65 million livestock. The number is growing. There is a need to unlock the potential of a very promising future by providing livestock farmers the access to credit; at the moment only 7% of Agriculture credit goes into the Livestock sector (SBP, 2010), which is contributing to 56% of the Agriculture Sector GDP.

**Figure 9: District-wise Registered Farmers**

![District wise Registered Farmer: 6,004,588](image)

Creating vertical market linkages is another important area for development, capable of institutionally replacing the middleman with elimination of all associated exploitations and limitations. It would link livestock primary production systems with end consumers with complete traceability for ensuring...
food safety. The 9211 System will be working as a buffer by creating an institutional link of facilitation in such a proposition. If succeeded, it will create another unique innovation: sort of an interlocking of Cooperatives' functions in this sector, performed not by a monolithic typical “Cooperative” but a virtual system working beyond transcendental horizon to provide benefits of gaining economies of scale to the poor scattered livestock farmer on market competitive basis.

The banking sector, particularly the biggest branchless and microfinance banking players in Pakistan have already entered into Agreements with the Livestock Department Punjab to join this spree of innovations for materializing a cherished dream of prosperity and development for the whole of the economy by the provision of the most important of the Extension Services: the “CREDIT”. This shall tremendously help build crucial commercial level farmer from the lifting of subsistence level farmer besides amelioration of whole supply chain by creating value proposition for stakeholders.

Now the Department is fully ripe for imparting training and integrating 50,000 rural women as village livestock activists from across the Province, thanks to the new vistas opened by 9211 System to track and manage performance up to service delivery end along multiple dimensions. Animal husbandry training to almost equal number has successfully been imparted by the Department on its own with the distribution of 41,059 poultry units and thousands of heifers, bulls, rams, bucks, sheep and goat, mostly to rural widows for kick starting the stalled restocking process.

HR rationalization on the basis of geographical distribution of livestock population by shifting of posts from Central Punjab, especially Lahore to South of Punjab is another premium gained on the basis of empirical evidence generated by the 9211 System.

**Figure 10: Livestock Profile of a Farmer**

![Livestock Profile](image)

The 9211 Virtual Governance puts the control of public service delivery initiation into the hands of the public with performance mapping of service delivery specs through an autonomic system with inbuilt sirens if compromise or failure occurs. It is especially designed keeping in view the ever increasing public demand regarding the delivery and performance aspects of democratic governance delivery in the country.

Although the overall scale of success of the system will be analyzed by future generations, yet successful construction of this phenomenon through 9211 Virtual Governance System into a working business model has proved its worth when it comes to generating real time empirical evidence that can be directly translated into public policy formulation, which is otherwise a complex and lengthy process. This is a story of just 18 calendar months: from the drawing board to writing of this paper with all the developments in between.
Conclusion

The policy ingredients include enabling infrastructure pertaining to social ecological and economic aspects of facilitation of core public good. The concept of market led growth in preference of private sector led growth has been introduced.

Knowledge management has been done by blending the local wisdom and lessons learnt. Customization has been made with the help of institutional knowledge by involving academia, policy makers, industry, farmers, practitioners and service providers. A circulatory approach has been adopted to shape up the strategy and policy.

The strategy thus formulated is culminating in the redirection and realignment of R&D away from paper to applied research. Specific areas of need have been communicated to the academia for future Human Resource development and research with requisite resource management of departmental resources: farm activities have been completely realigned in line with actual mandate of livestock research instead of commercial ventures with incurring of losses being non-competitive with the private sector. Vaccine production and quality has been improved.

Disease surveillance has been activated. First cross sectional survey of diseases up to village level has been done in the Punjab with disease profiling besides first ever survey of Vector-Born diseases. The same has helped select the specific medicine instead of broad spectrum costly medicines, reducing the medicines' budget by 70% in one year, which has been heavily diverted for the purchase of anthelmintic. Punjab Breeding Authority and Tribunal have been created. Affairs of private SPUs have been streamlined. For the first time in Pakistan DNA facility is being offered across board- to all farmers in the Punjab for checking the origin of their artificially inseminated animals' progeny. Animal Nutrition Regime has been activated. Forgotten regime of country medicines has been rejuvenated.

Need based HRD and capacity building has been made a permanent feature besides adoption of the “One Health” concept, which will ultimately reduce burden on the public health system to a great extent as 75% emerging infectious diseases are of Zoonotic origin. Only healthy livestock can ensure healthy human beings.

Picture 9: One Health Concept adopted by the Punjab

With the help of earlier mentioned efforts, a paradigm shift in Governance Framework has been induced with measurable successful results. A record volume of public interaction have been facilitated through the 9211 System, running into over several hundred million SMS, with complete mapping and electronic log of each of the farmers, their livestock, services delivered and performance mapping of each of 7000 field staff of L&DD with instant access to each of 6 million farmers through their mobile numbers. A backbone of traceable livestock has thus been created. The system has enabled the Department to adopt regional customized approaches. Moreover, this is the first model of disruptive technologies created in the public sector anywhere in the world, to earn public trust; and to generate required public response, while ensuring best quality service delivery with complete real time instant social audit.

The Punjab Government has thus materialized the concept into a tangible reality to enable the public to participate in real time in the policy formulation process by creating a digital bridge through 9211 Virtual Governance System. The same will also eliminate the extreme wastages encountered by not taking corrective measures well in time. It will also help create a dynamic knowledge bank of information, much needed for public policy formulation in future. Public access to information is not necessary as a Public Right only, rather it is imperative from the point of view of enlarging the surface area of interaction of governance institutions with the public to have a better understanding of public service delivery needs, in a fast changing and increasingly demanding world.

Over the past few years, the world has been hit by a series of economic, financial and food crises. Price volatility and weather shocks, due to fluctuating markets and climate change, likely to undermine food
security. In this context, promoting livelihood resilience and food and nutrition security has become central to the policy agendas of the Punjab Government. Smallholder farmers have been put at the center of this priority to play a pivotal role.

Markets provide the facility to make business transactions. They provide platforms to exchange the requisite information amongst the buyer and sellers regarding the products. The exchange of information requires structuring of the message regarding the products and offerings. Showcasing is but an expression of that message communicated in the market. The intrinsic function of the market is to maximize the offering of a given product. This induces competition, which fetches the best value for the produce.

Value and pricing are two distinct entities that can only be separated through vibrant market mechanics. Price is not traded in the fully functional and vibrant market; value does. Without creation of value chain and resultant value gain for a set of given products along the supply chain, the competitiveness and prosperity is a forlorn hope.

Last but not least, more than anything else, it is the return on investment in the form of value that determines the fate of the productivity, innovation and cost bearing by supply chain actors right from the primary production systems to the end consumers.

**Picture 10: Alternative Sources of Milk**

6.5 Kg/Day: Called Poor Man’s Cow

This region of the world, possesses the best genetic potential of livestock but the markets are not being allowed to evolve due to varied reasons like government interventions and unfair market practices because of the tunnel vision and parochial interests, which have now started to corrode the beneficiaries themselves. A buffalo, for instance, producing merely 6 Kg milk per day while standing with a subsistence level farmer jumps to 12 liters when sold in the Milkmen (Gawala) Colony in the outskirts of big urban centers. The same can be potentially enhanced if returns on investment are ensured by removing price capping on livestock produce that is culminating into capping of production by the farmer to reduce its losses.

The need of the time is to preserve the common cultural heritage of livestock rearing and development that runs through centuries in the blood of communities of this region world call “the Punjab” so that the hallmark of the Punjab to provide best quality food to neighbouring regions within respective countries and outside should continue to register a forward march by additionally promoting the peace and harmony amongst the two Nations of India and Pakistan by taking a joint stand on external front regarding IPRs and SPS standards under the WTO regime.
Endnotes

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4. Livestock & Dairy Development Policy of the Punjab, accessible at website of the Department at www.livestockpunjab.gov.pk
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