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Report No: ICR00004436

IMPLEMENTATION COMPLETION AND RESULTS REPORT

4809-IN

ON A

CREDIT

IN THE AMOUNT OF SDR 65.9 MILLION
(US$100 MILLION EQUIVALENT)

TO THE

REPUBLIC OF INDIA

FOR A

MAHARASHTRA AGRICULTURAL COMPETITIVENESS PROJECT

June 17, 2019

Agriculture Global Practice
South Asia Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective May 31, 2019)

Currency Unit =	Indian Rupees (Rs)
69.82=	US$1
US$1 =	SDR 1.39

FISCAL YEAR
April 1- March 31

ABBREVIATIONS AND ACRONYMS

ABPF	Agribusiness Promotion Facility
AHC	Animal Health Camp
AHD	Animal Husbandry Department
APM	Agriculture Produce Marketing
APMC	Agriculture Produce Marketing Committee
ATMA	Agricultural Technology Management Agency
BDS	Budget Development Services
BSM	Buyer-Seller Meets
CAS	Computerized Auction System
CIG	Common Interest Group
CSA	Climate Smart Agricultural
DID	Difference in Difference
EDP	Enterprise Development Program
ERR	Economic Rate of Return
ESMF	Environmental and Social Management Framework
F&V	Fruit and Vegetable
FCSC	Farmer Common Service Center
FIAC	Farmer information and Advisory Center
FM	Financial Management
FNPV	Financial Net Present Value
FPO	Farmer Producer Organization
FRR	Financial Rate of Return
GoI	Government of India
GoM	Government of Maharashtra
GP	Gram Panchayat (Village Council)
ICR	Implementation Completion and Results Report
IPNM	Integrated Pest and Nutrient Management
IRI	Intermediate Results Indicator
LSM	Livestock Market
M&E	Monitoring and Evaluation
MACP	Maharashtra Agricultural Competitiveness Project

MID	Market Information Display
MSAMB	Maharashtra State Agriculture Marketing Board
MSWC	Maharashtra State Warehousing Corporation
MTR	Midterm Review
NIC	National Informatic Center
NPV	Net Present Value
OCC	Opportunity Cost of Capital
PCU	Project Coordination Unit
PDO	Project Development Objective
PDOI	PDO Outcome Indicator
PIU	Project Implementation Unit
PPP	Public-Private Partnership
PwC	Pricewaterhouse Coopers
RF	Results Framework
RH	Rural *Haat*
SAS	Standardized Accounting System
SC	Schedule Caste
SRM	Small Ruminant Market
SP	Service Provider
ST	Schedule Tribes
NWR	Negotiable Warehouse Receipt

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TABLE OF CONTENTS

DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P120836	Maharashtra Agricultural Competitiveness Project
Country	**Financing Instrument**
India	Investment Project Financing
Original EA Category	**Revised EA Category**
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Republic of India	Department of Cooperation & Marketing

Project Development Objective (PDO)

Original PDO

The project development objective (PDO) is to increase the productivity, profitability, and market access of the farming community in Maharashtra. This would be achieved by strengthening farmers' capacity through technical knowledge, market intelligence, and market networks to support diversification and intensification of agriculture production aimed at responding to market demand. Farmers will also be assisted through farmer organizations, alternative market channels developed outside of regulated markets, and improved services provided by modernizing the promising traditional wholesale markets.

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
IDA-48090	100,000,000	88,903,239	83,694,432
Total	**100,000,000**	**88,903,239**	**83,694,432**
Non-World Bank Financing			
Borrower/Recipient	11,000,000	0	9,299,381
Local Communities	42,000,000	0	24,220,000
Total	**53,000,000**	**0**	**33,519,381**
Total Project Cost	**153,000,000**	**88,903,239**	**117,213,813**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
28-Sep-2010	20-Dec-2010	22-Apr-2013	31-Dec-2016	31-Oct-2018

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
26-Jun-2014	27.73	Change in Results Framework
27-Sep-2016	51.14	Change in Loan Closing Date(s)
26-Jul-2017	63.63	Change in Loan Closing Date(s)

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	25-Apr-2011	Satisfactory	Satisfactory	5.00
02	02-Nov-2011	Satisfactory	Satisfactory	5.72
03	11-Mar-2012	Satisfactory	Satisfactory	6.47
04	29-Jul-2012	Satisfactory	Satisfactory	8.38
05	11-Feb-2013	Satisfactory	Moderately Satisfactory	11.25
06	17-Aug-2013	Moderately Satisfactory	Moderately Satisfactory	16.06
07	02-Feb-2014	Moderately Satisfactory	Moderately Satisfactory	18.37
08	30-Jul-2014	Moderately Satisfactory	Moderately Satisfactory	27.73
09	08-Feb-2015	Moderately Satisfactory	Moderately Satisfactory	31.59
10	10-Sep-2015	Moderately Satisfactory	Moderately Satisfactory	40.75
11	22-Apr-2016	Moderately Satisfactory	Moderately Unsatisfactory	46.14
12	17-Nov-2016	Moderately Satisfactory	Moderately Satisfactory	53.90
13	08-Jun-2017	Moderately Satisfactory	Moderately Satisfactory	61.18
14	07-Aug-2017	Satisfactory	Satisfactory	63.63
15	26-Jan-2018	Satisfactory	Satisfactory	67.20
16	23-Jul-2018	Satisfactory	Satisfactory	74.65

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Agriculture, Fishing and Forestry	**24**
Agricultural Extension, Research, and Other Support Activities	5
Fisheries	3
Public Administration - Agriculture, Fishing & Forestry	13
Livestock	3
Industry, Trade and Services	**76**
Agricultural markets, commercialization and agri-business	76

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Private Sector Development	**100**
Jobs	100
Finance	**4**
Finance for Development	4
Agriculture Finance	4
Urban and Rural Development	**89**
Rural Development	89
Rural Markets	63
Rural Infrastructure and service delivery	22
Land Administration and Management	4
Environment and Natural Resource Management	**8**
Renewable Natural Resources Asset Management	8
Biodiversity	4
Landscape Management	4

ADM STAFF

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. **At appraisal, Indian agriculture sector was at a crossroads.** The country achieved food self-sufficiency in the late 1990s, but the sector was experiencing deceleration in agricultural growth rate. Concerns over the impact of slow growth on rural poverty reduction, fiscal burden of the food self-sufficiency agenda, increasing water stress, and environmental impact of the rice-wheat system were growing. The Government of India (GoI) intended to address these issues through improvements in agricultural productivity and diversification as stated in its National Agricultural Policy and 10th Five Year Plan (2001/02 to 2006/07). To support this objective, the Government was reforming its agriculture extension system by scaling up the Agricultural Technology Management Agency (ATMA) concept nationwide. The ATMA, which was successfully piloted in eight states with the World Bank's support, was centered around increased participation of farmers and private sector in extension services and improved coordination between line departments. In response to increasing recognition of the importance of well-functioning markets to support agricultural commercialization and diversification, the GoI was also implementing policy reforms to deregulate its historically heavily regulated agricultural marketing system. A model Agriculture Produce Marketing (APM) Act, which was formulated in 2002, for instance, if adopted by states, would allow private sector involvement in provision of basic marketing services to farmers, agro-processing, and other forms of value addition.

2. **The World Bank was engaged in the national dialogue on reforming agricultural marketing system and was supporting the Government's agenda including through analytical studies.** The most relevant among these studies was *India: Taking Agriculture to Markets* that identified major policy, institutional, and technical bottlenecks and constraints and explored options for improving performance of the agricultural marketing and processing sectors while drawing on national and international experiences. Key findings of the study were (a) inadequate market infrastructure and basic facilities within existing markets; (b) limited access by farmers to market and production-related information, advice, and technologies; and (c) weak technical capacity of entrepreneurs in preparing bankable business activities. The Government intended to implement, with the World Bank's assistance, key recommendations of these studies through a national project with a multistate focus. The states adopting the APM Act 2002 and ATMA extension system would be eligible for participation. Preparation of the proposed, which took place between December 2007 and August 2010, was delayed for different reasons including varying readiness and commitments among states. Therefore, it was decided to prepare stand-alone projects for the progressive states with strong commitments for reforms and readiness for the project implementation.

3. **Maharashtra, which had the largest concentration of poor in the country, majority of whom lived in rural areas, was among the most progressive states in reforming agriculture marketing[1].** As stated in its Vision 2015, agriculture marketing, which was informed by the World Bank's study, aimed to incentivize agricultural producers to increase productivity and quality through higher price realization.

[1] MACP PAD

The vision placed a greater role for the private sector in developing a vibrant, transparent, and competitive agricultural sector. It also emphasized the importance of risk management through promoting negotiable warehouse receipt (NWR) financing, improving accreditation of warehouses, and linking them to commodity exchanges and e-trading operations. It also pursued improved agricultural marketing system through creation of farmer producer organizations (FPOs),[2] which would allow achieving economies of scale through aggregation of input purchases and marketing of agricultural produce.

4. **The Maharashtra Agricultural Competitiveness Project (MACP) was developed to support the state's Vision 2015 through a three-pronged approach:** (a) promote development of alternative marketing options to farmers; (b) support the top tier of regulated wholesale markets in the state to reform, invest, and provide better services; and (c) gradually undertake further incremental regulatory reforms. This approach—comprising both regulatory change and investments in physical infrastructure, capacity building, and governance, allowing all stakeholders involved to buy into a policy and structural reform process—was envisaged to establish the critical mass for a competitive environment, which over time would move the rest of the agriculture marketing system in Maharashtra toward greater efficiency. This would support the 11th Five Year Plan (2007–2012) of the GoI and also contribute to Pillar One of the World Bank's Country Assistance Strategy (2008) that aimed to achieve a rapid and inclusive growth by expanding agricultural productivity while emphasizing fostering farmer-centered public extension systems as well as efficient and competitive markets.

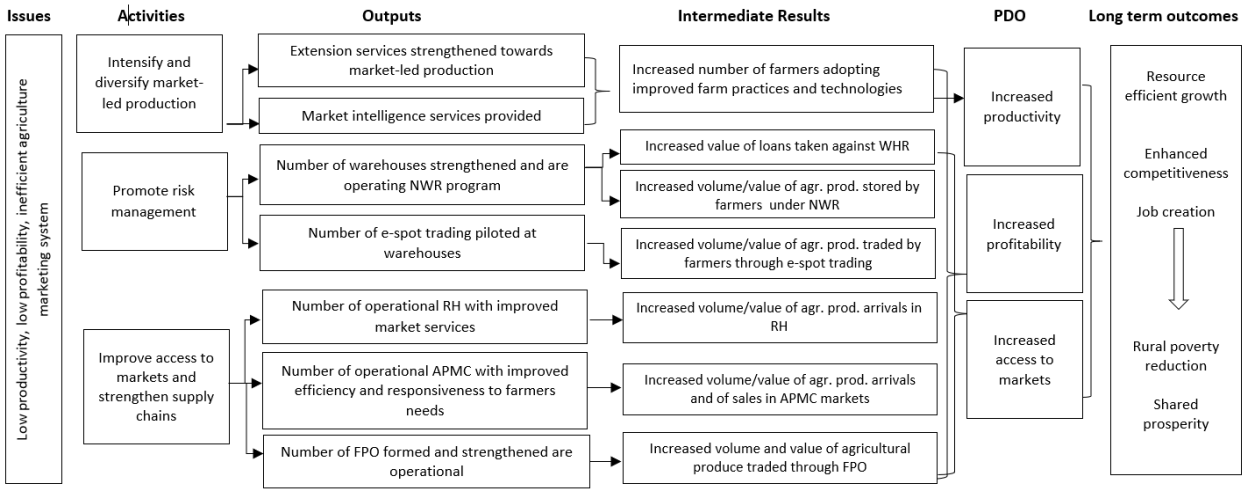
5. **Through appraisal and negotiation conditions, between 2007 and 2010 the Government of Maharashtra (GoM) implemented a number of policy and regulatory changes to create conducive policy and enabling environment for the project implementation.** These included (a) separation of the state's regulator role of agriculture marketing from the role of developer of the regulated wholesale markets; (b) removal of distance restrictions from the existing regulated wholesale market and the location of future private markets; (c) introduction and adoption of the Agriculture Produce Marketing Committee (APMC) model bylaws to improve the market governance, management, and operation; (d) permission for farmer organizations to establish and operate their own markets without making cess payments to the regulated markets; and (e) preparation of a Letter on Development Policy outlining the GoM's Vision for a long-term future of agriculture marketing reforms, especially on roles for private sector initiatives, public sector involvement, oversight in agriculture marketing, and development of risk management tools.

Theory of Change (Results Chain)

6. The theory of change and key assumptions are presented in figure 1. The Theory of Change was subject to several crucial assumptions: (a) the project is not subject to climate change risks, (b) appraisal implementation arrangements are suitable for all APMCs, (c) release of funds by the state is on time, (d) the implementation time line is adequate for the project implementing reform-linked interventions, and (e) piecemeal approach to extension would support effective planning and implementation.

[2] The project documents used terms FPOs and FPCs alternatively. For consistency and clarity, the ICR will use the term FPO.

Figure 1. Theory of Change



Note: RH = Rural *Haat*.

Project Development Objectives (PDOs)

7. The PDO was to increase the productivity, profitability, and market access of the farming community in Maharashtra.

Key Expected Outcomes and Outcome Indicators

8. Key expected outcomes and outcome indicators (PDOI) to measure achievement of the PDO were the following:

Part 1: Increase productivity

- Changes in crop yields - cereals, pulses, oilseeds, fruits, vegetables

Part 2: Increase profitability

- No profitability-specific PDOI but some overlap with the first and third parts of the PDO

Part 3: Increase market access

- The share of wholesale and retail price received by the farmer
- Compliance with business standards by office of Director of Marketing

Components

9. **Component A: Intensification and Diversification of Market-Led Production (estimated cost of US$32.40 million and actual cost of US$26.32 million).** The component would support agriculture technology transfer, facilitate networking among farmers and agribusinesses on emerging marketing opportunities, provide market intelligence using information and communication technology-based applications and other means, and strengthen livestock support services in the state.

10. **Component B: Improving Farmer Access to Markets (estimated cost of US$106.50 million and actual cost of US$77.09 million).** The component would promote alternative market opportunities by

establishing farmer groups and a warehouse receipts system, upgrading local RHs,[3] piloting e-trading platforms, and modernizing existing wholesale markets and livestock yards.

11. **Component C: Project Management, Learning and Adjusting (estimated cost of US$14.10 million and actual cost of US$13.80 million).** The component would undertake project coordination and management and monitoring and evaluation (M&E) services.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

Revised PDOs and Outcome Targets

12. The level 2 restructuring from June 26, 2014, revised the Results Framework (RF). The PDO and outcome targets were not revised.

Revised PDO Indicators

13. As presented in table 1, the restructuring (a) unpacked PDOI 1 to capture changes to wholesale and retail prices accurately, (b) assigned representative crops for PDOIs 1 and 2 to allow accurate assessment and (c) removed PDOI 3 due to its unsuitability for assessing the relevant PDO outcome.

Table 1. Appraisal and Restructured PDO Indicators

Appraisal PDO Indicators	Revised PDO Indicators	Original Target	Revised Target
1. The share of wholesale and retail price received by the farmer	**Revised** - 1. Increase in average share of farmer in wholesale price for select crops - *maize, chickpeas, soybean, pigeon pea, onions, tomato, mandarin, banana, pomegranate*	5%	5%
	Revised - 2. Increase in average share of farmer in retail price for select crops - *maize, chickpeas, soybean, pigeon pea, onions, tomato, mandarin, banana, pomegranate*	5%	5%
2. Changes in crop yields - *cereals, pulses, vegetables, oilseeds, fruits*	**Revised -** 3. Increase in crop productivity for select crops - *maize, chickpeas, soybean, pigeon pea, onions, tomato, mandarin, banana, pomegranate*	15%[4]	15%
3. Compliance with business standards by office of Director of Marketing	**Deleted**	100%	—

Revised Components

14. The project components were not revised.

[3] RHs are periodic (weekly) markets managed by *Gram Panchayats* (Village Councils, GPs).
[4] Net increase in crop productivity due to the project interventions excluding the general trend in the sector at 10 percent.

Other Changes

15. **On June 4, 2013, the Midterm Review (MTR) revised implementation arrangements and scopes for several activities.** Revisions included increased participation of APMCs in implementation (refer to para 67) and increased budget allocations for the APMC market modernization to adjust for high-price contingencies. In response to extensive coverage of market information services by the Department of Agriculture and private sector since appraisal, the MTR shifted the focus from provision of market information to market intelligence services. It was agreed to establish the Center for Indian Agriculture Marketing Intelligence for preparation and dissemination of market intelligence services and research. Furthermore, successful interventions were agreed for scaling-up using savings gained from depreciation of the rupee (Rs). These were interventions on RH, warehouses, agro-enterprises for the Enterprise Development Program (EDP), and crop technology transfer. The MTR also introduced an intermediate results indicator (IRI) for Business Development Services (BDS) provided under the Agribusiness Promotion Facility (ABPF).

16. **On June 26, 2014, the project was restructured to modify the RF.** The PDOIs were revised, as discussed in para 13. Appraisal IRIs were simplified and 13 IRIs were added to allow accurate monitoring of results and outcomes. Baseline and target values were updated to reflect the baseline data and changes to the scopes introduced at the MTR.

17. **The project received two extensions for a cumulative period of 22 months to complete key innovative activities and utilize exchange rate gains for scaling up successful interventions.** FPO formation works were delayed due to unavailability of qualified service providers (SPs). Severe droughts that occurred thrice over the project period delayed implementation of multiple activities, including modernization of market infrastructure. On September 27, 2016, the original closing date was extended by 12 months from December 31, 2016 to January 2, 2018.[5] On July 26, 2017, the closing date was extended for another 10 months from January 2, 2018 to October 31, 2018. Around US$16.84 million out of the total exchange rate savings of US$27.7 million was unutilized largely due to difficulty in obtaining one-time extension for a longer period, which would allow adequate planning and implementation, and delays in the Government's decision making on utilization of savings.

Rationale for Changes and Their Implication on the Original Theory of Change

18. The MTR revisions were introduced to adjust the project for changes that took place since the appraisal and for more efficient outreach, higher results and outcomes, and satisfactory implementation. The revisions were formalized through Aide Memoires and Management Letters. Modification to the RF and extension of project closing dates, which were formally approved through three restructurings, were introduced to facilitate more efficient and accurate M&E of results and outcomes, satisfactory completion of innovative interventions, and utilization of savings. These changes did not affect the original theory of change.

[5] The World Bank's letter, dated September 28, 2016, to the Ministry of Finance of India on 'Extension of Closing Date'.

II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

19. The PDO was highly relevant to the World Bank's Country Partnership Framework for FY2018–22 at the appraisal and continues to remain so at the project closure. Relevant focus areas of engagement are promoting resource-efficient growth, enhancing competitiveness, and enabling job creation. These focus areas address two pathways to ending poverty and boosting shared prosperity. The PDO also remains relevant to the focus on geographical areas of the poor and engaging the private sector. These are high priority areas in both national and state governments strategies as well. The relevance of the PDO is therefore High.

B. ACHIEVEMENT OF PDOs (EFFICACY)

20. The PDO consisted of three parts: (1) increase productivity, (2) increase profitability, and (3) increase market access. At closing, the project surpassed the target for one PDOI, fully achieved the target for another PDOI, and largely achieved the target for the third PDOI. The achievements are summarized in table 2.

Table 2. Summary of PDOI Achievements

PDO Indicators	Unit of Measure	End Target Value	End Actual Value	Achievement (%)
1. Increase in average share of farmer in wholesale price for select crops - *maize, chickpeas, soybean, pigeon pea, onions, tomato, mandarin, banana, pomegranate*	Percent	5.0	5.1	101
2. Increase in average share of farmer in retail price for select crops - *maize, chickpeas, soybean, pigeon pea, onions, tomato, mandarin, banana, pomegranate*	Percent	5.0	4.7	93
3. Increase in crop productivity for select crops - *maize, chickpeas, soybean, pigeon pea, onions, tomato, mandarin, banana, pomegranate*	Percent	15.0[6]	23.1[7]	154

Assessment of Achievement of Each Objective/Outcome

21. **PDO 1. Increase productivity.** The project successfully achieved this part of the PDO, and all relevant PDO outcome and results indicators, except one, substantially exceeded their target values. Against the target of 15 percent, the project achieved 23 percent net increase in crop productivity. Crop-wise and value-wise results were mixed (table 3). Crop-wise, the project substantially exceeded the

[6] The appraisal assumed gross yield increases at 25 percent, including 15 percent project attributed increase and 10 percent of general growth trend.
[7] Net change measured through the DID.

targets for four crops (pigeon pea, chickpea, soybean, onion) and did not achieve the target for one crop (maize). Although net productivity increase for tomato could not be assessed,[8] the baseline yield increased drastically by 105 percent. However, productivity changes were not always toward increase. The general trend for soybean, chickpea, and pigeon pea was toward decrease in the state largely due to deterioration of existing seed varieties and severe droughts that affected rabi crops more drastically. Nevertheless, the project succeeded to increase or halt drastic reductions in yields for these crops for the project farmers.

Table 3. Summary of Crop Productivity Increases

	Productivity (kg/ha)					Change over Baseline (%)		DID (%)	Achievement of Target (%)
	Baseline		Endline		Target				
	Project	Control	Project	Control	Project	Project	Control		
Soybean	1,585	1,567	1,488	1,015	1,823	−6	−35	29	194
Chickpeas	966	1,049	1,124	960	1,111	16	−8	25	165
Pigeon pea	760	788	821	677	875	8	−14	22	146
Maize	3,014	2,733	3,503	2,923	3,462	16	7	9	62
Onion	8,778	13,629	25,944	14,035	10,095	196	3	193	1,284
Tomato	11,587	n.a.	23,748	25,237	13,326	105	n.a.	n.a.	178
Average	4,448	3,953	9,438	7,475	5,115	112	89	23.1	154

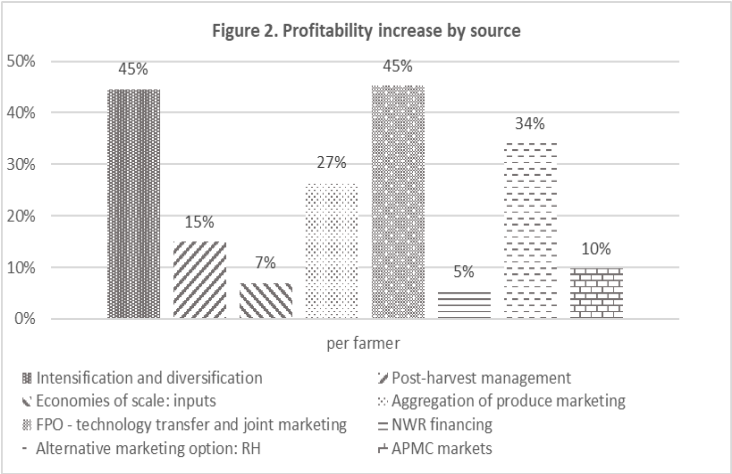
Source: Baseline, annual, and endline surveys conducted by external M&E consultancy.
Note: DID = Difference in difference.

22. **Crop productivity increases resulted from combination of project interventions that promoted market-led production and adoption of best farm practices and technologies.** The project strengthened extension SPs and training and research centers institutionally and technically (see para 47). Marketing Strategy Supplements, which identified gaps and constraints in market-led production and marketing systems and proposed strategies and measures for adjustment of extension services, were prepared for all ATMAs in 33 districts. Around 90,600 members of Common Interest Group (CIG) and FPO participated in more than 96,500 training and demonstrations on improved farming and climate smart agricultural (CSA) practices and technologies.[9] A total of 174 technologies, including for the nine target crops, were demonstrated.

23. **As a result of these interventions, shares of farmers adopting critical irrigation increased to 36 percent against the target of 12 percent.** Areas under critical irrigation reached 37 percent, also substantially exceeding the target of 13 percent. Around 30 percent of farmers adopted the entire package of project promoted practices and technologies, while 92 percent of farmers adopted one or more of them. Diffusion of technologies from beneficiary to non-beneficiary farmers was also high at 15 percent. Adoption of balanced use of fertilizers was largely achieved at 77 percent, but there was underestimation primarily due to the erroneous survey methodology. Furthermore, the project successfully increased productivity and profitability in goats that will be presented in annex 5.

[8] Baseline value for the control group was not available as the crop-wise monitoring started only after the MTR.
[9] Demos, training, and visits were demand driven and combined multiple topics simultaneously. Hence, some overlap should be expected.

24. **PDO 2. Increase profitability.** Though there was no PDO indicator assigned to measure profitability, the project systematically monitored profitability. Multiple thematic surveys found that the project achieved impressive profitability increases across all interventions. Individually, intensification and diversification interventions increased farm profits by 45 percent on average for all crops. Aggregated marketing through FPOs increased profitability of marketed shares of produce by 45 percent by reducing input costs by 7 percent and increasing price realization by 22 percent (figure 2, - data from end term assessments). Adoption of sorting and grading practices increased farm profits by 15 percent on average for all crops, vegetables and fruits. Direct marketing links contributed by profitability increases through increased net price realization by 38 percent and reduced post-harvest losses and wastes by 76 percent. For example, marketing in RH increased farm profits by 34 percent. All alternative marketing channels (overlap with the third part of the PDO) led to up to 5 percent higher net price realization and up to 78 percent reduction in losses and wastes (see para 31). Price risk management through NWR financing increased farm profits by 5 percent on average for key commodities. Improved price realization at APMCs increased farm profits by 10 percent. Crop-wise, profitability increases ranged from 10 percent (onion) to 312 percent (maize) with an average of 165 percent for all target crops. Analysis of several projects in the country and South East Africa, South Asia, and East Asia Pacific regions suggests that agriculture competitiveness interventions typically aim or achieve smallholder farm profitability increases in the range of 15 percent to 25 percent (refer to annex 5 for the list of projects). In this context, the MACP's objective to increase profitability is considered to be successfully achieved.



25. **To achieve this objective and results, the project established and strengthened FPOs with around 15,6000 members to operate and manage 406 Farmer Common Service Centers (FCSCs) for aggregated input purchase and produce marketing.** Around 11,500 demos, training, and exposure visits were organized on improved marketing strategies, post-harvest value addition, and quality improvement. The producers were also supported with market intelligence services that helped them get higher prices by adjusting production and marketing choices and time lines. In total, around 104 market forecasts for key commodities with accuracy rate of projected prices above 86 percent were prepared and disseminated. The project also developed and disseminated grading standards. Through ABPF, around 178 buyer-seller meets (BSM) and 48,027 public-private partnership (PPP) demos were organized with participation of 25 leading inputs suppliers and agricultural produce procurement companies. Long-term direct procurement arrangements with participating CIG and FPO were established, many of which remained operational at closing. The project promoted risk management mechanisms that contributed to both profitability as well as market access objectives. Details of the NWR financing will be discussed in para 33. It also supported 59 EDPs by individual entrepreneurial farmers and FPOs with training and provision of processing equipment for grain sorting, grading and processing, animal feed production, and fruit ripening and dehydration. Agriculture marketing reform-linked activities, including deregulation of

fruit and vegetable (F&V) trade and elimination of commission agent fees in regulated wholesale markets, which were implemented with the project's facilitation, also contributed to the profitability agenda.

26. **These interventions resulted in crop diversification on more than 17,800 ha with procurement value of Rs 38.7 crore (US$5.4 million) and 16 percent increase in cropping intensity.**[10] Grading and sorting practices were adopted by 72 percent of the target farmers, while knowledge diffusion from the target to non-target farmers reached 1:9. The price forecasts guided production choices for 82 percent of farmers, marketing choices for 59 percent, and timing of sales for 49 percent. Around 37,200 MT of produce valued at Rs 100.5 crore (US$13.4 million) and agricultural inputs worth Rs 38.6 crore (US$5.4 million) were traded through FPOs (see also para 31). Additional 55,100 MT of produce worth Rs 80.8 crore (US$11.2 million) was marketed through CIGs and FPOs and 60,300 MT of produce was traded through contract farming arrangements with procurement companies. Over the project period, EDP processed around 11,030 MT of grains, fruits, and animal feed with the total turnover of Rs 137 crore (US$2 million).

27. **PDO 3. Increase market access.** This part of the PDO was successfully achieved through (a) promotion of alternative marketing options to be measured through the increase in average share of farmer in retail price (PDOI 2) and (b) improved the market infrastructure and services of regulated wholesale markets to be measured through the increase in average share of farmer in wholesale price (PDOI 1).

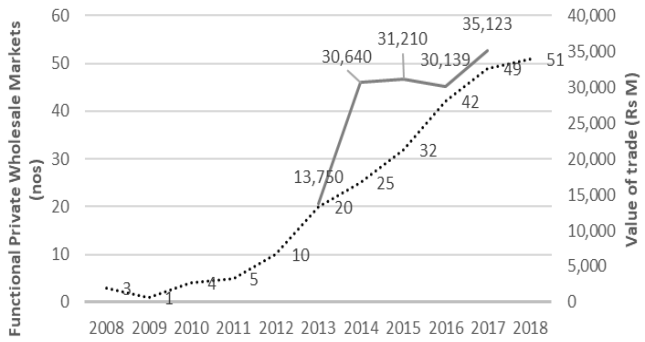
28. **Alternative marketing options.** The project promoted alternative marketing options through combination of marketing reform activities implemented as part of the appraisal and negotiations conditions as well as reform-linked activities implemented under the project. The pre-project reform activities included (a) removal of distance restrictions for private markets and (b) granting FPOs to establish and operate their own markets without making cess payments to the regulated markets. The reform-linked activities implemented under the project included (a) direct marketing arrangements through FPOs, (b) contract farming arrangements between CIGs/FPOs and private sector, (c) NWR financing, (d) e-trading pilots, and (e) improving market infrastructure and services of RHs.

29. **As a result of these interventions, alternative market options such as private markets, direct marketing arrangements, and contract farming strongly and significantly emerged in the state since 2008.** At closing, there were 51 operational private markets with more than 600 collection centers spread across the state (figure 3). Their turnover increased steadily and reached 11 percent of the state's turnover of Rs 3,513 crore (US$486.8 million) in FY2017–18. According to the impact study, the net price realization in private markets for major crops was approximately 4.4 percent higher than in traditional market outlets. The study also found that the alternative marketing channels significantly empowered the farmers in getting a higher net price realization, accessing more efficient market transaction processes and forced the traditional regulated markets to improve their business processes and reduce market fees in response to increasing competition. It also led to significant reduction in marketing costs, losses, and wastes. At closing, alternative marketing channels were found to increase the average share of farmers in retail price by 4.7 percent against the target of 5 percent (PDOI 2). Contribution of different marketing channels to this achievement is described in the following paras.

[10] Diversification increased areas of baby corn, potato, tomato, onion, pomegranate, pulses, groundnut, and maize.

30. **Direct marketing arrangements.** The project formed and strengthened FPOs with over 160,000 members to operate and manage 406 FCSCs for aggregated input purchases and produce marketing. At closing, 327 FPOs availed direct marketing license and 203 FPOs obtained agriculture input marketing license. Of these, 184 FPOs achieved cumulative trade volumes of 32,300 MT of grains and 14,900 MT of fruits with respective values of Rs 97.6 crore (US$13.5 million) and Rs 16 crore (US$2.2 million). Aggregated produce marketing by Direct Marketing License (DML) holders led to 22 percent higher price realization on average for all major crops and all marketing channels. The result targets for trade volumes and values marketed through FPOs, however, were unmet due to a combination of factors. These included substantial delays in implementation resulting from unavailability of qualified SPs, severe droughts that affected production, and unrealistic targets for F&V volumes traded through FPOs considering that the state has the lowest irrigation coverage in the country. **Contract farming arrangements** between CIGs/FPOs and private sector through the PPP and BSM demos, as described in para 27, helped the participating farmers obtain up to 43 percent higher price realization.

Figure 3. Development of private agriculture markets in Maharashtra



31. **NWR financing.** To improve farmers' access to price risk management services, high-quality storage facilities, and access to alternative marketing option through commodity exchanges, the project upgraded 112 warehouses and facilitated commercial banks' participation in the NWR program. These interventions resulted in drastic increases in annual volumes and values of agricultural produce stored by farmers by 555 percent and 527 percent, respectively. Between 2013 and 2016, both volumes and values of produce stored by farmers substantially exceeded their respective annual targets by 42 percent on average. The targets for the following years were unmet as the Government reserved warehouse spaces for the state-procured grains and pulses to control prices in the aftermath of the 2016 drought. Nevertheless, when all transaction costs are deducted, the NWR financing increased net price realization by 8.7 percent on average for all commodities. According to the impact survey, 79 percent of participating farmers reported increase in net profits by 5 percent and 98.5 percent of them considered using the NWR in the future. **E-spot trading pilot.** In partnership with NCDEX Spot Exchange Ltd, the project piloted e-spot trading in 181 warehouses. However, this was discontinued due to lack of liquidity in the operation.

32. **Modernization of RH.** Against the target of 350, the project modernized 472 RHs. Respective targets for the volumes and values of arrivals in RHs were met at 101 percent and 138 percent. The impact study found that numbers of sellers and buyers in RHs increased by 33 percent and 94 percent of respondents were satisfied with the market investments. Moreover, several project RHs were expanded by the GPs due to increased demand for market spaces. The project expected that the market modernization would lead to increases in market lease value. However, the majority of GPs chose to maintain prevailing market lease rates to avoid putting additional burden on farmers. Only few GPs increased the lease values but by reducing costs through direct management and operation of the market by GPs instead of hiring private operators.

33. **Improving regulated wholesale markets.** The project was instrumental in improving efficiency and responsiveness of regulated wholesale markets to farmers needs through the reform-linked activities implemented through the appraisal and negotiation conditions and under the project. The pre-project reform activities (a) separated the state's conflicting roles as a regulator of agriculture marketing and a developer of regulated wholesale markets,[11] (b) removed distance restrictions for private markets, and (c) introduced new model bylaws for improved market governance. The project (a) introduced a Standardized Accounting System (SAS) for accounting for improved transparency and comparability of wholesale markets, (b) piloted computerized auction system (CAS) for improved price discovery, and (c) modernized the wholesale market infrastructure.

34. **SAS.** The project successfully introduced SAS to all 306 APMCs in the state. At closing, SAS was adopted by 296 APMCs, of which 150 APMCs had their new accounting books audited at closing. The process was met with some resistance, which the project addressed by putting significant efforts in capacity building, eliminating windows for manipulation, and regular monitoring. Currently all APMCs are connected to the main server of MSAMB and their financial details are readily accessible which supports informed and transparent decision making. Whereas at the APMC level, adoption of SAS freed up one third of productive working hours of the accounting staff, drastically improved accuracy of financial reports, and eliminated rooms for imposing ineligible market fees by agents.

35. **CAS.** For the first time in the country, the project successfully championed e-auctioning. CAS was introduced to 25 APMCs in two phases. In the phase 1 APMC, shares of arrivals traded through CAS increased from 7 percent to 56 percent, with increased volume of e-traded produce. The impact survey found that around 66 percent of the respondent farmers, who traded through CAS, were satisfied with it. According to these respondents, CAS improved transparency (65 percent), allowed receiving comparatively higher prices (42 percent), reduced transaction time (52 percent), and will be used by them in the future (52 percent). The survey also found increased farmer participation in trade (14 percent) and reduced involvement of traders and intermediaries (5 percent) which the agriculture marketing reform pursued.

36. **Modernization of wholesale market infrastructure.** The project modernized market infrastructure for 81 APMCs (against the target of 100 APMCs) and added 81,245 MT warehouse space, 76,638 m^2 of covered auction areas. Meeting the appraisal target was constrained by two factors: (a) severe droughts reduced many APMCs' ability to meet the project's eligibility criteria in terms of arrival volumes and financial contributions and (b) some APMCs withdrew from the project due to unsuitability of the implementation arrangements (see para 67). In addition to these, the implementation was delayed due to restriction of water use for construction purposes during drought years. Despite these unfavorable factors, the project successfully exceeded all result targets that were set for the appraisal projected 100 APMCs. Respective result targets for annual volumes and values of agricultural produce were achieved at 143 percent and 215 percent. Moreover, the arrival volumes and values in the project APMCs grew at significantly higher rates. Between 2010 and 2017, the arrival values increased by 130 percent in the project APMCs against 59 percent in the control APMCs. Similarly, the arrival volumes increased by 77 percent in the project APMCs against 29 percent in the control APMCs. According to the impact survey, improved market infrastructure coupled with improved efficiency and transparency of market transaction

[11] Combined post of the regulatory body, Director of Marketing Agriculture and Managing Director, Maharashtra State Agriculture Marketing Board (MSAMB), and implementing arm was segregated.

processes were key driving factors. The survey respondents, of whom 93 percent were satisfied with the project investments, reported substantial improvements in handling practices, timing of transactions, and availability of market information. The improved efficiency and responsiveness in regulated wholesale markets resulted in 5.04 percent increase in the average share of farmers in wholesale price against the target of 5 percent (PDOI 1).

37. **Modernization of livestock market (LSM) and small ruminant market (SRM).** The project modernized 20 LSMs and 4 SRMs. According to the impact survey, between 2010 and 2014 the number of animals sold in the project LSM/SRM increased drastically by 1,321 percent against 70 percent increase in the control LSM/SRM. In the following years, in response to the Government policy[12] that banned sales of cattle for slaughtering, numbers of traded animals declined by 95 percent in the project-supported markets. In contrary, 438 percent increase in numbers of traded animals was observed in the control markets. The survey did not identify reasons for such difference, but it is reasonable to assume that improved transparency and accountability in the project markets could be behind it. The survey also found that more than 90 percent of survey respondents were satisfied with the project investments in LSMs. According to the respondents, construction of loading and unloading ramps substantially reduced numbers of livestock injuries and enabled farmers and traders to use larger vehicles, thereby reducing transportation costs. Construction of veterinary dispensaries contributed to improved animal disease surveillance and simplification of verification processes at road checkpoints that used to be costly and time consuming in the past when veterinary and market transaction certificates were not issued to buyers and sellers. Improved infrastructure reportedly reduced frequencies of thefts.

Justification of Overall Efficacy Rating

38. The project achieved all of its intended outcomes. The overall efficacy is therefore rated Substantial.

C. EFFICIENCY

Assessment of Efficiency and Rating

39. The appraisal estimated overall project's economic rate of return (ERR) at 19.4 percent with economic net present value (NPV) of Rs 2,007 million. Key returns were projected to derive from (a) intensification and diversification interventions that were expected to increase crop productivity by 15 percent (net), crop diversification by 10 percent, and cropping intensity by 10 percent and (b) development of alternate markets and modernization of wholesale market infrastructure that were expected to increase average shares of farmers in wholesale and retail prices. Project costs and benefits were estimated in 2010 prices for a period of 20 years and at 12 percent opportunity cost of capital (OCC).

40. The Implementation Completion and Results Report (ICR) analysis re-estimated the economic returns following the appraisal methodology but using 2018 prices. The overall project ERR was estimated at 18.8 percent, which is negligibly lower than the appraisal ERR of 19.4 percent. Despite substantial delays, the project achieved comparable level of ERR due to a combination of several factors. These included (a) substantial scaling-up of diversification and intensification activities for exchange rate gains,

[12] Maharashtra Animal Preservation (Amendment) Act 2015.

(b) substantially higher results generated by lesser-than-targeted numbers of APMC markets, (c) substantially higher returns to goat interventions, and (d) spending 17 percent lesser IDA credits owing to exchange rate gains.

Table 4. Summary of Economic and Financial Results: Appraisal and ICR

	Appraisal		ICR	
	ERR (%)	ENPV, Rs million	ERR (%)	ENPV, Rs million
Intensification and diversification of market-led production	24.5	519	31.4	2,421
Promoting alternative markets	20.4	467	21.3	5,443
Modernizing wholesale markets	24.6	1,779	19.1	1,537
Market-led production and improved farmer access to markets	23.8	2,764	22.7	7,864
Project as a whole, including entire project costs	19.4	2,007	18.8	5,925

41. Cumulative 22 months delay had a mixed effect on efficiency. It delayed benefit realization. But the extension was effectively used for scaling-up of successful interventions and at no additional costs. Despite delays, the project implementation cost remained below the appraisal estimates whereas favorable exchange rate gains contributed to spending 17 percent lesser IDA credit. These contributed to obtaining the comparable ERR. The project's efficiency is therefore rated Substantial.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

42. Though delayed, the project successfully achieved its intended outcomes. Moreover, the effect of the delay on the project's efficiency was not entirely negative. The overall project outcome is therefore rated Satisfactory.

E. OTHER OUTCOMES AND IMPACTS

Gender

43. Despite not having a focused gender strategy, the proportion of women in key project interventions was close to one-third the total number of members of all groups formed, that is, CIG, FPO, and EDPs. The participation of women in the outreach program for capacity building including exposure visit within and outside the state too was more than a third of all the members who received training. Women's access to markets also improved significantly due to the project interventions that ensured provision of toilets, drinking water, and better lighting in markets. However, a more focused gender approach could have benefitted participation of women in decision making in FPO. While each project-supported FPO has at least one woman on its board of directors, women's participation in the decision making was negligible. On the other hand, FPO operations allowed women to get paid jobs. In the case of livestock FPOs, women dominate and in at least one FPO all board members are women.

Institutional Strengthening

44. **Line departments.** The project trained around 3,100 staff of line departments and 1,700 field functionaries through various training programs, workshops, and exposure visits. Within agriculture,

ATMAs in all 33 project districts, 66 Farmer information and Advisory Centers (FIACs),[13] Vasantrao Naik Agricultural Management and Training Institute, and The Horticulture Processing Training Institute (HPTI) were strengthened institutionally and technically (office and training equipment and facilities, laboratory) to support market-led production. Similarly, training facilities and curriculum of the Animal Husbandry Department (AHD) were upgraded and around 1,200 officers were retrained to support market-led production. The AHD's capacity was further strengthened with the project-introduced LLW.

45. **FPO.** The project trained FPOs on organizational and financial management (FM), market-led production, post-harvest technologies, price risk management, marketing links, and agribusiness. However, those FPOs that are formed under phase 3 need more hand-holding to become sustainable and financially independent. Additionally, around 1,400 staff of **APMCs, LSMs, SRMs, and RHs** were trained to provide improved market management and operation. APMCs were further strengthened with SAS, CAS, and e-procurement practices.

Mobilizing Private Sector Financing

46. In addition to the IDA credit of US$83.69 million, government contribution of US$9.30 million, and beneficiary contribution of US$24.22 million, the project successfully leveraged additional US$232 million from the private sector. These included (a) NWR financing of US$160 million, (b) capital investments of US$47 million in agribusinesses mobilized through ABPF, (c) working capital finance of US$3 million for FPO mobilized through ABPF, and (d) private market investments of US$22 million.

Poverty Reduction and Shared Prosperity

47. **Social inclusion.** The project has performed well in terms of participation of small and marginal farmers[14] in key project interventions. Distribution of small and marginal farmers in three out of the four key project interventions—CIG, FPO, and FCSC—was higher than the state averages. The disaggregated data on social and economic profile reveal that of the total number of members of groups created, marginal farmers constitute 48 percent and women are 31 percent. This clearly establishes that the project has reached out to the vulnerable groups who have across the board benefited from the project. The project achieved satisfactory outcome also in terms of inclusion with more than 50 percent of the farmers being in Schedule Tribes (ST), Schedule Castes (SC), and other Backward Castes category. Distribution of SC in the CIG and EDP was higher than the state-level proportion (8 person), whereas distribution of ST in all the key interventions was by and large consistent with the state-level proportion of ST population (6 percent). Implementation of the comprehensive communication strategy enabled the farmers to take informed decisions. Use of print and electronic media, workshops, events at district and state level, and participation of farmers in state-level agricultural exhibitions provided wide publicity to project activities and created platforms for learning and knowledge sharing.

Other Unintended Outcomes and Impacts

48. In 2016, the National Institution for Transforming India assessed implementation of agricultural marketing and farmer-friendly reforms across Indian states. The assessment ranked **Maharashtra first in**

[13] FIACs were supported by the project to serve as the extension planning and operational arm of ATMAs.
[14] Marginal farmers operate up to 2.5 acres; small farmers operate between 2.5 and 5 acres; and others more than 5 acres.

implementation of most of the agricultural marketing reforms and for offering the best environment for doing agribusiness.

49. **The project influenced several national- and state-level policies and programs.** At the national level, the latest GoI's actions on RH modernization were influenced by the project demonstrated design and investment approaches. FPO-related chapters of GoI's 'Doubling Farmers' Income by 2022' were prepared with the project's contribution. Successful demonstration of CAS informed the design of the National Agriculture Market Electronic Trading (e-Nam) Platform of GoI. Successful demonstration of the RH interventions and consequent increases in demand for similar support led to allocating resources in the national Union Budget for FY2018–19 for 22,000 RHs across the country.

50. **ABPF.** The project set up the ABPF to promote, among other things, private investment in agribusiness sector. Around 1,836 agro-enterprises—including 1,332 BDS, 98 EDPs, and 406 FPOs—were supported. Around 8,700 training and workshops were conducted for them and 81 studies and publications were prepared to improve the agribusiness knowledge base. Respective target numbers for the agro-enterprises supported by and receiving loans through ABPF facilitation were largely met at 75 percent and 87 percent due to difficulties with meeting collateral requirements of the commercial banks and limited access to electricity. Nevertheless, at closing, the cumulative investments of Rs 39.7 crore (US$54 million) were invested by these enterprises, including the project's contribution of Rs 61.7 crore (US$8.6 million). According to the impact survey, a total of 6,577 full-time equivalent jobs, including 28 percent to female, were supported by the project-supported 1,065 agribusiness enterprises. Around 62 percent of the respondent enterprises witnessed 12–25 percent increase in their annual revenues over the past year. However, contribution of these enterprises to agriculture profitability was not monitored.

51. **E-procurement.** The project facilitated adoption of an e-procurement system in 60 APMCs for procurement of works and goods/equipment with a total contract value of Rs 204.4 crore (US$31.4 million). Application of e-procurement system contributed to substantial administrative and economic efficiency gains. For example, the procurement process from the publication to signing of the contract was reduced from 55 days to 31 days. In 105 e-procured contracts, 79 percent of awarded contracts were below estimated cost (by 32 percent) against in 57 percent of contract in the earlier system.

52. **Changing usage pattern of RH and spillover benefits.** Around 20 percent of project RHs moved from the weekly to biweekly schedule, some are operating simultaneously as wholesale markets, and some are also used for conducting social events. Several project RHs were expanded by the GP for own resources in response to increased demand for market space. The impact survey also found spillover benefits, including increased utilization of abandoned agricultural lands around the markets for vegetable production, development of transportation services, and increased awareness about the importance of basic infrastructure (water and toilet facilities).

53. **Mainstreaming environmentally sustainable agricultural practices.** Over 6,000 demonstrations of Integrated Pest and Nutrient Management (IPNM) were undertaken. This led to adoption, inclusion, and over 80,000 demonstrations of the practice through its integration into the Technology Kit of ATMA. Another area where the project made significant contribution was waste management at APMCs, which was transformed from a collection-disposal model to recycle-use model by producing vermicompost. Besides creating the revenue stream, this activity resulted in hygienic conditions in APMCs, reduced burden on municipal landfills, and promoted use of organic inputs by farmers.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

54. **The project design was simple, clearly articulated, and had strong links to the Government's development priorities and the World Bank's engagement strategy in the country.** To achieve this, the originally proposed design was simplified by removing the proposed interventions in dairy and fishery marketing.

55. **A policy and regulatory environment conducive for increased transparency of market transactions and inclusiveness of market participants was established through conditions for the project appraisal and negotiation.** These were (a) an amendment to APM Act separating the state's regulator role of agriculture marketing from the role of developer of the regulated wholesale markets; (b) elimination of minimum distance criteria for new private markets from existing APMC markets; (c) introduction and adoption of APM model bylaws on improving governance, management and operation of APMCs, and encouraging competition and enhancing transparency in agriculture marketing; and (d) preparation of a Letter on Development Policy outlining the GoM's vision for a long-term future of agriculture marketing reforms, especially on roles for private sector initiatives, public sector involvement, oversight in agriculture marketing, and development of risk management tools..

56. **Readiness for implementation was strong.** At appraisal, key risks to the project were identified and appropriate measures were proposed. Key fiduciary, safeguards, and implementation arrangements were discussed and agreed. Recruitment process for fiduciary and safeguards specialists was initiated. Accounting software was procured and installed in all ATMA offices. Implementation arrangements for APMC and RH interventions were discussed and agreed with the phase 1 APMCs and GPs though these were found to be unsuitable for some APMCs. Implementation of APMC, RH, and FPO interventions was facilitated with (a) preparation of investment demand assessments and full project proposals for selected eight APMCs and eight RHs, (b) securing initial financial contributions from APMCs, and (c) establishment of five prototype FPOs. Memorandum of Understanding was signed with the Union Bank of India and leading e-spot exchanges in the state, for piloting e-spot trading platforms. The appraisal, however, could consider external risk factors such as severe droughts that occurred thrice during the project life or the availability of quality SPs.

57. **The appraisal implementation time line was unrealistic given that the project was designed to implement reform-linked interventions.** For example, qualified SPs to support the FPO interventions were not readily available in the market which delayed implementation and affected quality. Moreover, the project was designed to follow the phased approach for testing and learning on innovative interventions that required additional time.

58. **The RF could have been better designed to allow more accurate and efficient assessment of the project outcomes and results.** Proposed PDOIs and IRIs were difficult to measure and insufficient to assess the project contribution to achieving outcomes. Though drivers for profitability changes were clearly described, appropriate PDOIs and IRIs were not assigned. Proposed IRIs for other PDO outcomes were also limited to capture attribution and results chain.

B. KEY FACTORS DURING IMPLEMENTATION

59. The project was subject to several factors—both within and beyond the control of the Government, implementing agencies, and the World Bank—that impeded implementation.

60. **Adequate arrangements were made by the Government to facilitate implementation at the state and field levels.** A Project Steering Committee with representatives from the relevant line departments was set up as the apex body for the project. The state-level Project Coordination Unit (PCU) and district Project Implementation Units (PIUs) for all implementing line departments were set up and staffed with competent project team on time and were fully equipped with necessary equipment and facilities. The commitment and leadership of the state government was evident through the attention and support the project received. **However, the project faced funds constraints due to delayed release of funds.** In the initial three years, the bulk of the funds were released in the third and fourth quarters and also closer to the end of the respective quarters. Satisfactory and timely implementation of the phase 1 activities was affected as a result. This was a critical limitation because the project was designed to test the innovative interventions during the phase 1 and design the following phases based on lessons learned.

61. **Qualified SPs for some critical innovative interventions were not readily available in the market leading to delays.** The FPO interventions were affected the most. The entire FPO support package starting from mobilization to full development was originally designed for two years. However, the package was completed in four years on average. In April 2016, the project implementation progress was downgraded to Moderately Unsatisfactory as a result.

62. **APMC market modernization works were affected by internal and external factors.** Severe droughts that occurred three times over the project period reduced potential APMC capacity to meet the project's eligibility criteria in terms of arrival volumes and financial contributions. The droughts also substantially delayed construction time lines as water usage for construction purposes was restricted. In addition, the appraisal procurement and implementation arrangements were unsuitable for some APMCs. The appraisal considered preparation of market modernization designs and plans by the project-appointed SP and procurement by the PIU of the Department of Agriculture Marketing.[15] However, these were perceived by some APMCs—whose marketing committees comprise democratically elected members and which finance substantial shares of the market modernization costs[16]—as mistrust in the APMCs' governing bodies. This led to withdrawal of applications by some APMCs at various stages of implementation. The APMCs' concerns were addressed by allowing their increased participation in implementation but under close supervision and support by the project and the PIU-Agriculture Marketing (AM). Though the arrangements were revised to allow increased participation of APMCs in implementation and the revision facilitated implementation, reaching the target numbers for APMCs was difficult during the remaining time frame.

63. **The first extension of the project closing date for 12 months was too short to support effective planning and implementation of remaining activities.**

[15] The PCU was responsible for coordination of activities implemented by three implementing agencies viz., Departments of Marketing, Agriculture, and Animal Husbandry. Each implementing agency had a designated PIU for the project.
[16] APMCs financed 50 percent of basic infrastructure and 75 percent of productive infrastructure investments.

64. **Project implementation was at times delayed by external factors.** Severe droughts in 2012, 2013, and 2016 had an adverse impact on implementation in multiple ways. Declines in production, for instance, reduced market arrivals, thereby limiting APMCs' ability to meet eligibility criteria for participation in the project and their financial capacity to contribute to the investment costs. It also affected the construction time lines as water usage for construction purposes was restricted. Moreover, the Government took the warehouse storages to mitigate the impacts of droughts on food grain prices, thereby constraining the project's ability to meet the relevant results targets. Poor access to electricity for FPO limited their ability to utilize productive infrastructure at the full capacity. The challenging security situation in the phase 1 districts, which included seven poorest districts with the highest rates of suicides in the country, delayed mobilization works.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

65. The appraisal M&E design had both strengths and shortcomings. The theory of change was clear overall. However, selection of outcome and results indicators and proxies could have been designed better. PDOIs on productivity and market access, for instance, were designed as aggregation of multiple subindicators and proxies making monitoring complex. Supporting IRIs were limited in numbers. The profitability objective was not assigned a clear outcome and results indicators. The design, however, detailed out survey methodologies, including rolling sampling baseline survey method.

M&E Implementation

66. The M&E implementation was satisfactory overall. The RF was restructured to facilitate more accurate and effective M&E. However, the profitability outcome and results indicators remained unassigned. The baseline, MTR, follow-up, and endline surveys were conducted on time, except the baseline for phase 1 activities. The surveys were designed to capture the project's attribution accurately using DID technique, and selection of control groups was adequate and monitoring was systematic. The project also conducted various thematic studies to assess the changes brought by the project and also to support the Government's agriculture marketing reform agenda. The physical and financial reports were prepared timely and supported informed decision making.

M&E Utilization

67. The project adequately monitored the project progress, results, and outcomes. The M&E data guided restructuring, utilization of exchange rate savings, and selection of successful interventions for scaling-up.

Justification of Overall Rating of Quality of M&E

68. The project established a robust M&E system that effectively supported key decisions. However, more adequate monitoring of profitability results and outcomes could have been considered. Overall rating of M&E quality is therefore rated Modest.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

69. **Environmental safeguards.** Throughout the implementation, environmental safeguards performance was satisfactory overall. The project triggered Environmental Assessment (OP 4.01) and Pest Management (OP 4.09) policies. Mitigation actions planned under the Environmental and Social Management Framework (ESMF) were adequately implemented. A qualified environmental expert was in place throughout project implementation who regularly monitored and reported on environmental safeguards compliance. In addition to provisions of ESMF, to address the concerns of 57 RHs located close to rivers, Environmental Management Plans were prepared and implemented. Environmental safeguards resulted in introducing and adopting sustainable agricultural practices, notably in IPNM and management of organic wastes in APMC markets (refer to para 57). The project created awareness on CSA, introduced CSA practices for 12 crops, and prepared and disseminated 'Integrated Climate Smart Agricultural Practices', including in local language.

70. **Social safeguards.** The social safeguard measures in the project were satisfactory overall. Social Safeguard Operational Policies 4.10 and 4.12 were applicable to the project. Accordingly, an Indigenous Peoples' Development Plan and a Resettlement Policy Framework were prepared. Indigenous Peoples' Development Plans were implemented in three districts to promote integrated organic farming with ATMAs support. The project-supported RHs were mostly built on GP lands and in some cases lands were donated by private individuals or taken on long-term lease, for which due processes were followed.

71. **FM.** Overall, the FM arrangements were responsive to implementation requirements. Considering that the project activities were spread across multiple line departments, autonomous agencies, and 33 districts and the wide variety of interventions and stakeholders involved, the project design necessitated a large number of accounting units (about 80). FM risk was mitigated through adequate measures. These included (a) staffing the PCU with qualified government officials and experts including a Chartered Accountant, (b) agreeing on the funds flow and ensuring that accounting for major part of the project expenditures is done through the state's time-tested accounting system, (c) strengthening internal control framework by hiring internal auditors and timely implementation of their key recommendations, (d) laying out clear service standards and time lines for release of funds, and (e) extensive training and capacity-building activities for FM staff. Despite these, the project faced challenges with timely release of funds due to the lack of understanding and flexibility leading to restrictions in the availability of funds. The issue was largely resolved from the year 3 onwards. Nevertheless, the generation and submission of interim unaudited financial reports was regular and timely. The Accountant General of Maharashtra conducted audits of the funds and expenditures of the project. Audits were usually on time, and in the context of the project scope, there were no major findings. The response on audit findings was reasonable, appropriate, and timely.

72. **Procurement.** Procurement arrangements were responsive to implementation requirements. Procurement management risks were mitigated through (a) recruitment of qualified procurement specialists, (b) timely and adequate guidance to procurement officers, and (c) provision of extensive training and capacity-building activities for procurement staff. The project successfully implemented (a) the Systematic Tracking of Exchanges in Procurement system in all implementing agencies and (b) e-procurement using the National Informatic Center (NIC) portal from 2017 in all implementing agencies and 60 APMCs. Generally, the procurement process has been completed well within the bid/proposal

validity period, and awarded contracts were uploaded on the project website and NIC portal. The response and compliance of post procurement review findings were satisfactory, reasonable, and timely.

C. BANK PERFORMANCE

Quality at Entry

73. The World Bank's performance at the appraisal was moderately satisfactory overall. The project design was in alignment with development priorities of the Government and the World Bank. It was informed by the World Bank's analytical study that thoroughly examined institutional, technical, and policy constraints for efficient agriculture marketing system at national and state levels. Through appraisal and negotiations conditions, the preparation effectively ensured creation of enabling policy and regulatory environment for smooth implementation of the project. Preparation of demand assessments to identify readiness of beneficiaries' participation in the project and willingness to make required financial contributions before the project effectiveness was critical for smooth implementation start. The design also considered alternative design options, including, as proposed by the Government, a national project with multistate focus, matching grants and contract farming, and inclusion of dairy and fishery subsectors. The multistate project approach was declined, leading to preparation of the stand-alone projects for the progressive states with strong commitments for reforming extension services toward market-led production focus and agricultural marketing system and readiness for the project implementation. The other design options were rejected for the purpose of simplification. The preparation was also notable for proposing the phased implementation approach to build on the lessons learned from early experiences. Potential risks to the project implementation and development objectives were identified and appropriate mitigation measures were proposed. Appointment of key project staff and selection process for consultants were initiated before negotiations. However, the RF could have been designed better to allow accurate and effective measuring of all results and outcomes. Similarly, potential external factors such as a climate change events, absence of quality service providers could have been considered.

Quality of Supervision

74. The World Bank's supervision quality was Satisfactory overall. The World Bank's supervision was timely. The supervision was particularly notable on several areas. The World Bank task team visited the project frequently beyond the implementation support missions to provide hand-holding support, which was possible because of a country-based team. The task team's proactiveness in dealing with the PDO indicators early on ensured more accurate reporting. Through systematic and thorough monitoring, the supervision identified key implementation constraints on time and alerted the Government together with adequate measures for addressing them. It made strategic decisions on selection of successful interventions for scaling up or scaling down. Compliance with the World Bank's fiduciary and safeguards policies was also effectively monitored and necessary actions were taken on time. The supervision also ensured that the technical team composed of adequate expertise that supported the project management. The task team leadership was also notable in effective facilitation of knowledge sharing through careful selection of suitable projects and countries with relevant experiences and best practices. Finally, the supervision was notable for candid and adequate rating of the project progress. The only limitation of the supervision quality was that it could ensure assigning relevant outcome and results indicators for profitability.

Justification of Overall Rating of Bank Performance

75. The quality of the World Bank performance was on the higher side both at the appraisal and supervision. However, the M&E design had limitations at appraisal, which was not fully addressed during the implementation. Overall rating of the World Bank performance therefore is Satisfactory.

D. RISK TO DEVELOPMENT OUTCOME

76. Project outcomes (for example, access to markets and profitability increases) are linked to the performance of FPOs. However, some FPOs, especially those established under the last phase 3, were still weak at project closing. Without further strengthening and hand-holding, the constrained capacity of these FPOs poses a moderate risk to development outcome.

V. LESSONS AND RECOMMENDATIONS

77. **The project interventions on improving market infrastructure had positive spillover effects on non-project market operators.** According to the MSAMB, improvements in institutional and technical capacities of project APMCs incentivized non-project AMPCs to achieve similar improvements to remain competitive. Similarly, the project generated positive multiplier benefits across sectors through knowledge transfer and knowledge building. The SP that implemented ABPF activities, for instance, applies the knowledge gained under the project to its other services in Maharashtra and other states. Another example is the replication of the FPO model by the BAIF Development Research Foundation in 58 other places in the state.

78. **Crop diversification that is market led and partnered with the private sector is more likely to sustain beyond the project.** At closing, a majority of the contract arrangements that were initiated with the project facilitation remained operational. According to the private sector players, successful partnership between the private sector and FPOs is more likely to sustain beyond project when partnerships based on mutual trust, financial incentives, and maturity of the participating organizations are established.

79. **More tailored and flexible implementation time frame should be considered for projects that are designed for implementation of reform-linked interventions.** As the project experience showed, such projects need additional time for testing and learning processes and may face difficulties with availability of qualified SPs. In this line, the project experience also showed that the piecemeal approach to extension does not support effective planning and implementation.

80. **Continuous consultation and enlisting views of broader groups of beneficiaries are critical for smooth implementation.** The project experience showed that implementation arrangements that worked for some APMCs did not work for others. The project also learned that increased participation of APMCs in the implementation led to smoother implementation.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Increase in average share of farmer in wholesale price for select crops

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase in average share of farmer in wholesale price for select crops	Percentage	0.00 01-Jul-2012	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018
Maize	Percentage	67.63 01-Jul-2012	72.63 31-Dec-2016	72.63 31-Oct-2018	82.01 31-Oct-2018
Chickpeas (gram)	Percentage	61.50 01-Jul-2012	66.20 31-Dec-2016	66.20 31-Oct-2018	87.67 31-Oct-2018
Soybean	Percentage	73.66 01-Jul-2012	78.66 31-Dec-2016	78.66 31-Oct-2018	88.91 31-Oct-2018

Pigeon peas	Percentage	59.81 01-Jul-2012	64.81 31-Dec-2016	64.81 31-Oct-2018	89.93 31-Oct-2018
Onion	Percentage	48.10 01-Jul-2012	53.10 31-Dec-2016	53.10 31-Oct-2018	67.14 31-Oct-2018
Tomato	Percentage	51.14 01-Jul-2012	56.14 31-Dec-2016	56.14 31-Oct-2018	66.61 31-Oct-2018
Mandarin	Percentage	41.42 01-Jul-2012	46.42 31-Dec-2016	46.42 31-Oct-2018	67.67 31-Oct-2018
Banana	Percentage	29.51 01-Jul-2012	34.51 31-Dec-2016	34.51 31-Oct-2018	57.22 31-Oct-2018
Pomegranate	Percentage	34.13 01-Jul-2012	39.13 31-Dec-2016	39.13 31-Oct-2018	66.56 31-Oct-2018

Comments (achievements against targets):

Objective/Outcome: Increase in average share of farmer in retail price for select crops

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase in average share of farmer in retail price for select crops	Percentage	0.00 01-Jul-2012	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018
Soybean	Percentage	62.41 01-Jul-2012	67.41 31-Dec-2016	67.41 31-Oct-2018	87.72 31-Oct-2018
Pigeon Pea	Percentage	50.13 01-Jul-2012	55.13 31-Dec-2016	55.13 31-Oct-2018	84.31 31-Oct-2018
Maize	Percentage	59.31 01-Jul-2012	64.31 31-Dec-2016	64.31 31-Oct-2018	76.95 31-Oct-2018
Mandarin	Percentage	23.36 01-Jul-2012	28.36 31-Dec-2016	28.36 31-Oct-2018	40.54 31-Oct-2018
Chickpeas (gram)	Percentage	50.78 01-Jul-2012	55.78 31-Dec-2016	55.78 31-Oct-2018	81.71 31-Oct-2018
Banana	Percentage	21.80	26.80	26.80	30.59

		01-Jul-2012	31-Dec-2016	31-Oct-2018	31-Oct-2018
Pomegranate	Percentage	17.49 01-Jul-2012	22.49 31-Dec-2016	22.49 31-Oct-2018	45.14 31-Oct-2018
Onions	Percentage	33.76 01-Jul-2012	38.76 31-Dec-2016	38.76 31-Oct-2018	53.67 31-Oct-2018
Tomatoes	Percentage	38.13 01-Jul-2012	43.13 31-Dec-2016	43.13 31-Oct-2018	46.40 31-Oct-2018

Comments (achievements against targets):

Objective/Outcome: Increase in crop productivity for select crops

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increase in crop productivity for select crops	Number	0.00 01-Jul-2012	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018
Chickpeas (gram)	Number	966.00 01-Jul-2012	1111.00 31-Dec-2016	1111.00 31-Oct-2018	1124.00 31-Oct-2018

Soybean	Number	1585.00 01-Jul-2012	1823.00 31-Dec-2016	1823.00 31-Oct-2018	1488.00 31-Oct-2018
Pigeon Pea	Number	760.00 01-Jul-2012	0.00 31-Dec-2016	875.00 31-Oct-2018	821.00 31-Oct-2018
Maize	Number	3014.00 01-Jul-2012	3462.00 31-Dec-2016	3462.00 31-Oct-2018	3503.00 31-Oct-2018
Onion	Number	8778.00 01-Jul-2012	10996.00 31-Dec-2016	10996.00 31-Oct-2018	25944.00 31-Oct-2018
Tomato	Number	11586.00 01-Jul-2012	13326.00 31-Dec-2016	13326.00 31-Oct-2018	23748.00 31-Oct-2018

Comments (achievements against targets):

A.2 Intermediate Results Indicators

Component: Component A. Intensification and Diversification of Market-Led Production

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Percent increase in farmers adopting balanced use of fertilizers	Percentage	0.00 01-Jul-2012	12.00 31-Dec-2016	12.00 31-Oct-2018	9.23 31-Oct-2018
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percent increase in farmers adopting critical irrigation of crops	Percentage	0.00 01-Jul-2012	12.00 31-Dec-2016	12.00 31-Oct-2018	36.07 31-Oct-2018
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percent increase in farmers adopting grading and or sorting	Percentage	0.00 01-Jul-2012	13.00 31-Dec-2016	13.00 31-Oct-2018	73.00 31-Oct-2018
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percent increase in area	Percentage	0.00	13.00	13.00	36.88

under critical irrigation		01-Jul-2012	31-Dec-2016	31-Oct-2018	31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Technologies demonstrated in the project areas (number)	Number	0.00 01-Jul-2012	136.00 31-Dec-2016	136.00 31-Oct-2018	174.00 31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of farmers and agro-entrepreneurs receiving loans after facilitation by ABPF	Number	0.00 01-Jul-2012	1940.00 31-Dec-2016	1940.00 31-Oct-2018	1424.00 31-Oct-2018

Comments (achievements against targets):

Component: Component B. Improving Farmer Access to Markets

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased volume of	Metric ton	18.47	23.56	23.56	23.90

agricultural produce arrivals in Rural Haats (RH)		01-Jul-2012	31-Dec-2016	31-Oct-2018	31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased value of agricultural produce arrivals in Rural Haats (RH)	Amount(USD)	0.06 01-Jul-2012	0.08 31-Dec-2016	0.08 31-Oct-2018	0.11 31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased lease value of Rural Haats (RH)	Amount(USD)	1.83 01-Jul-2012	4.50 31-Dec-2016	4.50 31-Oct-2018	3.17 31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased volume of agricultural produce arrivals in APMC markets in	Metric ton	0.00 27-Aug-2010	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018

Summer season	Metric ton	4432.00 01-Jul-2012	5540.00 31-Dec-2016	5540.00 31-Oct-2018	5715.00 31-Oct-2018
Kharif Season	Metric ton	2489.00 07-Jul-2012	3111.00 31-Dec-2016	3111.00 31-Oct-2018	7898.00 31-Oct-2018
Rabi Season	Metric ton	4660.00 01-Jul-2012	5825.00 31-Dec-2016	5825.00 31-Oct-2018	7122.00 31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased value of agricultural produce arrivals in APMC markets in	Amount(USD)	0.00 01-Jul-2012	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018
Summer Season	Amount(USD)	9.33 01-Jul-2012	11.71 31-Dec-2016	11.71 31-Oct-2018	11.23 31-Oct-2018
Kharif Season	Amount(USD)	3.63 01-Jul-2012	5.09 31-Dec-2016	5.09 31-Oct-2018	21.87 31-Oct-2018

Rabi Season	Amount(USD)	9.62 01-Jul-2012	12.07 31-Dec-2016	12.07 31-Oct-2018	19.57 31-Oct-2018
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of APMCs statewide with functioning and appropriately located electronic market information display (MID)	Number	69.00 01-Jul-2012	219.00 31-Dec-2016	219.00 31-Oct-2018	138.00 31-Oct-2018
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Volume of agricultural produce marketed through FCSC, of which:	Metric ton	0.00 01-Jul-2012	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018
Grain	Metric ton	0.00 01-Jul-2012	50000.00 31-Dec-2016	50000.00 31-Oct-2018	30526.00 31-Oct-2018
Fruits and Vegetables	Metric ton	0.00	200000.00	200000.00	13278.00

		01-Jul-2012	31-Dec-2016	31-Oct-2018	31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Value of agricultural produce marketed through FCSC, of which:	Metric ton	0.00 01-Jul-2012	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018
Grains	Metric ton	0.00 01-Jul-2012	70.00 31-Dec-2016	70.00 31-Oct-2018	86.74 31-Oct-2018
Fruits and Vegetables	Metric ton	0.00 01-Jul-2012	200.00 31-Dec-2016	200.00 31-Oct-2018	12.31 31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Volume of agricultural produce stored under warehouse receipts by	Metric ton	0.00 01-Jul-2012	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018
Farmers	Metric ton	8571.00	100603.00	100603.00	43370.00

		01-Jul-2012	31-Dec-2016	31-Oct-2018	31-Oct-2018
Traders	Metric ton	72301.00 01-Jul-2012	321510.00 31-Dec-2016	321510.00 31-Oct-2018	72809.00 31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Value of loans taken against warehouse receipts by	Metric ton	0.00 01-Jul-2012	0.00 31-Dec-2016	0.00 31-Oct-2018	0.00 31-Oct-2018
Farmers	Metric ton	8.00 01-Jul-2012	142.00 31-Dec-2016	142.00 31-Oct-2018	32.00 31-Oct-2018
Traders	Metric ton	49.00 01-Jul-2012	453.00 31-Dec-2016	453.00 31-Oct-2018	77.00 31-Oct-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of farmers using	Number	0.00	1120.00	1120.00	181.00

electronic spot market in MSWC		01-Jul-2012	31-Dec-2016	31-Oct-2018	31-Oct-2018
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Volume of agricultural produce traded by farmers using electronic spot market in MSWC	Metric ton	0.00 01-Jul-2012	2240.00 31-Dec-2016	2240.00 31-Oct-2018	1324.00 31-Oct-2018
Comments (achievements against targets):					

B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Increase productivity	
Outcome Indicators	1. Increase in productivity of select focus crops - *maize, chickpeas, pigeon pea, soybean, onion, tomato*
Intermediate Results Indicators	1. Percent increase in farmers adopting balanced use of fertilizers 2. Percent increase in farmers adopting critical irrigation of crops 3. Percent increase in area under critical irrigation 4. Technologies demonstrated in the project areas (number)
Key Outputs by Component	1. 36 percent increase in farmers adopting balanced use of fertilizers 2. 319 percent increase in farmers adopting critical irrigation of crops 3. 547 percent increase in area under critical irrigation 4. 174 technologies demonstrated in the project areas
Objective/Outcome 2: Increase profitability	
Outcome Indicators	None
Intermediate Results Indicators	1. Percent increase in farmers adopting sorting and grading practices 2. Number of farmers and agro-entrepreneurs receiving loans after facilitation by ABPF 3. Volume of agricultural produce marketed through FCSC (overlap with PDO 3) 4. Value of agricultural produce marketed through FCSC (overlap with PDO 3) 5. Volume of agricultural produce stored under warehouse receipt (overlap with PDO 3) 6. Value of loans taken against warehouse receipts (overlap with PDO 3)
Key Outputs by Component	1. 162 percent increase in farmers adopting sorting and grading practices 2. 1424 farmers and agro-entrepreneurs received loan 3. Volume of agricultural produce marketed through FCSC (overlap with PDO 3) 4. Value of agricultural produce marketed through FCSC (overlap with PDO 3) 5. 43,370 MT per year of agricultural produce stored under warehouse receipts by farmers (overlap with PDO 3) 6. Rs 77 crore worth of agricultural produce stored under warehouse receipt by farmers (overlap with PDO 3)
Objective/Outcome 3: Increase market access	

Outcome Indicators	1. Increase in average share of farmer in wholesale price for select crops - *maize, chickpeas, soybean, pigeon pea, onions, tomato, mandarin, banana, pomegranate* 2. Increase in average share of farmer in retail price for select crops - *maize, chickpeas, soybean, pigeon pea, onions, tomato, mandarin, banana, pomegranate*
Intermediate Results Indicators	1. Volume of agricultural produce marketed through FCSC (overlap with PDO 2) 2. Value of agricultural produce marketed through FCSC (overlap with PDO 2) 3. Volume of agricultural produce stored under warehouse receipt (overlap with PDO 2) 4. Value of loans taken against warehouse receipts (overlap with PDO 2) 5. Volume of agricultural produce arrivals in Rural Haats (overlap with PDO 2) 6. Value of agricultural produce arrivals in Rural Haats (overlap with PDO 2) 7. Lease value of Rural Haats (overlap with PDO 2) 8. Volume of agricultural produce arrivals in APMC markets 9. Value of agricultural produce arrivals in APMC markets 10. Number of APMCs with functioning and appropriately located electronic market information display 11. Number of farmers using electronic spot market in Maharashtra State Warehousing Corporation (MSWC) 12. Volume of agricultural produce traded by farmers using electronic spot market in MSWC
Key Outputs by Component (linked to the achievement of the Objective/Outcome 3)	1. 43,804 MT per year of agricultural produce marketed through FCSC 2. Rs 99.05 crore per year worth of agricultural produce marketed through FCSC 3. 43,370 MT per year of agricultural produce stored under warehouse receipts by farmers 4. Rs 32 crore worth of agricultural produce stored under warehouse receipt by farmers 5. 23.90 MT per RH per week of agricultural produce arrived in RHs 6. Rs 11 lakh per RH per week worth of agricultural produce arrived in RHs 7. Rs 3.16 lakh per RH per year is the average lease value of RHs 8. 20,735 MT per APMC per month of agricultural produce marketed through APMC 9. Rs 52.67 crore per APMC per month worth of agricultural produce marketed through APMC 10. 138 APMCs have MIDs 11. 181 farmers used electronic spot market in MSWC 12. 1,324 MT per year of agricultural produce traded by farmers using e-spot market in MSWC

C. STATUS OF ACHIEVING OBJECTIVE/OUTCOMES

Maharashtra Agricultural Competitiveness Project

No.	Indicator Name	Unit		Baseline 2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Achievement of target %	Achievement of target status	Data source	Frequency of data collection
	PDO INDICATORS													
1	**Indicator 1:** Average share of farmer in wholesale price for select crops													
A	Soybean	%	Target	n.a	73.66	74.66	75.66	76.66	77.66	78.66	113%	exceeded	External M&E consultancy	Baseline, follow up and end-term survey
			Actual	73.66	76.60	85.58	87.61	87.94	87.50	88.91				
B	Chickpeas (gram)	%	Target	n.a	61.50	62.20	63.20	64.20	65.20	66.20	132%	exceeded		
			Actual	61.50	63.90	79.30	78.97	79.79	81.00	87.67				
C	Pigeon peas	%	Target	n.a	59.81	60.81	61.81	62.81	63.81	64.81	139%	exceeded		
			Actual	59.81	62.00	85.39	87.32	87.38	89.25	89.93				
D	Maize	%	Target	n.a	67.63	68.63	69.63	70.63	71.63	72.63	113%	exceeded		
			Actual	67.63	70.80	80.58	82.08	81.32	83.00	82.01				
E	Onion	%	Target	n.a	48.1	49.1	50.1	51.1	52.1	53.10	126%	exceeded		
			Actual	48.10	40.70	85.39	68.27	65.09	49.61	67.14				
F	Tomato	%	Target	n.a	51.14	52.14	53.14	54.14	55.14	56.14	119%	exceeded		
			Actual	51.14	45.20	43.52	40.09	48.18	52.96	66.61				
G	Mandarin	%	Target	n.a	41.42	42.42	43.42	44.42	45.42	46.42	146%	exceeded		
			Actual	41.42	43.60	39.08	47.78	31.68	59.94	67.67				
H	Banana	%	Target	n.a	29.51	30.51	31.51	32.51	33.51	34.51	166%	exceeded		
			Actual	29.51	30.70	37.80	36.47	35.45	44.03	57.22				
I	Pomegranate	%	Target	n.a	34.13	35.13	36.13	37.13	38.13	39.13	170%	exceeded		
			Actual	34.13	34.30	49.34	63.64	63.14	64.12	66.56				
	Average for all crops	**%**	**Target**	**n.a**	**51.88**	**52.84**	**53.84**	**54.84**	**55.84**	**56.84**	**132%**	exceeded		
			Actual	**51.88**	**51.98**	**65.11**	**65.80**	**64.44**	**67.93**	**74.86**				
2	**Indicator 2:** Average share of farmer in retail price for select crops													
A	Soybean	%	Target		62.41	63.41	64.41	65.41	66.41	67.41	130%	exceeded	External M&E consultancy	Baseline, follow up and end-term survey
			Actual	62.41	67.30	78.80	82.10	81.83	85.06	87.72				
B	Chickpeas (gram)	%	Target		50.78	51.78	52.78	53.78	54.78	55.78	146%	exceeded		
			Actual	50.78	52.80	68.11	71.69	73.44	78.70	81.71				
C	Pigeon Pea	%	Target		50.13	51.13	52.13	53.13	54.13	55.13	117%	exceeded		
			Actual	50.13	52.60	74.05	75.74	77.53	81.14	84.31				
D	Maize	%	Target		59.31	60.31	61.31	62.31	63.31	64.31	120%	exceeded		
			Actual	59.31	60.80	75.71	79.09	79.86	78.93	76.95				
E	Onion	%	Target		33.76	34.76	35.76	36.76	37.76	38.76	111%	exceeded		
			Actual	33.76	26.70	44.68	54.75	48.75	30.03	53.67				
F	Tomatoes	%	Target		38.13	39.13	40.13	41.13	42.13	43.13	108%	exceeded		
			Actual	38.13	29.50	27.89	29.50	39.48	31.37	46.4				
G	Mandarin	%	Target		23.36	24.36	25.36	26.36	27.36	28.36	143%	exceeded		
			Actual	23.36	25.00	29.82	38.42	19.95	37.74	40.54				
H	Banana	%	Target		21.8	22.8	23.8	24.8	25.8	26.80	114%	exceeded		
			Actual	21.80	23.10	27.13	20.22	21.12	26.10	30.59				
I	Pomegranate	%	Target		17.49	18.49	19.49	20.49	21.49	22.49	199%	exceeded		
			Actual	17.49	21.30	37.67	47.96	51.14	43.65	45.14				
	Average for all crops	**%**	**Target**	**n.a**	**39.69**	**40.69**	**41.69**	**42.69**	**43.69**	**44.69**	136%	exceeded		
			Actual	**39.69**	**39.90**	**51.54**	**55.50**	**54.79**	**54.75**	**60.78**				
3	**Indicator Three:** Crop productivity for select crops (**net increase measured through DID**)													
A	Soybean	Kg/ha	Target		1,585	1,334	1,694	1,743	1,774	1,823	194%	exceeded	External M&E consultancy	Baseline, follow up and end-term survey
			Actual	1,585	1,613	1,036	1,397	1,639	1,816	1,488				
B	Chickpeas (gram)	Kg/ha	Target		966	995	1,033	1,062	1,082	1,111	165%	exceeded		
			Actual	966	1,018	696	1,078	1,047	1,115	1,124				
C	Pigeon Pea	Kg/ha	Target		760	783	813	836	852	875	146%	exceeded		
			Actual	760	765	716	986	727	794	821				
D	Maize	Kg/ha	Target		3,014	3,104	3,222	3,311	3,371	3,462	62%	did not achieve		
			Actual	3,014	2,485	2,390	5,340	3,269	3,302	3,503				
E	Onion	Kg/ha	Target		8,778	9,041	9,394	9,657	9,831	10,996	1284%	exceeded		
			Actual	8,778	9,392	7,754	23,939	23,458	24,017	25,944				
F	Tomato	Kg/ha	Target		11,587	11,935	12,400	12,747	12,976	13,326	178%	exceeded		
			Actual	11,586	9,409	12,828	39,234	27,129	33,253	23,748				
	Average for all crops	**Kg/ha**	**Target**	**n.a**	**2,975**	**3,034**	**3,187**	**3,276**	**3,334**	**3,526**	**154%**	**exceeded**		
			Actual	**4,448**	**3,092**	**3,185**	**9,004**	**7,167**	**8,045**	**7,087**				

INTERMEDIATE RESULTS INDICATORS														
4	**Farmers adopting balanced use of fertilizers**													
		%	Target		2	4	6	8	10	12.00	77%	did not achieve	External M&E consultancy	Baseline, follow up and end-term survey
			Actual	---*	6.80	4.31	5.59	4.91	3.03	9.23				
5	**Farmers adopting critical irrigation of crops**													
		%	Target		2	4	6	8	10	12.00	301%	exceeded		
			Actual	---*	8.60	25.31	25.72	23.16	59	36.07				
6	**Farmers adopting grading and or sorting**													
		%	Target		3	5	7	9	11	13.00	562%	exceeded		
			Actual	---*	4.50	26.65	27.38	26.35	68	73				
7	**Area under critical irrigation**													
		%	Target		2	4	6	8	10	13.00	284%	exceeded		
			Actual	---*	5.70	10.56	19.98	20.37	54	36.88				
8	**Technologies demonstrated in the project areas**													
		Number	Target		25	27	29	20	20	136	128%	exceeded	PMIS	Annual
			Actual	0	10	38	103	154	174	174				
9	**Number of farmers and agro- entrepreneurs receiving loans after facilitation by ABPF**													
		Number	Target		0	0	200	620	1280	1940	73%	did not achieve	PMIS	Monthly
			Actual	0.00	15	287	327	327	770	1424				
10	**Increased volume of agricultural produce arrivals in Rural Haats (RH)**													
		MT / RH / Week	Target		18.47	19.2	19.79	20.77	22.02	23.56	101%	exceeded	External M&E consultancy	Monthly (on the first week of the month)
			Actual	18.47	20.14	DNA	DNA	DNA	DNA	23.90				
11	**Increased value of agricultural produce arrivals in Rural Haats**													
		Rs. Cr / RH / Week	Target		0.06	0.07	0.07	0.07	0.07	0.08	138%	exceeded		
			Actual	0.06	0.07	DNA	DNA	DNA	DNA	0.11				
12	**Increased lease value of Rural Haats**													
		Rs. Lakh / RH / Annum	Target		3.61	3.61	3.79	3.9	3.97	4.50	70%	did not achieve	PMIS	Quarterly
			Actual	1.83	2.26	2.22	2.41	3.14	3.16	3.17				
13	**Volume of sales of market transactions in APMC markets during**													
	Summer season (June - September)	MT/ APMC/ Month	Target		4432	4742	4964	5229	5362	5540	103%	exceeded	MSAMB Data Center	Monthly (on the first week of the month)
			Actual	4432	2274	4856	4795	3757	5142	5715				
	Kharif Season (October - January)	MT/ APMC/ Month	Target		2489	2663	2787	2937	3011	3111	254%	exceeded		
			Actual	2489	5278	6081	5512	6896	8621	7898				
	Rabi Season (February - May)	MT/ APMC/ Month	Target		4660	4986	5219	5499	7639	5825	122%	exceeded		
			Actual	4660	4825	5169	7055	9557	8458	7122				
	Annual	MT/ APMC/ Month	Target							14476	143%	exceeded		
			Actual	11581						20735				
14	**Increased value of agricultural produce arrivals in APMC markets during:**													
	Summer Season	Rs.Cr / APMC / Month	Target		9.33	10.09	10.44	11.03	11.29	11.71	96%	largely achieved	MSAMB Data Center	Monthly (on the first week of the month)
			Actual	9.33	13.50	06.81	07.55	8.31	11.19	11.23				
	Kharif Season	Rs.Cr / APMC / Month	Target		3.63	3.88	4.16	4.45	4.76	5.09	430%	exceeded		
			Actual	3.63	3.20	10.82	12.25	18.10	17.47	21.87				
	Rabi Season	Rs.Cr / APMC / Month	Target		9.62	10.33	10.77	11.38	11.64	12.07	162%	exceeded		
			Actual	9.62	12.90	08.30	15.57	24.84	20.78	19.57				
	Annual	Rs.Cr / APMC / Month	Target		9.62	10.33	10.77	11.38	11.64	28.87	215%	exceeded		
			Actual	22.58	12.90	08.30	15.57	24.84	20.78	61.97				

15	**Number of APMCs with functioning and appropriately located electronic market information displays**													
		Number	Target		69	112	219	219	219	219	63%	did not achieve	PMIS	Monthly
			Actual	69	111	43	85	131	134	138				
16	**Volume of agricultural produce marketed through FCSC, of which:**													
	Grain	MT / annum	Target	n.a	0	0	20000	30000	40000	50000	61%	did not achieve	PMIS	Monthly
			Actual	0	0	0	288	1449	DNA	30526				
	Fruits and Vegetables	MT / annum	Target	n.a	0	0	50000	100000	150000	200000	7%	did not achieve		
			Actual	0	0	0	818	723	DNA	13278				
17	**Value of agricultural produce marketed through FCSC, of which:**													
	Grains	Rs.Cr / Annum	Target	n.a	0	0	28	42	56	70.00	124%	exceeded	PMIS	Monthly
			Actual	0.00	0.00	0.00	2.15	8.69	DNA	86.74				
	Fruits and Vegetables	Rs.Cr / Annum	Target	n.a	0	0	50	100	150	200.00	6%	did not achieve		
			Actual	0.00	0.00	0.00	1.92	1.73	DNA	12.31				
18	**Volume of agricultural produce stored under warehouse receipt by**													
	Farmers	MT / annum	Target	n.a	8571	31923	32561	59267	97673	100603	43%	did not achieve	PMIS	Monthly
			Actual	8571	22481	48319	50184	67475	53820	43370				
	Traders	MT / annum	Target	n.a	72301	1167573	120260	216768	357233	321510	23%	did not achieve		
			Actual	72301	82235	166370	142112	118706	90215	72809				
19	**Value of loans taken against warehouse receipts by**													
	Farmers	Rs.Cr / Annum	Target	n.a	8	45	46	84	138	142	23%	did not achieve	PMIS	Monthly
			Actual	8	19	38	36	54	40	32				
	Traders	Rs.Cr / Annum	Target	n.a	49	165	170	306	504	453	17%	did not achieve		
			Actual	49	32	92	100	86	76	77				
20	**Number of farmers using electronic spot market in MSWC**													
		Number	Target	n.a	0	0	170	400	700	1120	16%	did not achieve	PMIS	Monthly
			Actual	0	0	51	92	35	3	181				
21	**Volume of agricultural produce traded by farmers using electronic spot market in MSWC**													
		MT / annum	Target	n.a	0	0	340	800	1400	2240	59%	did not achieve	PMIS	Monthly
			Actual	0	0	397	661	229	37	1324				

Maharashtra Agricultural Competitiveness Project

No.	Indicator Name	Unit		Baseline 2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Achievement of target %	Achievement of target status	Data source	Frequency of data collection
	PDO INDICATORS													
1	**Indicator 1:** Average share of farmer in wholesale price for select crops													
A	Soybean	%	Target	n.a	73.66	74.66	75.66	76.66	77.66	78.66	113%	exceeded	External M&E consultancy	Baseline, follow up and end-term survey
			Actual	73.66	76.60	85.58	87.61	87.94	87.50	88.91				
B	Chickpeas (gram)	%	Target	n.a	61.50	62.20	63.20	64.20	65.20	66.20	132%	exceeded		
			Actual	61.50	63.90	79.30	78.97	79.79	81.00	87.67				
C	Pigeon peas	%	Target	n.a	59.81	60.81	61.81	62.81	63.81	64.81	139%	exceeded		
			Actual	59.81	62.00	85.39	87.32	87.38	89.25	89.93				
D	Maize	%	Target	n.a	67.63	68.63	69.63	70.63	71.63	72.63	113%	exceeded		
			Actual	67.63	70.80	80.58	82.08	81.32	83.00	82.01				
E	Onion	%	Target	n.a	48.1	49.1	50.1	51.1	52.1	53.10	126%	exceeded		
			Actual	48.10	40.70	85.39	68.27	65.09	49.61	67.14				
F	Tomato	%	Target	n.a	51.14	52.14	53.14	54.14	55.14	56.14	119%	exceeded		
			Actual	51.14	45.20	43.52	40.09	48.18	52.96	66.61				
G	Mandarin	%	Target	n.a	41.42	42.42	43.42	44.42	45.42	46.42	146%	exceeded		
			Actual	41.42	43.60	39.08	47.78	31.68	59.94	67.67				
H	Banana	%	Target	n.a	29.51	30.51	31.51	32.51	33.51	34.51	166%	exceeded		
			Actual	29.51	30.70	37.80	36.47	35.45	44.03	57.22				
I	Pomegranate	%	Target	n.a	34.13	35.13	36.13	37.13	38.13	39.13	170%	exceeded		
			Actual	34.13	34.30	49.34	63.64	63.14	64.12	66.56				
	Average for all crops	**%**	**Target**	**n.a**	**51.88**	**52.84**	**53.84**	**54.84**	**55.84**	**56.84**	**132%**	exceeded		
			Actual	**51.88**	**51.98**	**65.11**	**65.80**	**64.44**	**67.93**	**74.86**				
2	**Indicator 2:** Average share of farmer in retail price for select crops													
A	Soybean	%	Target		62.41	63.41	64.41	65.41	66.41	67.41	130%	exceeded	External M&E consultancy	Baseline, follow up and end-term survey
			Actual	62.41	67.30	78.80	82.10	81.83	85.06	87.72				
B	Chickpeas (gram)	%	Target		50.78	51.78	52.78	53.78	54.78	55.78	146%	exceeded		
			Actual	50.78	52.80	68.11	71.69	73.44	78.70	81.71				
C	Pigeon Pea	%	Target		50.13	51.13	52.13	53.13	54.13	55.13	117%	exceeded		
			Actual	50.13	52.60	74.05	75.74	77.53	81.14	84.31				
D	Maize	%	Target		59.31	60.31	61.31	62.31	63.31	64.31	120%	exceeded		
			Actual	59.31	60.80	75.71	79.09	79.86	78.93	76.95				
E	Onion	%	Target		33.76	34.76	35.76	36.76	37.76	38.76	111%	exceeded		
			Actual	33.76	26.70	44.68	54.75	48.75	30.03	53.67				
F	Tomatoes	%	Target		38.13	39.13	40.13	41.13	42.13	43.13	108%	exceeded		
			Actual	38.13	29.50	27.89	29.50	39.48	31.37	46.4				
G	Mandarin	%	Target		23.36	24.36	25.36	26.36	27.36	28.36	143%	exceeded		
			Actual	23.36	25.00	29.82	38.42	19.95	37.74	40.54				
H	Banana	%	Target		21.8	22.8	23.8	24.8	25.8	26.80	114%	exceeded		
			Actual	21.80	23.10	27.13	20.22	21.12	26.10	30.59				
I	Pomegranate	%	Target		17.49	18.49	19.49	20.49	21.49	22.49	199%	exceeded		
			Actual	17.49	21.30	37.67	47.96	51.14	43.65	45.14				
	Average for all crops	**%**	**Target**	**n.a**	**39.69**	**40.69**	**41.69**	**42.69**	**43.69**	**44.69**	136%	exceeded		
			Actual	**39.69**	**39.90**	**51.54**	**55.50**	**54.79**	**54.75**	**60.78**				
3	**Indicator Three:** Crop productivity for select crops													
A	Soybean	Kg/ha	Target		1,585	1,334	1,694	1,743	1,774	1,823	194%	exceeded	External M&E consultancy	Baseline, follow up and end-term survey
			Actual	1,585	1,613	1,036	1,397	1,639	1,816	1,488				
B	Chickpeas (gram)	Kg/ha	Target		966	995	1,033	1,062	1,082	1,111	165%	exceeded		
			Actual	966	1,018	696	1,078	1,047	1,115	1,124				
C	Pigeon Pea	Kg/ha	Target		760	783	813	836	852	875	146%	exceeded		
			Actual	760	765	716	986	727	794	821				
D	Maize	Kg/ha	Target		3,014	3,104	3,222	3,311	3,371	3,462	62%	did not achieve		
			Actual	3,014	2,485	2,390	5,340	3,269	3,302	3,503				
E	Onion	Kg/ha	Target		8,778	9,041	9,394	9,657	9,831	10,996	1284%	exceeded		
			Actual	8,778	9,392	7,754	23,939	23,458	24,017	25,944				
F	Tomato	Kg/ha	Target		11,587	11,935	12,400	12,747	12,976	13,326	178%	exceeded		
			Actual	11,586	9,409	12,828	39,234	27,129	33,253	23,748				
	Average for all crops	**Kg/ha**	**Target**	**n.a**	**2,975**	**3,034**	**3,187**	**3,276**	**3,334**	**3,526**	**154%**	**exceeded**		
			Actual	**4,448**	**3,092**	**3,185**	**9,004**	**7,167**	**8,045**	**7,087**				

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Supervision/ICR	
Manivannan Pathy	Task Team Leader(s)
Heenaben Yatin Doshi	Procurement Specialist(s)
Tanuj Mathur	FM Specialist
Mridula Singh	Social Specialist
Anupam Joshi	Environmental Specialist
Abhishek Pruthi	FM Consultant
Adarsh Kumar	Agribusiness Specialist
Dina Umali-Deininger	Practice Manager
Elliot Wamboka Mghenyi	Agriculture Economist
Jacqueline Julian	Agriculture Analyst
Jolly Barooah	Consultant
Juan Carlos Alvarez	Legal Counsel
Kalesh Kumar	Procurement Specialist
Leena Malhotra	Program Assistant
Martien van Nieuwkoop	Director
Mona Sur	Manager Operations
Papia Bhattachaarji	FM Specialist
Ravishankar Natarajan	Consultant
Rohit Gawri	IT Officer, Client Services
Samik Sundar Das	Rural Development Specialist
Sarita Rana	Operations Analyst
Saumya Srivastava	Consultant
Shankar Narayanan	Social Development Specialist
Shashank Ojha	Digital Development Specialist

Name	Role
Helen Leitch	FAO Consultant - Livestock Specialist
Kunduz Masylkanova	FAO Consultant - Economist
Mustaqar Rahman	FAO - Operations Specialist
Paul Sidhu	Consultant - Agriculturist
Severin Kodderitzsch	Retired as Practice Manager

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY10	27.121	237,931.73
FY11	15.178	47,463.59
Total	**42.30**	**285,395.32**
Supervision/ICR		
FY10	3.150	5,990.76
FY11	25.412	81,735.97
FY12	24.812	92,764.15
FY13	28.422	117,389.77
FY14	17.944	86,624.77
FY15	12.507	63,851.90
FY16	13.397	45,150.98
FY17	17.522	90,974.67
FY18	18.701	101,986.29
FY19	15.899	92,825.01
Total	**177.77**	**779,294.27**

ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$, millions)	Actual at Project Closing (US$, millions)	Percentage of Approval (%)
Component A : Intensification and Diversification of Market-led Production	32.40	26.32	81.2
Component B : Improving Farmer Access to Markets	106.50	77.09	72.4
Component C : Project Management, Learning and Adjusting	14.10	13.80	97.9
Total	**153.00**	**117.21**	**76.6**

ANNEX 4. EFFICIENCY ANALYSIS

Appraisal Economic and Financial Analysis

1. **Methodology and assumption.** At appraisal, the economic and financial feasibility of the project was assessed through the cost-benefit analysis. The analysis assessed the benefits generated from project investments in intensifying and diversifying market-led production and improving farmer access to markets. Major sources of expected benefits from the project interventions were grouped under market-led production-related benefits and market access improvement-related benefits. Results achieved by the World Bank's National Agricultural Technology Project (NATP) in Maharashtra were used as basis for key benefit assumptions.

2. **Project costs and benefits were estimated in 2010 prices.** Financial prices were converted into economic values by removing taxes and subsidies accounting for 11 percent of project costs and by adjusting the benefit flows with appropriate conversion factors based on the import/export parity prices for the internationally traded inputs and outputs and standard conversion factor at 0.90 for others. Conversion of financial labor wages into economic values is not mentioned. Benefits were estimated for a period of 20 years at the OCC at 12 percent.

3. **Benefits.** Intensification and diversification of major production systems in the catchment areas of the improved, modernized, and expanded market infrastructure covering 124 markets, 300 RHs, 400 FCSCs, and 40 MSWCs were projected to generate benefits through incremental crop productivity by 15 percent, crop diversification by 10 percent, cropping intensity by 10 percent, and adoption of improved technologies and practices at 40 percent during the project period. Annual incremental financial benefits from intensification and diversification were estimated at Rs 371 million.

4. **Improved farmer access to markets was to be ensured through alternative market channel development and modernizing existing markets.** The development of markets with expanded infrastructure and improved access for producers to market opportunities were expected to generate benefits from reduced spoilage, transaction and transport costs, competitive price realization, increased market arrivals, and reduced risk for small farmers. The analysis projected that market arrivals in RHs would increase by about two-thirds by the end of project implementation. Similarly, it was envisaged that common interest farmer groups would be mobilized covering grains and horticulture, to establish and operate 400 commodity-specific FCSCs in the collection and trading of on-farm produce as well as agricultural inputs in the catchment areas of the modernized wholesale markets. These FCSCs were expected to market 25 percent of their marketed surplus after cleaning/grading in the improved APMCs. Over time, these FCSCs were expected to sell 35 percent through spot sales and 40 percent through future sales by taking advantage of their link with the improved warehouse and APMCs. Around 200 food grain FCSCs were expected to enable the farmer members to access warehouse financing and access e-spot trading in the national spot exchange.

5. In case of modernized wholesale markets, that is, APMCs with upgraded basic and productive infrastructure facilities, the major sources of incremental benefits were expected to be increased market arrivals by at least 2 percent, reduced spoilage, and efficient transaction, transport, product handling and utilization of productive infrastructure in the improved market yards due to product aggregation by

farmer groups. Similarly, in case of livestock and SRMs, the major sources of benefits were considered as increased market arrivals (5 percent for LSMs and 2 percent for SRMs) and increased price realization (5 percent in LSMs and 10 percent in SRMs). Annual incremental financial benefits generated by promoting alternative markets through RHs, FCSCs, and MSWCs, at full project development, were estimated at Rs 309 million, and annual incremental benefits generated by the modernization of 122 existing markets were estimated at Rs 945 million.

6. **Costs.** Estimated total actual cost of the project was Rs 708.20 crore, inclusive of the Government financing and beneficiary contributions. The analysis accounted for both investment and recurrent costs during the implementation period while need-based recurrent maintenance costs accounted for were projected to sustain the project interventions thereafter.

7. **Results.** When all project costs are considered, overall project's ERR was estimated at 19.4 percent with economic ENPV of Rs 2,007 million. Component-wise, the estimated ERRs were 24.5 percent for intensification and diversification of market-led production, 20.4 percent for promoting alternative markets, and 24.6 percent for modernizing existing markets.

8. The overall project financial rate of return (FRR) was estimated at 18.3 percent with financial net present value (FNPV) of Rs 1,780 million. Annual incremental financial returns from the project investments at the full project development were projected at Rs 1,625 million, contributed by market-led production (23 percent) and improved farmer access to markets (77 percent). The results are summarized in table 4.1.

Table 4.1. Summary of Appraisal Financial and Economic Results

	ERR (%)	ENPV, Rs million	FRR (%)	FNPV, Rs million
Intensification and diversification of market-led production	24.5	519	23.7	541
Promoting alternative markets	20.4	467	21.9	556
Modernizing existing markets	24.6	1,779	22.9	1,528
Market-led production and improved farmer access to markets	23.8	2,764	22.8	2,625
Project as a whole, including entire project costs	19.4	2,007	18.3	1,780

9. **Sensitivity tests and risk analysis** concluded that the project would be able to absorb substantial negative impacts and is yet to generate robust ERRs. Under various sensitivity scenarios, including 20 percent increase in costs, or 20 percent decrease in benefits, both occurring independently or together, or delay in implementation by one to two years, the ERRs were expected to remain above 12 percent. The risk analysis, which was performed by simulating the distribution of critical risk variables by considering 20 percent increase in costs and 20 percent decrease in benefits with their combined impact on projected outcomes, reached the same conclusion.

ICR Economic Efficiency Analysis

10. **Methodology and key assumptions.** The appraisal economic and financial analysis was not available in an Excel spreadsheet to support preparation of the ICR economic efficiency analysis. Therefore, the ICR was prepared anew following the appraisal economic and financial analysis

methodology, using actual costs and benefits, updating post-project costs and benefit assumptions. The project progress data were used for actual physical and financial progress and implementation time lines. Baseline and results assessment survey data and findings of thematic studies were used for assessing benefits.

11. The benefits were estimated for 20 years, exclusive of project implementation period, which correspond to technical life of modernized market infrastructures, if adequate management, operation, and maintenance is provided, and at 12 percent OCC. However, the benefit accumulation phase for market-led production interventions was assumed to be 10 years. As the appraisal economic and financial analysis was unavailable in an Excel spreadsheet, reassessing the returns in 2010 prices was impossible. Hence, the ICR assessed the returns in 2018 prices. The intervention-specific assumptions will be discussed in relevant paragraphs below.

12. **Beneficiaries.** The project benefited directly around 1.73 million farmers, 61,700 traders, 1,600 officials of line departments, and 8,615 market functionaries. Around 2.8 million consumers of agricultural produce indirectly benefited from the project interventions.

13. **Benefits.** The project interventions generated benefits from multiple sources. Transfer of knowledge on improved farm practices, technology, and market intelligence led to substantial increases in crop and goat productivity. Diversification toward crops that market demands and from crops toward goat production, increased intensification, economies of scale through aggregated purchase of inputs and sales of outputs, adoption of post-harvest technologies, and adjusting of production and market choices and time lines as per the market forecasts led to impressive increases in profitability. Improved access to markets through use of alternative marketing options and improving efficiency of existing wholesale and periodic rural markets led to increased shares of farmers in wholesale and retail markets and reduced marketing costs and losses.

14. **Productivity increases.** The project investments in market-led production resulted in net crop productivity increases—measured through DiD—by 23 percent on average for target crops against the appraisal projection of 15 percent (table 4.2). However, crop-wise and value-wise productivity changes were mixed. Crop-wise, net yield increases for four out of six crops were higher than projection, with 22 percent for pigeon pea, 25 percent for chickpea, 29 percent for soybean, and 193 percent for onion, whereas maize yield increased by 9 percent only. Due to lack of the baseline value for the control group, net changes to tomato yields could not be assessed. However, in the treatment group, the increase over baseline value was substantial at 105 percent.

15. However, productivity changes were not always toward increases. At closing, soybean yields, for instance, were lower than baseline values both in the treatment and control groups. However, the decline was substantially higher in the control group at 35 percent against 6 percent in the treatment group. A similar trend was observed for pigeon pea and chickpeas. While yields in the control group declined by 8 percent for chickpea and 14 percent for pigeon pea, respective yields in the treatment group increased by 16 percent and 6 percent. Deterioration of existing varieties of seeds for soybean, pigeon pea, and chickpeas as well as severe droughts that affected rabi crops were key contributing factors. The project interventions therefore were able to either increase yields marginally or halt drastic declines in these crops. The analysis assumed that the current yields both in the treatment and control groups would remain constant in the post-project situation.

Table 4.2. Summary of Crop Productivity Increases

	Yields (kg/ha)					Treatment: Change over Baseline (%)	Control: Change over Baseline (%)	DID (%)
	Baseline		Endline		Target			
	Project	Control	Project	Control	Project			
Soybean	1,585	1,567	1,488	1,015	1,823	−6	−35	29
Chickpeas	966	1,049	1,124	960	1,111	16	−8	25
Pigeon pea	760	788	821	677	875	8	−14	22
Maize	3,014	2,733	3,503	2,923	3,462	16	7	9
Onion	8,778	13,629	25,944	14,035	10,996	196	3	193
Tomato	11,587	n.a.	23,748	25,237	13,326	105	n.a.	n.a.
Average	4,448	3,953	9,438	7,475	5,266	112	89	23

Source: Baseline, annual, and endline surveys conducted by external M&E consultancies.

16. **Goat productivity,** assessed through liveweight of animal at the time of sale, increased from 5.5 percent (Common Interest Group (CIG) model) to 15 percent (Higher Value Goat (HVG) model).[17] The CIG model, which targeted 150 Small Ruminant Federations (SRFs) with 2,250 members, focused on productivity increases through adoption of improved buck, feeding, deworming, and housing management practices to decrease mortality and increase kidding rates and liveweight. The HVG model, which supported 1,750 farmers, focused on profitability increases through diversification from crop to fodder production and adoption of improved practices listed above. The project established 397 animal health camps (AHCs) and mobilized 750 LLWs to support livestock farmers. In the CIG model, adoption of improved animal husbandry, disease control, and feeding practices resulted in 1 percent increases in kidding rates and 20 percent reduction in mortality directly contributing to productivity increases. In the HVG model, the kidding rate increased by 25 percent and mortality rate decreased by 53 percent.

17. **Profitability increases.** The project formed around 12,700 CIGs and 406 FCSCs for aggregated purchases of inputs and sales of outputs. Around 11,500 demos, training, and exposure visits were organized. Through the ABPF, 178 BSMs and 48,027 PPP demos were conducted,[18] with the participation of 25 leading inputs suppliers and procurement companies. These interventions resulted in crop diversification on more than 17,800 ha toward baby corn, potato, bitter gourd, tomato, onion, chilly, pomegranate, pulses, groundnut, and maize for feed. Cropping intensify increased by 16 percent. Around 37,200 MT of produce was traded through FCSCs, while additional 55,100 MT of produce was marketed through BSMs. A total of 171 FCSCs supplied agricultural inputs worth Rs 38.6 crore to member farmers. Grading and sorting practices were adopted by 72 percent of target farmers, whereas knowledge diffusion from the target to non-target farmers reached 1:9. A total of 98 agro-entrepreneurs—that were supported with grain and fruits cleaning, grading and processing units—processed around 11,030 MT of grains, fruits, and feed with the total turnover of Rs 137 crore.

18. According to the impact studies, individually, intensification and diversification interventions increased farm profits by 45 percent on average for all crops. Aggregated marketing through FPOs increased profitability of marketed shares of produce by 45 percent by reducing input costs by 7 percent and increasing price realization by 22 percent. Adoption of sorting and grading practices increased farm

[17] These are net changes over the control group measured through the DID technique.
[18] The BSMs and PPP demos were organized through the ABPF.

profits by 15 percent on average for all crops, vegetables and fruits (table 4.3). Direct marketing links contributed by profitability increases through increased net price realization by 38 percent and reduced post-harvest losses and wastes by 76 percent. For example, marketing in RH increased farm profits by 34 percent. All alternative marketing channels led to up to 5 percent higher net price realization and up to 78 percent reduction in losses and wastes. Price risk management through the NWR financing increased farm profits by 5 percent on average for key commodities. Improved price realization at APMCs increased farm profits by 10 percent. Crop-wise, profitability increases ranged from 10 percent (onion) to 312 percent (maize) with an average of 165 percent for all target crops).

Table 4.3. Costs and Returns to Intensification and Diversification of Production

Crops	Without Project		With Project		Incremental	
	Production and Marketing Cost (Rs/ha)	Net Income (Rs/ha)	Production and Marketing Cost (Rs/ha)	Net Income (Rs/ha)	Costs (%)	Net Income (%)
Maize	35,456	2,425	39,266	2,940	−8%	1%
Chickpea	30,112	3,291	32,783	6,436	−8%	65%
Pigeon pea	27,159	3,584	26,193	9,541	−13%	139%
Soybean	30,338	2,209	28,789	13,594	−19%	426%
Onion	86,937	148,444	82,676	167,691	−11%	6%
Tomato	91,299	132,869	94,762	174,830	−10%	14%
Average per kg	5.94	5.77	5.38	6.62	−9%	15%

19. Profitability in goat production—through diversification from crop production, aggregated sales, and selling by weighing—increased by 500 percent on average. The HVG model successfully demonstrated that, while carrying lower marketing, disease and climate risks, growing fodder for goat production generates net profits of nearly Rs 135,000 per ha.[19] This is five times higher than average net profits for crops such as cotton, sugarcane, and soybean. The successful demo results resulted in expansion of land allocation for fodder production by 122.5 percent. A total of 25 percent of farmers exposed to the model adopted the practice.

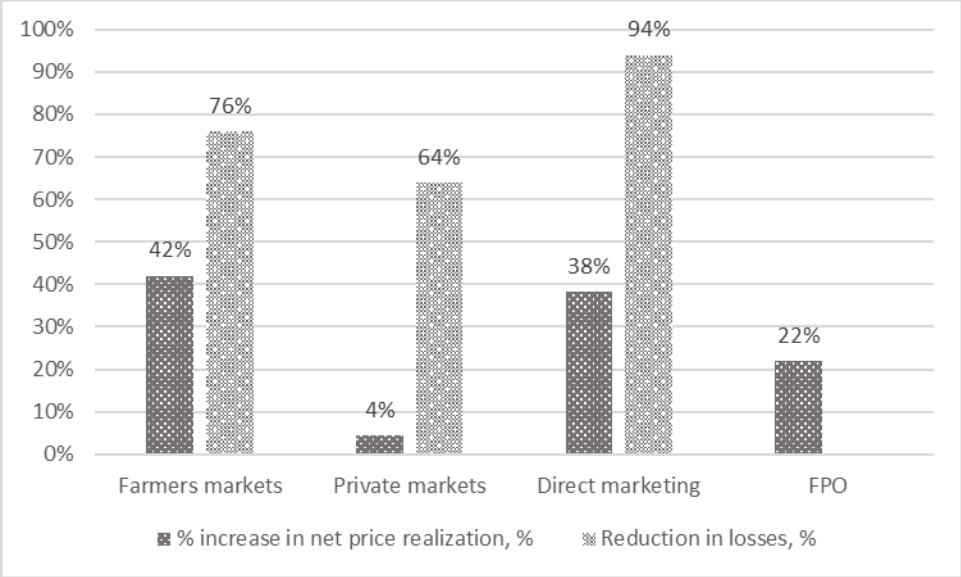
20. **ABPF.** Through the ABPF, the project established around 1,836 agro-enterprises, including 1,332 enterprises supported under the BDS, 98 enterprises supported through the EDP, and 406 FPOs. The enterprises were supported with development of business proposals and facilitation of their access to capital investment and working capital loans from commercial banks and government programs. The ABPF results survey found that a total of 6,577 full-time equivalent jobs, including 28 percent to women, were supported by the 1,065 agribusiness enterprises promoted under the project. Around 62 percent of the respondent enterprises witnessed 12–25 percent increase in their annual sale revenues over the 2018.

21. **Improved market access.** As shown in figure 4.1, these interventions in alternative marketing options led to the following results: (a) the farmers received 4.4 percent higher prices by selling their produce in private markets and had 64 percent lesser losses, (b) aggregated marketing through FPO/FCSC reduced cost of production by 7 percent at the farmer level and increased price realization by 22 percent,

[19] The PwC estimate of profit per ha per goat is Rs 134,480 based on 47 females and 2 males and 53 kids per ha.

(c) marketing through farmer markets increased net price realization for major crops by 42 percent and reduced losses by 76 percent, and (d) marketing through the NWR financing increased price realization for farmers by 5 percent on average and generated incremental monthly net profit of Rs 32.2 per MT of quantity stored for 112 warehouses with actual storage utilization at around 688,550 MT over the project period (not presented in the figure 4.1).

Figure 4.1. Impact of Alternative Marketing Options on Prices and Losses



Source: Project M&E data.

22. **Reforming existing regulated wholesale markets.** The project successfully facilitated several key reform-linked activities, including (a) separation of the role of the state regulator of agriculture marketing from the role of developer of the regulated wholesale markets, (b) removal of distance restrictions from the existing regulated wholesale market and the location of future private markets, (c) introduction of new model bylaws for regulated wholesale markets to improve the markets' governance, (d) adoption of new, uniform accounting standards for regulated wholesale markets to improve transparency and comparability of wholesale markets, (e) piloting of CAS for improved price discovery, and (f) piloting of e-procurement for enhanced efficiency of APMC procurement processes. The project also modernized 81 APMC markets, 24 LSMs, and 472 RHs.

23. The project investments, according to the results surveys, substantially increased the volumes of arrivals of agricultural produce and their values in APMC and RH markets. The annual volumes of market transactions and annual values of agricultural produce arrivals in APMCs increased by 79 percent and 175 percent over baseline values, whereas the volumes of arrivals of agricultural produce and their values in RHs increased by 29 percent and 83 percent, respectively. At the farmer level, improved market efficiency resulted in net increases in the average share of farmer in retail price by 4.7 percent and in wholesale price by 5.04 percent measured through the DID technique (table 4.4).

Table 4.4. Changes to Average Share of Farmers in Retail Prices

	Average Share of Farmers in Prices (%)					Treatment: Change over Baseline (%)	Control: Change over Baseline (%)	DID (%)
	Baseline		Endline		Target			
	Project	Control	Project	Control	Project			
Average Share of Farmers in Retail Price (%)								
Soybean	62.41	62.70	81.71	85.37	67.41	19.30	22.67	(3.37)
Chickpea	50.78	51.40	81.71	79.04	55.78	30.93	27.64	3.29
Pigeon pea	50.13	49.50	84.31	82.41	55.13	34.18	32.91	1.27
Maize	59.31	65.90	76.95	77.60	64.31	17.64	11.70	5.94
Onion	33.76	26.10	53.67	46.58	38.76	19.91	20.48	(0.57)
Tomato	38.13	n.a	46.40	43.97	43.13	8.27	n.a	n.a
Mandarin	23.36	21.10	40.54	37.30	28.36	17.18	16.20	0.98
Banana	21.80	21.90	30.59	29.77	26.80	8.79	7.87	0.92
Pomegranate	17.49	n.a	45.14	43.65	22.49	27.65	n.a	n.a
Average	39.69	42.66	60.11	58.41	44.69	20.43	15.75	4.67
Average Share of Farmers in Wholesale Price (%)								
Soybean	73.66	73.30	87.67	86.53	78.66	14.01	13.23	0.78
Chickpea	61.50	62.30	89.93	84.80	66.20	28.43	22.50	5.93
Pigeon pea	59.81	60.70	89.93	87.90	64.81	30.12	27.20	2.92
Maize	67.63	75.30	82.01	82.71	72.63	14.38	7.41	6.97
Onion	48.10	37.20	67.14	58.27	53.10	19.04	21.07	(2.03)
Tomato	51.14	n.a	66.61	63.12	56.14	15.47	n.a	n.a
Mandarin	41.42	37.40	67.67	62.26	46.42	26.25	24.86	1.39
Banana	29.51	29.60	57.22	55.68	34.51	27.71	26.08	1.63
Pomegranate	34.13	n.a	66.56	64.37	39.13	32.43	n.a	n.a
Average	51.88	53.69	74.97	71.74	56.84	23.09	18.05	5.04

Source: Baseline and endline surveys conducted by external M&E consultancies.

24. At the APMC level, increased arrivals generated net incremental returns at around Rs 172 million for food grain and vegetable and fruit APMCs and Rs 20 million for livestock APMCs. At the RH level, the increased arrivals generated net returns at Rs 5,850 per MT for RHs and Rs 220 million for all RHs.

25. **Unquantified benefits.** The project investments in CSA practices and solid waste management practices were not accounted in the analysis due to lack of required data. According to the AHD, AHCs also contributed to 17 percent increases in milk productivity in dairy cows, which was not accounted for. Similarly, spillover benefits to reform-linked activities and market modernization activities, which contributed to efficiency improvements in non-project markets by increasing competition, were also unaccounted. The latter interventions also resulted in improved investments choices by the regulated markets from non-productive toward projective investments. Incremental returns to this spillover benefits were also excluded.

26. **Costs.** The actual total project cost—inclusive of contingencies, taxes, and beneficiary contributions and exclusive of investments of private sector in private agricultural markets and lending by commercial banks in warehouse receipts and agro-entrepreneurs—is estimated at Rs 753.49 crore

(US$117.21 million). Component-wise distribution of cost was the following: (a) market-led agricultural technology transfer at Rs 166.19 crore (US$26.32 million), (b) improving farmers access to markets at Rs 501.23 crore (US$77.09 million), and (c) project management at Rs 86.07 crore (US$13.80 million). It should be noted that the project had savings of 17 percent in IDA lending due to the depreciation of the rupee after deduction of parts of these savings used for scaling up key interventions that produced satisfactory results.

27. **Financial analysis and results.** At the farm household level, the project interventions generated incremental net income per household on average (simple) at Rs 12,100.29. The intervention-wise and project-level results are summarized in table 4.5. The ICR estimated substantially higher ERR for market-led production at 31.4 percent against the projected 24.5 percent. Scaling-up of project interventions on market-led production interventions and substantially higher adoption of improved practices and technologies were key contributing factors to this. The ICR ERR for the investments in alternative marketing options at 21.3 percent was negligibly higher than the appraisal value at 20.4 percent. In contrast, the ICR FRR for modernization of existing markets was lower than appraisal projection primarily due to modernization of 81 markets against the target of 100 markets and due to implementation delays. Lower-than-projected benefits to modernization of existing markets led to lower FRR for the overall project at 17.9 percent against the appraisal value of 18.3 percent.

28. **Economic analysis and results.** The project investments in market-led production and alternative marketing options are estimated to generate higher-than-appraisal projected ERR at 31.4 percent and 21.3 percent, respectively. The ICR-estimated ERR for modernizing existing markets of 19.1 percent was lower than the appraisal ERR of 24.6 percent due to combination of lesser-than-projected scopes of markets being modernized and implementation delays. The ICR-estimated ERR for combination of market-led production and improved market access at 22.7 percent is negligibly lower than the appraisal ERR of 23.8 percent. The ERR for the project as a whole was estimated at 18.8 percent, which is also negligibly lower than the appraisal estimate at 19.4 percent.

29. The appraisal and ICR estimated economic and financial results are summarized in table 4.5.

Table 4.5. Summary of Appraisal and ICR Economic and Financial Results

	Appraisal				ICR			
	ERR (%)	ENPV, Rs million	FRR (%)	FNPV, Rs million	ERR (%)	ENPV, Rs million	FRR (%)	FNPV, Rs million
Market-led production	24.5	519	23.7	541	31.4	2,421	23.6	1,642
Alternative market options	20.4	467	21.9	556	21.3	5,443	22.1	431
Modernizing existing markets	24.6	1,779	22.9	1,528	19.1	1,537	18.5	1,375
Market-led production and market access	23.8	2,764	22.8	2,625	22.7	7,864	21.4	7,322
Overall project as, including entire project costs	19.4	2,007	18.3	1,780	18.8	5,925	17.9	5,382

ICR Design and Administrative Efficiency

30. A combination of design, administrative, and external factors delayed the project implementation. The FPO formation and strengthening was delayed due to unavailability of qualified SPs and droughts. Modernization of APMC markets was delayed due to a combination of droughts and unsuitability of the appraisal implementation arrangements. Livestock activities were delayed due to limited implementation capacity, unavailability of breeding bucks in the market, and delayed decision making by the AHD.

31. Implementation delays required cumulative extension of the project closing date by 22 months. The extension had a mixed effect on efficiency. Benefits realization was delayed. However, the extension made scaling-up of successful key interventions and satisfactory completion of critical innovative activities and at no additional cost possible. Interventions with highest results—such as market-led production activities, HVG model, and market modernization—were scaled up, generating substantially higher-than-projected benefit scopes. Despite the delays, the project implementation cost remained below the appraisal estimates. Moreover, exchange rate savings contributed to spending 17 percent IDA credit.

ICR Efficiency Analysis

32. Despite the cumulative 22-month extension, the project successfully generated benefit scopes that closely match the appraisal projections. The ERR for the project as a whole was estimated at 18.8 percent, which is negligibly lower than the appraisal estimated ERR of 19.4 percent. A combination of factors contributed to achieving comparable benefits: (a) higher-than-projected scopes for intensification and diversification interventions, (b) higher-than-projected increases in productivity and profitability for both crops and goats, (c) arrivals in 81 APMC markets exceeding arrivals projected for 100 APMC markets, (d) successful interventions scaled for exchange rate savings, and (e) project completion for around 17 percent lesser IDA lending owing to exchange rate gains. The project's efficiency is therefore rated Substantial.

ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

1. Agriculture and allied sector play a significant role in the socio-economic development of the State, as about 58 percent of the state's population lives in rural areas, most of whom are dependent on agriculture in some way for their livelihoods. The Government of Maharashtra has always been on the task of improving the agriculture and allied sectors in the State and has taken up many programs for development of these sectors. One such initiative was the World Bank financed Maharashtra Agricultural Competitiveness Project (MACP), which was taken up during the period 2010-2018. That project had laid down the foundation of a market led production and increasing farmers access to markets in the State.

Project Objectives and Components

2. The project development objective (PDO) is to increase the productivity, profitability, and market access of the farming community in Maharashtra. This would be achieved by strengthening farmers' capacity through technical knowledge, market intelligence, and market networks to support diversification and intensification of agriculture production aimed at responding to market demand. Farmers will also be assisted through farmer organizations, alternative market channels developed outside of regulated markets, and improved services provided by modernizing the promising traditional wholesale markets.

3. To achieve these objectives the Project supported a number of activities under two components viz. (a) Intensification and Diversification of Market-Led Production; and (b) Improving Farmer Access to Markets.

Project Design

4. The principal objectives of the Project, and the size and scope of the Project was well thought out and focused on the objectives. Though the project design was not altered, some of the components and activities thereof were modified suitably during the course of the project.

5. The community procurement model has been a great success and brought a paradigm shift in managing community involved programs of the project. This has created a vivid sense of ownership of the assets amongst the farmers and these assets were put to more productive use by the farmers.

Project Appraisal

6. The Developmental Objectives were not changed during the life of the project. However, the minor changes that were affected in the scope, size and small operational modalities of some of the programs like Modernization of Rural Haats, APMCs, LSMs; Produce Aggregation and sale through Producer Associations; EDP which were essential and adequate. Similarly, it was also logical to drop the sub-component of Market Information Services - SMS Service and sub-component of Introducing e-Marketing Platforms.

Project Implementation

7. Under Component A1.2 preparation and implementation of Production and Marketing Strategies, one of the activities named Innovative Pilots was replaced by Entrepreneurship Development Programme (EDP) owing to less number of nomination of farm level innovation at district level and lack of scalability of such innovations.

8. Under Component B.1.1 Product Aggregation and sale through Producers Association, the implementing arrangement was changed, where the responsibility of promotion of Farmer Producer Companies and subsequent Farmer Common Service Centres (FCSCs) was handed over from Project Implementation Unit – Agri Marketing (PIU-AM) to Project Implementation Unit – Agriculture (PIU-A). Moreover, the total assistance to be given to Farmer Common Service Centres (FCSCs) was changed from INR 10.00 Lakhs to INR 18.00 Lakhs.

9. Similarly, under Component B.1.3 Rural Haat Markets the target for modernizing Rural Haat was increased from 300 to 472. The assistance given per RH was increased form INR 20.00 Lakhs to INR 25.00 Lakhs. Also, the payment schedule or subsidy tranche release pattern was changed from total 3 tranches to 4 tranches, where last tranche was proposed to be released after audit of modernization work.

10. Similarly, under Component B.2.1 Modernizing Wholesale Markets, the subsidy release pattern was changed.

11. Though the implementing agencies and other partners were too many, co-ordination was efficiently and effectively managed by the PCU, MACP. Implementation got expedited post MTR due to the concerted support and guidance of the World Bank, dedicated effort by the PCU and the implementing agencies and the project has been completed successfully. The arrangement of a 'Nodal Officer' in each of the Project Implementation Units (PIU) at the Directorate level Head Quarter of the implementing line departments and a corresponding 'Co-ordinating Officer' from the line departments at the PCU has outstandingly helped in smooth coordination of the activities.

12. Being a demand driven project, reputed and upright NGOs / Service provider (SPs) were involved to ensure active participation of farmers and community in all the sectors for developing community stewardship and formation of Community groups.

Performance of IDA

13. Regular supervisions/ review missions and hand-holding by the World Bank have helped in achieving the project objectives. The Mission members have always been very co-operative and the wrap-up discussions with topmost Government level functionaries aided in resolving implementation issues promptly. Field visits by the mission members and the Aide Memoirs have provided an objective and useful feedback for initiating corrective actions. The Task Team Leaders (TTL) of the Bank had always been pro-active in providing guidance and advices. Overall performance of the World Bank has been highly satisfactory since beginning of the project.

14. The MTR mission of the World Bank had sorted out almost all the difficulties in Project design and/or implementation arrangement by objectively assessing all the relevant aspects. Project had

received a focused attention from the IDA post MTR, and many micro implementation level issues were sorted out. Close review and ample guidance on Safeguards related issues ensured better community involvement and environmental mitigating measures. The support on procurement and financial management ensured the fiduciary compliance and high level of transparency and efficiency.

Performance of the Implementing Agencies

15. After removal of the initial constraints during MTR, performance of the implementing agencies had improved considerably and the PCU played an efficient and significant role in coordinating with the Bank, GoM, GoI and the implementing agencies, and also ensured smooth fund flow across all the project locations.

16. Government of Maharashtra's resolve to make MACP a success has ensured placing of efficient Governmental staff in the PCU. The dedication and determination of the implementing officials of the line departments, coupled with close monitoring and supervision by PCU has made the project implementation smooth. Continuous efforts by the PCU for building efficiency in the management of safeguards, procurement and financial aspects brought a fair level of synergy & unity of purpose.

Project Results

17. The project directly benefitted about 1.73 million farmers, 61700 traders, 1600 officials of line departments, and 8615 market functionaries. Around 2.8 million consumers of agricultural produce indirectly benefitted from the project interventions. Small, marginal and land less farmers communities were the key focus of the project. The outcome of the project has already been recorded in other sections of this report.

KEY PHYSICAL OUTPUT & INTERMEDIATE OUTCOMES

18. The key physical output and the intermediate outcomes of the project have already be recorded in other sections of this report and hence not repeated.

Reform Initiatives

19. Introducing and increasing the effectiveness of Agricultural Marketing Reforms was one of the major initiatives undertaken by the project. MACP helped promoting the alternate marketing channels namely Private Markets, Farmer-Consumer Markets, Direct Marketing and Single Licensing in APMCs in Maharashtra. The FPCs formed under project were encouraged to use these alternate channels. Continuous interaction with these alternate market channels and communicating the needs to government helped to increase the effectiveness of the reforms. e.g. continuous follow-up for creating two different posts viz. Director of Marketing (DoM) and Managing Director (MD) of Maharashtra State Agricultural Marketing Board (MSAMB), and the minimum distance criteria for establishing private markets in the vicinity of existing wholesale markets.

Beneficiary Contribution & Sustainability

20. Beneficiary of the project have contributed total US$ 24.22 million for participating in different activities, which had ensured ownership, efficiency, and sustainability of the project investments. The

Sustainability Analysis report of the independent M&E consultants shows that most of the project activities are sustainable.

Community Involvement & Social Profile

21. Community involvement and participation through formation of farmer groups was successfully done by involving NGOs / Service Providers (SPs). The project achieved satisfactory outcome also in terms of inclusion with more than 50 percent of the farmers being in Schedule Tribes (ST), Schedule Castes (SC) and other Backward Castes (OBC) category.

Lessons Learned

22. Deliverables of a project needs to be forecasted with a realistic implementation schedule, with sufficient time for start-up activities and community mobilization.

23. Successful project interventions are normally mainstreamed by the line departments in their own programs.

24. Projects with multiple implementing agencies should be monitored & coordinated by an apex single entity, for easier supervision, monitor, fiduciary control, environmental & social safeguards and for greater operational synergies.

25. A clear objective strategy and transparent beneficiary selection criteria facilitate smooth implementing of project activities, without any controversies or biasness.

26. Monitoring and Evaluation is an important tool for measuring project performance against given indicators.

27. Farmer Producer Companies/Organizations (FPCs/FPOs) is an effective way to address the issues of small and marginal farmers. The project has effectively laid the foundation by promoting FPCs in each district and providing market linkage support. However, further efforts are needed to strengthen these FPCs by creating more conducive environment to increase their effectiveness in future.

Looking forward – Next Step

28. On successful completion of MACP, the GoM proposed a new Project to the GoI titled **'State of Maharashtra's Agri-business and Rural Transformation Project'** and GoI has posed the project to the World Bank in June 2018 and project preparation is on the way.

ANNEX 6. SUPPORTING DOCUMENTS

Project achievements in increasing productivity and profitability in goat production

1. The project successfully increased goat productivity by 5.5 percent in the CIG model and 15 percent in the HVG model.[20] The CIG model supported 150 SRFs[21] with 2,250 members with adoption of improved buck, feeding, deworming, and housing management practices. The HVG model supported 1,750 farmers to shift from crop to fodder production and adopt improved animal husbandry practices. The project also mobilized 750 LLWs to deliver the last mile services delivery. In the CIG model, adoption of improved animal husbandry, disease control, and feeding practices resulted in 1 percent increases in kidding and 20 percent reduction in mortality rates. In the HVG model, the kidding rate increased by 25 percent and mortality rate decreased by 53 percent. In addition to these, the project established 397 AHCs, where 2.8 million large and small ruminants were treated over the course of the project. According to the AHD, the camps contributed to 17 percent increase in milk productivity in dairy cows. The latter was not monitored by the project.

2. The project also successfully increased goat profitability on average by 500 percent through diversification from crops (cotton, soybean, and sugarcane) to fodder production, aggregated sales, and selling by weighing. The HVG model successfully demonstrated that, while carrying lower marketing, disease, and climate risks, growing fodder for goat production can generate net profits of nearly Rs 135,000 per ha.[22] The drought risk factor was particularly important for drought-prone areas such as Yavatmaal with the highest farmer suicide rates[23] in the country. The success of the demo led to expansion of land allocation for fodder production by around 123 percent. Where adoption was systematically monitored, 25 percent of target farmers adopted the HVG model.

3. Through successful demonstration of the impact of using improved breeds, the project established an alternative market for Osmanabadi breeding bucks. These bucks now command premiums of roughly 70 percent compared to meat market values as practiced in the past. This is a highly significant achievement with a long-lasting impact, given that breeding establishes the foundation for productivity. Recognizing the success of goat interventions, the AHD mainstreamed the LLW program and elite breeding buck market and restructured AHCs and in-service training for AHD officers with an increased focus on small ruminants.

4. Gender impact was also impressive in livestock activities with 56 percent of beneficiaries being female. About 100 percent of community-led extension service delivery was also facilitated through all-women LLW program. The program empowered women by raising their social status, providing them with additional incomes, and gaining recognition and praise by farmers for contributing to productivity improvement and ultimately rural development. One of the LLWs, Sunita Kambale, received a national award at the 'Transforming India Forum' in Delhi for her contribution to rural development. In Yavatmaal district, which has the highest farmer suicide rate in the country, 38 of the 50 LLWs are widows.

[20] These are net changes over the control group measured through the DID technique.
[21] The project documents used terms FPO and FPC alternatively.

Appraisal documents

- India National Agricultural Competitiveness Project (P093136). Project Concept Note, May 12, 2006, World Bank

Project Progress Reports

- Annual Progress Reports for 2012–2018 prepared by Project Coordination Unit
- Annual Follow-Up Survey Reports for Phase I, II, and III for 2013–14, 2014–15, 2015–16, 2017–18

Baseline, Follow up and Endline Surveys

- Baseline Survey Report for Phase II and III, August 2015 by PricewaterhouseCoopers (PwC)
- Impact Study 1: Assessing the impact of field demonstrations (Goat demonstrations) - Part B, March 23, 2016, by PwC
- Impact Study 2: Assessing the Impact of Warehouse Receipt Scheme on Farmers, March 21, 2016, by PwC
- Impact Study 3: Assessing the impact of alternative agricultural marketing channels on farmers and APMCs, September 30, 2016, by PwC
- Impact Study 4: Assessing the Impact of Investment Activities on APMCs and RHs, November 27, 2017, by PwC
- Study to assess crop productivity improvement and adoption of demonstrated improved on-farm technologies, May 24, 2018, by PWC
- Impact Study 6: Study to assess the adoption of grading and sorting practices amongst direct beneficiaries of MACP Phase II, August 20, 2018, by PwC
- Role of MACP in strengthening of market-led agriculture extension in Maharashtra, October 2018, by PwC
- End Term Survey 2017–18 Results - Phase I, II, and III, November 2, 2018, by PwC
- Six Monthly Monitoring Reports for the period of 2014–2018, by PwC

User Satisfaction Surveys

- User Satisfaction Survey Report I, March 21, 2016, by PwC
- User Satisfaction Survey Report II, March 24, 2017, by PwC
- User Satisfaction Survey Report III, March 24, 2018, by PwC
- User Satisfaction Survey Report IV, November 13, 2018, by PwC

Thematic studies

- Thematic **and cross-cutting study 2. Assessment of the contribution of ABPF in promoting agribusiness in Maharashtra and employment generated through ABPF, October 31, 2018, by PwC**

Other reports

- Project Completion Report by the Maharashtra State Government from October 2018
- Agricultural Marketing and Farmer Friendly Reforms Across Indian States and UTs by the National Institution for Transforming India, October 2016

Projects with agriculture competitiveness elements

- India Andhra Pradesh Integrated Irrigation and Agriculture Transformation Project (2018)
- India Tamil Nadu Irrigated Agriculture Modernization Project (2017)
- India Rajasthan Agriculture Competitiveness Project (2012)
- Nepal Project for Agriculture Commercialization and Trade (2009)
- Malawi Agricultural Competitiveness Project (2017)
- Lao Agriculture Competitiveness Project (2018)