

GOLD



Indian Minerals Yearbook 2017

(Part- II : Metals & Alloys)

56th Edition

GOLD

(ADVANCE RELEASE)

**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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Gold in its purest form, is a bright, slightly reddish yellow, dense, soft malleable and ductile metal. It is one of the least reactive chemical elements and is solid under standard conditions. Gold often occurs in free elemental (native) form, as nuggets or grains, in rocks, in vein, and in alluvial deposits. Gold is dissolved in alkaline solution of cyanide, which are used in mining and electroplating. It dissolves in mercury, forming amalgam alloys, but this is not a chemical reaction. Gold is resistance to corrosion and their chemical reactions and its distinctive color.

Gold is a relatively scarce metal in the world and a scarce commodity in India. The domestic demand is mainly met through imports. The consumption of gold produced in the world is about 50% in jewellery, 40% in investment, and 10% in industry.

RESERVES/RESOURCES

As per NMI data based on UNFC system, as on 1.4.2015, the total reserves/resources of gold ore in the country have been estimated at 501.83 million tonnes. Out of these, 17.22 million tonnes were placed under reserves category and the remaining 484.61 million tonnes under remaining resources category. The total reserves/resources of gold (primary), in terms of metal stood at 654.74 tonnes. Out of these, 70.09 tonnes were placed under reserves category and 584.65 tonnes under remaining resources category. The resources include placer-type gold ore in Kerala estimated at 26.12 million tonnes containing 5.86 tonnes gold metal.

By States, largest resources in terms of gold ore (primary) are located in Bihar (44%) followed by Rajasthan (25%), Karnataka (21%), West Bengal (3%), Andhra Pradesh (3%), Jharkhand (2%). The remaining 2% resources of ore are located in Chhattisgarh, Madhya Pradesh, Kerala, Maharashtra and Tamil Nadu. In terms of metal content, Karnataka remained on top followed by Rajasthan, Andhra Pradesh, Bihar, Jharkhand, etc. (Table-1).

As per Annual Report 2016-17 of Deccan Gold Mines Limited, total measured mineral resources estimated were 2.30 million tonnes of grade 3.7g/t. Total indicated mineral resources estimated were 0.45 million tonnes of grade 2.1 g/t. Total inferred mineral resources estimated were 0.21 million tonne of grade 2.3 g/t.

EXPLORATION & DEVELOPMENT

The exploration and development details are given in the review on EXPLORATION & DEVELOPMENT in "GENERAL REVIEWS".

PRODUCTION & STOCKS

The production of gold ore at 582 thousand tonnes during 2016-17 increased by 3% as compared to that in the previous year. The quantity of ore treated also increased from 552 thousand tonnes to 575 thousand tonnes as compared to previous year. There were five reporting mines of gold ore in 2016-17.

The average grade of gold ore produced in India during 2016-17 was 3.14 g/t as against 2.76 g/t in 2015-16, whereas, that of gold ore treated was 3.07 g/t in 2016-17 as compared to 2.67 g/t in 2015-16.

Production of primary gold in 2016-17 at 1,594 kg increased by 20% as compared to that in the previous year. No production of Secondary gold was reported for more than 8 years. In addition, HINDALCO, an Aditya Birla Company, extracts gold from imported copper concentrates. During the process of copper refining, the gold and other precious metals like silver and selenium are also recovered at the plant located in Dahej, district Bharuch, Gujarat.

Karnataka was the leading producer of primary gold accounting for 99% of the total production. The remaining production was reported from Jharkhand (Tables- 2 to 6).

The average daily employment of labour in 2016-17 was 3,382 as against 3,426 in the previous year.

**Table – 1: Reserves/Resources of Gold as on 1.04.2015
(By Grades/States)**

(In tonnes)

State/Grade	Reserves				Remaining Resources						Total Resources (A+B)		
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)
		STD121	STD122			STD221	STD222						
All India: Total													
Ore (Primary)	10404349	6401725	422100	17228174	1925669	1303000	1968176	30333248	70136727	233608305	145336333	484611458	501839632
Metal (Primary)	53.41	16.26	0.42	70.09	7.69	3.85	12.1	128.65	143.8	227.44	61.12	584.65	654.74
Ore (Placer)	-	-	-	-	-	-	-	-	2552000	23569000	-	26121000	26121000
Metal (Placer)	-	-	-	-	-	-	-	-	2.29	3.57	-	5.86	5.86
By States													
Andhra Pradesh													
Ore (Primary)	-	3902725	-	3902725	655133	-	889515	291000	55000	6980031	-	8870679	12773404
Metal (Primary)	-	8.49	-	8.49	2.45	-	3.57	1.08	0.17	23.78	-	31.05	39.54
Bihar													
Ore (Primary)	-	-	-	-	-	-	-	-	-	128884860	94000000	222884860	222884860
Metal (Primary)	-	-	-	-	-	-	-	-	-	21.6	16.0	37.6	37.6
Chhattisgarh													
Ore (Primary)	-	-	-	-	-	-	-	-	600000	4241033	-	4841033	4841033
Metal (Primary)	-	-	-	-	-	-	-	-	1.8	3.71	-	5.51	5.51
Jharkhand													
Ore (Primary)	9349	-	-	9349	-	-	-	-	5146952	4203337	767000	10117289	10126638
Metal (Primary)	0.07	-	-	0.07	-	-	-	-	3.61	10.26	0.62	14.49	14.56
Karnataka													
Ore (Primary)	10395000	2499000	4221000	13316100	1270536	1303000	1078661	24979968	8204595	16020324	37673000	90530084	103846184
Metal (Primary)	53.34	7.77	0.42	61.53	5.24	3.85	8.53	120.73	28.67	38.29	43.78	249.09	310.62

(Contd.)

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Table - 1 (Concl'd.)

Grade/State	Reserves				Remaining Resources						Total Resources (A+B)		
	Proved STD111	Probable		Total (A)	Feasibility STD221	Pre-feasibility STD221	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334		Total (B)	
		STD121	STD122										Total (A)
Kerala													
Ore (Primary)	-	-	-	-	-	-	462280	96180	-	-	-	558460	558460
Metal (Primary)	-	-	-	-	-	0.17	0.03	0.03	-	-	-	0.2	0.2
Ore (Placer)	-	-	-	-	-	-	2552000	23569000	-	-	-	26121000	26121000
Metal (Placer)	-	-	-	-	-	-	2.29	3.57	-	-	-	5.86	5.86
Madhya Pradesh													
Ore (Primary)	-	-	-	-	-	-	5841000	1947000	-	-	-	7788000	7788000
Metal (Primary)	-	-	-	-	-	-	6.18	2.22	-	-	-	8.4	8.4
Maharashtra													
Ore (Primary)	-	-	-	-	-	-	-	1517000	-	-	-	1517000	1517000
Metal (Primary)	-	-	-	-	-	-	-	3.55	-	-	-	3.55	3.55
Rajasthan													
Ore (Primary)	-	-	-	-	-	-	4600000	50193000	69747720	63000	124603720	124603720	124603720
Metal (Primary)	-	-	-	-	-	-	6.67	103.34	123.03	0.07	233.11	233.11	233.11
Tamil Nadu													
Ore (Primary)	-	-	-	-	-	-	-	-	67000	-	-	67000	67000
Metal (Primary)	-	-	-	-	-	-	-	-	1	-	-	1	1
West Bengal													
Ore (Primary)	-	-	-	-	-	-	-	-	-	-	12833333	12833333	12833333
Metal (Primary)	-	-	-	-	-	-	-	-	-	-	0.65	0.65	0.65

Figures rounded off.

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Table – 2: Producers of Gold, 2016-17

Name and address of the producer	Location of the mine	
	State	District
The Hutti Gold Mines Co. Ltd, Hutti, Dist. Raichur 584 115 Bengaluru- 560 047, Karnataka.	Karnataka	Raichur
Manmohan Industries (P) Ltd, Shantiniketan, 286, New Patliputra Colony, Patna, Bihar.	Jharkhand	Singhbhum (East)

**Table – 3: Production of Gold Ore
2015-16 and 2016-17
(By States)**

(In tonnes)

State	2015-16		2016-17 (P)	
	Ore Produced	Avg. Grade (g/t)	Ore Produced	Avg. Grade (g/t)
India	562956	2.76	582280	3.14
Jharkhand	4153	3.55	5581	2.99
Karnataka	558803	2.76	576699	3.14

**Table – 4: Gold Ore Treated
2015-16 and 2016-17
(By States)**

(In tonnes)

State	2015-16		2016-17 (P)	
	Ore treated	Avg. Grade (g/t)	Ore treated	Avg. Grade (g/t)
India	552390	2.67	574604	3.07
Jharkhand	4153	3.55	5581	2.99
Karnataka	548237	2.66	569023	3.07

**Table – 5: Production of Gold, 2014-15 to 2016-17
(By States)**

(Quantity in kg; Value in ₹'000)

State	2014-15		2015-16		2016-17 (p)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	1441	3602722	1323	3214623	1594	4362410
Primary Gold	1441	3602722	1323	3214623	1594	4362410
Jharkhand	11	30615	13	35871	15	45424
Karnataka	1430	3572107	1310	3178752	1579	4316986

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**Table – 6: Production of Gold, 2015-16 and 2016-17
(By Sectors/States/Districts)**

(Quantity in kg; Value in ₹'000)

State/District	No. of mines	2015-16		No. of mines	2016-17 (p)	
		Quantity	Value		Quantity	Value
India	5	1323	3214623	5	1594	4362410
Public Sector	3	1310	3178752	3	1579	4316986
Private Sector	2	13	35871	2	15	45424
Primary Gold	5	1323	3214623	5	1594	4362410
Andhra Pradesh	1*	-	-	1*	-	-
Kurnool	1	-	-	1*	-	-
Jharkhand	1	13	35871	1	15	45424
Singhbhum East	1	13	35871	1	15	45424
Karnataka	3	1310	3178752	3	1579	4316986
Raichur	3	1310	3178752	3	1579	4316986

* Only Labour reported. (p): provisional

Gold Bullion

Production of gold bullion in India is reported both in primary and secondary forms and includes gold recovered from imported copper concentrates. The total production of gold bullion during 2016-17 at 10,081 kg decreased by about 3 % as compared to 10,412 kg in the previous year (Table -7).

**Table – 7: Production of Gold Bullion
2014-15 to 2016-17**

(Quantity in kg; Value in ₹'000)

Year	Quantity	Value
2014-15	9988	25320142
2015-16	10412	25359408
2016-17 (P)	10081	27339280

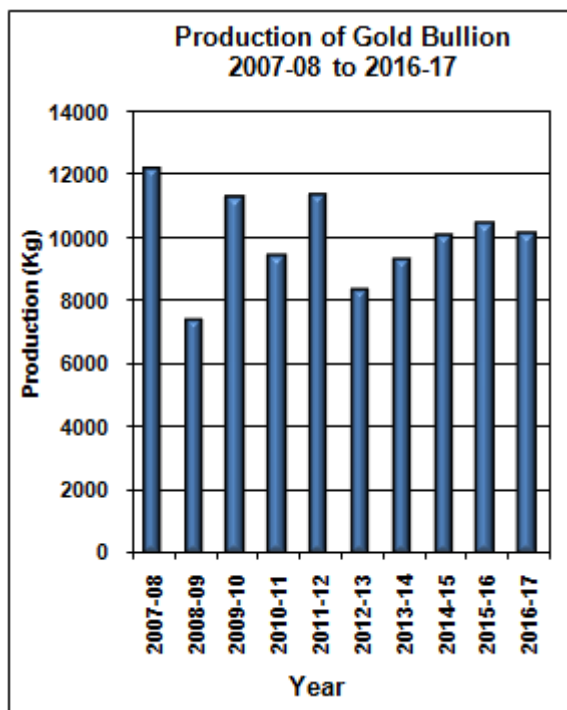
Note: Includes gold recovered as by-product from copper concentrates by Hindalco Industries Ltd in Gujarat.

MINING & MILLING

Presently, HGML is the only Public Sector Company producing gold in the country. While in the Private Sector Manmohan Mineral Industries Pvt. Ltd is engaged in mine production of gold at Kunderkocha, in Singhbhum East district,

Jharkhand by underground method of mining. HGML operates mines at Hutti, Uti and Hira-Buddini in Raichur district, Karnataka. The total installed capacity of Hutti mine is 7 lakh tpy gold ore. Implementation of mechanisation of mining operations at Hutti mine was in progress. The production of ore at the mine was 5,24,617 tonnes during 2015-16. Sub-level and LDBH stoping methods are used to exploit the gold ore. In the Uti mine, mining was carried out by opencast method till the year 2006 and thereafter by underground method. The ore from this mine is transported to Hutti mine by road for processing at the mills. The present mine production as reported in 2015-16 was 23,562 tonnes of ore. Underground exploratory mining too is in progress. Several operations at Hira-Buddini old unit, such as, exploratory mine development and deepening and re-equipping of main shaft are in progress. The production of the mine was 68 tonnes during 2015-16. Exploratory mine development using compressed air jackhammer drilling and electrical hoist in the shaft is presently underway. Based on the developmental work and feasibility, the locomotive loaders, wagon drills and other required machinery will be used to increase the ROM.

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The new ore processing plant based on modern technology (SAG and Ball Mill) with a capacity of 2000 TPD has been operational at Hutti underground gold mine since 2010. At the Hutti Mineral Treatment Plant, the r.o.m. of -8" size is crushed. The final product from crushing plant, i.e. -10 mm size is stored in a 1,500 tonnes capacity fine ore bin for subsequent treatment, i.e., grinding. The Milling/Grinding process of gold ore employs two distinct grinding techniques. The first technique involve grinding that is in two stages, i.e., primary grinding followed by secondary grinding for adequate comminution. The processes involve one primary mill and three tube mills which constitute one stream of grinding in which pebbles and smaller size balls are used as composite grinding media.

There are two such streams and strake tables used to collect coarse gold as concentrate for this circuit. In the second technique, grinding is done by four ball mills of different sizes and each of them is an independent circuit in which large size balls are used as grinding media. In these circuits, Knelson concentrator is used to collect coarse gold as concentrate. In all the milling techniques, cyclones are in closed circuit with the mills so as to get the required sizes (80% passing 75 micron) for the subsequent treatment process.

The concentrate collected from both the techniques is upgraded on James Table. The upgraded concentrates are roasted, magneted and finally smelted into bullion buttons.

All the cyclone overflow, i.e., finely ground ore in the form of slurry from the two streams of first technique and 4 streams of second technique join together in a distributor box from which finely ground ore slurry is fed to High Rate Thickener for thickening purpose. The thickened pulp (60% solid w/w) thus obtained from thickeners is subjected to cyanidation process in which cyanide accessible gold in slurry makes complexes with cyanide in presence of oxygen and dissolves in solution at high pH. To increase the oxygen potential of slurry, H_2O_2 is added in addition to compressed air. The cyanidation or leaching process is carried out in a series of mechanically agitated agitators of different sizes.

The cyanide leached pulp is then fed to two Carbon-in Pulp (CIP) plants. The CIP plants are of 1,000 tpd size each and are parallel in circuit. The objective of CIP plant is to absorb the dissolved gold in activated carbon from the solution.

The gold-loaded carbon is removed from the CIP plant periodically, subjected to acid and alkaline wash and then eluted in four elution columns with 1.0% NaOH and 0.1% NaCN solution at 95 °C for a period of 60 hours. The solution is then passed through four electrowinning cells in which gold is deposited on steel wool cathodes. The gold loaded steel wool cathodes are manually removed periodically, subjected to acid digestion, drying and smelting to obtain bullion buttons. The bullion buttons thus obtained from table concentrate and steel wool are cast into bullion bars weighing 4 to 11 kg and then despatched for sales.

In the past, gold was produced by the Central Government undertaking, namely, BGML. BGML earlier mined and processed the ore from Chigargunta reef in Chittoor district, Andhra Pradesh, Mysore Mines of Kolar Gold Fields in Karnataka and Yeppamana mine in Anantapur district, Andhra Pradesh. All activities of BGML were

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stopped and BGML was closed w.e.f. 1.3.2001 under Section 25 (O) of the Industrial Disputes Act, 1947 in terms of Ministry of Labour, Government of India's order dated 29.1.2001. To augment gold production in the country, as per XI Plan document, Chigargunta and Bisanthan mines deserve active consideration for opening and commencement of operations.

Gold is sometimes recovered from the pregnant (Simple gold bearing solution) solutions by adding zinc to form soluble zinc cyanide and precipitate of gold & silver. The pregnant solution can also be passed through activated carbon which absorbs dissolved gold. Gold from either process is cast into bars, bullion and dore (when it contains silver), which must be further refined to remove impurities, such as mercury, arsenic and copper. Some ores cannot be treated by cyanide processing as gold in them is in small inclusions or even by solid solutions in minerals, such as pyrite. This gold is generally recovered by roasting which converts pyrite into porous iron oxides containing small grains of gold that can be dissolved by cyanide.

DEVELOPMENT

HGML is the 40th member of the World Gold Council and the first one from India.

The Deccan Gold Mines Ltd (DGML), India's first and largest listed gold exploration company, collected rock and stream sediment samples and analysed them. DGML has plans for geophysical studies and drilling prospects at areas located in proximity to existing old mines and also at earlier explored areas in Hutti belt, Manglur belt, Dharwar-Shimoga belt in Karnataka; Attapadi Project in Kerala; and Ramgiri belt in Andhra Pradesh. The main prospects for gold at Ganajur and Karajgi have progressed into advanced stages of exploration and existence of high grade gold bearing zones in the prospect have been established. Exploration is being conducted in Hutti belt at various prospects, viz, in Hutti Mine north prospect, Hirenagnur prospect, southern and northern continuity of Uti mine lodes, Uti Temple prospect, Chinchergi prospect, Buttapur prospect and Yatkall prospect. In south Hutti RP block, the investigations are going on in Tuppadhur-Buddini prospect, Maski prospect, Ashoka prospect and Sanbal prospect.

The mining method suggested by Snowden is conventional open pit mining with load, haul and drill blast activities performed by an experienced mining contractor. It is planned that the mining

contractor will buy back the waste for use in their civil operations elsewhere, subject to an off take agreement with DESPL. The Ganajur gold ore comprises layer of oxide Ore followed by Sulphide Ore and will be mined at the rate of 0.3 Mtpa. The proposed mining plan envisages the Oxide and Sulphide Ores being mined separately. The projected life of mine (LOM) average process operating cost for the 0.3 Mtpa Ganajur Gold recovery plant is USD 18.36/tonne(t) or USD 243/oz of Oxide ore processed and USD 23.53/t or USD 249.31/oz for the Sulphide ore processed. Snowden has estimated 2.14 million tonnes @ 3.63g/t gold as proved Ore Reserves, and 0.37 million tonnes @ 1.98 g/t as Probable Reserves for the Ganajur Main Gold Deposit. DGML in Joint Venture with JB Group examined the available data to select the area for reconnaissance studies. The detailed geological mapping and systematic channel sampling have revealed the 5 sub-parallel zone of gold mineralisation in Hesdaba prospects and Asaleyta prospects in Djibouti.

Birla Copper Complex of Hindalco Industries Ltd situated at Dahej, district Bharuch, Gujarat has an installed capacity of 15 tpy for gold recovery from imported copper concentrates.

HCL which recovers by-product secondary gold from indigenous copper ores at its ICC plant in Jharkhand has an installed capacity of 698 kg per annum gold recovery plant. This plant, however, did not report production since 2007-08.

NMDC has secured a gold mining lease in Bulyangombe area in Tanzania.

A study on techno-economic feasibility of Ajjanahalli Gold Mine of M/s. Hutti Gold Mines Ltd, Hutti, district Raichur, Karnataka was carried out by Mining Research Cell, TMP Division of IBM. The project has been completed and the report was submitted to the party. The details have been discussed in the chapter on 'Research & Development' provided in Vol. I of this title.

POLICY

Foreign Direct Investment (FDI) up to 100% in Mining Sector in respect of gold is eligible for automatic approval.

Gold being a specified mineral, Mineral Concessions, viz, reconnaissance permits (RP), prospecting licences (PL) and mining leases (ML) for gold are granted by the State Governments after prior approval of the Central Government.

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In the revised Export-Import Policy, comprised in the Foreign Trade Policy (FTP), 2015-20, gold ores and concentrates are under freely importable category. Under Heading No.7108, the import of non-monetary gold metal also falls under Free category subject to RBI regulations, while import of gold metal in monetary form is restricted.

ENVIRONMENTAL CONCERNS

Gold is recovered from ores by two main methods, both of which affect environment. Earlier, for recovery of gold, amalgamation processes were used in which ore was mixed with mercury that selectively dissolved gold which was then recovered by evaporation. Mercury from these operations was never recovered and remained as pollutant in many old mining areas. The cyanide process is based on the property of precious metals in forming soluble complex ions with cyanide anion. Cyanide does not dissolve quartz, iron oxides and other common gangue minerals and yields a relatively simple gold-bearing solution known as pregnant solution. In some gold mines, gold is dissolved from the ore by crushing and grinding followed by mixing with cyanide solution in large vats.

Cyanide is a highly toxic compound and requires special handling. During ore treatment, pH of cyanide solution must be kept at about 11 to prevent cyanide from reacting with hydrogen ion to produce HCN, a deadly gas. Although less toxic substitutes of cyanide are known, it is not yet clear whether such substances will be cost-effective or environment-friendly.

DEMAND & CONSUMPTION

Jewellery accounted for major consumption of gold, i.e., 85%, followed by electronics 6%, medal and coins 2% and other sectors 7%. The Industrial demand especially in the Electrical Sector for gold is mainly on account of its excellent thermal and electrical properties. Besides, a significant amount is consumed in dentistry and medicine. Continuing research has discovered new applications for gold as catalyst and in nano-technology. No proper estimation of gold demand in the country could be attempted due to lack of proper consumption data of the end-use industry. However, from overall evaluation it is seen that India has a traditional and stable market for gold consumption. There is increase in demand from Ornamental and Electronic Sectors. Gold is considered a valuable asset, for investments and bank reserves. A huge gap exists between demand and indigenous production which is likely to continue.

SUBSTITUTES

Platinum and palladium substitute gold to some extent, but their use is influenced by price relationship and by an established consumer preference for gold. Silver can be a substitute, but it offers less resistance to corrosion. Gold-plated palladium and bright tin-nickel can be used in electronics. Titanium and chromium-based alloys can be used in dental work. High prices encourage substitutes, particularly base metal clad with gold in Electronic & Electrical Industry and in jewellery products. No metal or alloy substitute has all the properties of gold, and therefore, the emphasis is only on reduction of gold content rather than substitution.

WORLD REVIEW

The estimated world reserves of gold were about 54,000 tonnes of metal. The gold reserves are mainly located in Australia, Russia, South Africa, Indonesia, USA, Peru and Brazil. The world reserves of gold are provided in Table- 8.

The world mine production of gold was estimated at 3,110 tonnes in 2015. China contributed about 14% to the world's total mine production of gold followed by Australia (9.1%), Russia (8%), USA (7.1%) and South Africa & Peru (5.1% each) (Table-9).

**Table – 8: World Reserves of Gold
(By Principal Countries)**

(In tonnes of gold content)

Country	Reserves
World: Total (rounded)	54,000
Australia	9800
Brazil	2400
Canada	2200
China	2000
Ghana	1000
Indonesia	2500
Kazakhstan	1000
Mexico	1400
Papua New Guinea	1300
Peru	2300
Russia	5500
South Africa	6000
Uzbekistan	1800
USA	3000
Other countries	12000

Source: Mineral Commodity Summaries, 2018.

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**Table – 9: World Mine Production of Gold
(By Principal Countries)**

(In tonnes of metal content)			
Country	2013	2014	2015
World: Total	3014	3066	3110
Argentina	52	72	71
Australia	268	274	278
Brazil	80	81	80 ^e
Canada	134	152	159
Chile	51	46	43
China [@]	428	452	450
Colombia	56	57	59
Ghana	190	139	113
Indonesia	60	69	92
Kazakhstan	43	50	64
Mali ^e	46	45	47
Mexico	120	118	125
Papua New Guinea	56	58	60
Peru	151	140	145
Russia	230	249	256
South Africa	160	152	145
Sudan	70	73	82
Tanzania	43	41	46
USA	228	210	212
Uzbekistan ^e	90	102	102
Other countries	458	485	483

*Source: World Mineral Production, 2011-2015.
@- Metal production,*

According to Gold Fields Mineral Services Ltd (GFMS), annual review of world gold supply and demand, the total global supply of gold in 2015 was 4,306 tonnes, a slight decrease compared with 4,310 tonnes in 2014. It included an estimated 27 tonnes in global primary production and 128 tonnes of net increase in producers stock. Gold recovery from old scrap increased for the first time in 5 consecutive years by 15 tonnes to 1,173 tonnes.

The 12 leading gold-producing countries, in decreasing order of production were China, Australia, Russia, USA, Canada, Peru, South Africa, Mexico, Uzbekistan, Indonesia, Ghana and Sudan. These countries together accounted for 70% of global production. The next 12 leading gold-producing countries accounted for almost 20% of global gold production.

Prices

The gold prices have increased from US \$ 1276.5 per ounce to US \$ 1277.40 per ounce during 2016.

Argentina

In 2015, gold production was estimated at 64,000 kg, 7% more than that in 2014. Much of the increase was due to the first full year of production from Goldcorp's Cerro Negro Mine, which produced 15,800 kg of gold during the year. In 2015, Barrick's Veladero Mine produced 18,700 kg of gold, a 17% decrease compared to the production in 2014 owing to lower ore grade.

Australia

In 2015, gold production in Australia was 277,800 kg, 3,837 kg more than the previous year. Much of the increase was from the two leading gold production mines Newmont and Tanami mines, both of which increased their throughputs of higher grade ore. Together these mines produced about 5,880 kg more gold in 2015 than in 2014. Production increases were also associated with recently restarted or newly commissioned mines, which included Kathleen Valley (Ramelius Resources Ltd) and Old Pirate (ABM Resources NL), which together contributed about 3,000 kg of gold in 2015.

Canada

Canada's gold mine output increased slightly in 2015 to 152,747 kg. Production increased primarily owing to the startup of the Goldcorp's Eleonore Mine, which produced 8,340 kg of gold in 2015. Production increases were reported by a number of other mines. The Detour Lake Mine produced 15,700 kg of gold in 2015, 11% more than that in 2014. Agnico Eagle Mines Ltd's La Ronde and Goldex Mines produced 8,330 kg (up by 31%) and 3,590 kg of gold (up by 15%), respectively.

Chile

In 2015, gold production was 42,501 kg, an 8% decrease compared with the production in 2014 primarily owing to production decreases at the country's leading gold mines Centinela (70%) and Marubeni Corp. (30%). In 2015, gold production at the Centinela copper-silver-gold mine decreased by 20% from that of 2014 to 5,050 kg owing to a decrease in the average gold mill-head grade and lower throughput.

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China

In 2015, production was estimated to have been constant at 450,000 kg compared with 2014 figures. Although gold production from gold mines decreased slightly, production from non-ferrous metal mining increased by 7%. According to the China Gold Association, China's gold consumption (which includes bullion consumption) in 2015 was 985,000 kg, a 4% increase compared with 2014 consumption.

FOREIGN TRADE

Exports

The exports of Gold, Non -monetary: other Unwrought forms in 2016-17 were about 1,32,980 kg and were mainly to UAE (100%). (Table-10). The export of Gold, Monetary in 2016-17 was nil. The exports of gold (non-monetary & monetary) increased to 1,35,275

Table – 10: Exports of Gold, Non-monetary: Other Unwrought Forms (By Countries)

State	2016-17	
	Quantity (kg)	Value (₹'000)
All Countries	132980	361645931
UAE	132980	361645931

Source: Export-Import data bank, Ministry of Commerce, HS Code :71081200

kg in 2015-16 from 70,796 kg in 2014-15. The exports in 2015-16 were almost to UAE (99%) and to Switzerland (1%). (Tables- 11 to 15)

Imports

The import of Gold, Non-monetary: other Unwrought forms in 2016-17 were about 7,65,440 kg and were mainly from Switzerland (49%), UAE (10%), Ghana, Dominican, Rep. and South Africa (6% each) (Table-16). Imports of monetary and non-monetary gold increased to 9,68,075 kg in 2015-16 from 9,15,473 kg in 2014-15. The share of Non-monetary: Other Unwrought forms, was 9,59,841 kg. Imports of gold were mainly from Switzerland (48%), UAE & USA (9% each), Ghana (8%), South Africa (5%) and Dominican Rep. (4%) in terms of volume (Tables-17 to 21).

Table – 11: Exports of Gold (Non-monetary & Monetary) Total (By Countries)

Country	2014-15		2015-16 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	70796	174423808	135275	325665937
UAE	69981	172515079	134271	323336851
Switzerland	800	1882087	1000	2323815
Hong Kong	5	1776	2	5178
Guinea	-	-	1	50
Singapore	-	-	1	43
Australia	5	12828	-	-
Other countries	5	12038	-	-

Table – 12: Exports of Gold, Non-monetary: Other Unwrought Forms (By Countries)

Country	2014-15		2015-16 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	70790	174421703	135272	325660716
UAE	69980	172514750	134271	323336851
Switzerland	800	1882087	1000	2323815
Guinea	-	-	1	50
Australia	5	12828	-	-
Ghana	5	12038	-	-

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**Table – 13: Exports of Gold Non-monetary
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	70796	174423808	135275	325665937
UAE	69981	172515079	134271	323336851
Switzerland	800	1882087	1000	2323815
Hong Kong	5	1776	2	5178
Guinea	-	-	1	50
Singapore	-	-	1	43
Australia	5	12828	-	-
Other countries	5	12038	-	-

**Table – 14: Exports of Gold-clad Metals/Base Metals, NES
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	2	-	-
Germany	++	2	-	-

**Table – 15: Exports of Gold, Non-monetary , Other Semi manufactured Forms
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	6	2105	3	5221
Hong Kong	5	1776	2	5178
Singapore	-	-	1	43
UAE	1	329	-	-

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**Table – 16: Imports of Gold (Non-monetary : Other Unwrought forms)
(By Countries)**

Country	2016-17	
	Qty (kg)	Value (₹'000)
All Countries	765440	1830238051
Switzerland	377240	1030325235
UAE	80100	218197699
USA	48260	94251120
South Africa	42260	113418330
Peru	24600	39175654
Ghana	48370	118125497
Dominican Rep.	49500	34121998
Other Countries	95110	182622518

Source : Export-Import data bank, Ministry of Commerce, HS Code : 71081200

**Table – 17: Imports of Gold (Non-monetary & Monetary): Total
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	915473	2106580447	968075	2074874964
Switzerland	499811	1221503115	467231	1111591264
UAE	103840	254900282	90027	216926702
Ghana	28241	64388217	82092	181150973
USA	81984	165484297	85896	148274564
South Africa	43241	104705618	43554	103264490
Australia	40079	98290226	20359	48498055
Tanzania	17509	36100293	16939	31239214
Peru	8877	12953017	19043	30755563
Colombia	8521	17999946	15787	28865072
Dominican Rep	28580	16698178	42631	24894845
Other countries	54790	113557258	84516	149414222

**Table – 18: Imports of Gold, Non-monetary: Other Semi-manufactured Forms
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	12097	24134381	8201	19175265
UAE	566	1396874	5665	13576495
Ghana	1668	3865587	839	1760473
Switzerland	200	484213	700	1610851
USA	2453	5095869	448	992275
Hong Kong	63	161097	218	537466
Peru	1676	2022623	132	246628
Italy	62	153290	96	241326
Spain	141	308226	50	112249
UK	15	36290	12	29124
Singapore	27	64562	14	25985
Other countries	5226	10545750	27	42393

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**Table – 19: Imports of Gold, Non-monetary: Other Unwrought Forms
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	903374	2082446048	959841	2055623069
Switzerland	499611	1221018902	466531	1109980413
UAE	103274	253503408	84362	203350208
Ghana	26573	60522630	81253	179390500
USA	79530	160388420	85435	147251873
South Africa	43241	104705618	43554	103264490
Australia	40079	98290226	20358	48497234
Tanzania	15300	31359397	16939	31239214
Peru	7201	10930394	18911	30508935
Colombia	8253	17428471	15787	28865072
Dominican Rep.	28580	16698178	42631	24894845
Other countries	51732	107600404	84080	148380285

**Table – 20: Imports of Gold, Non-monetary , Powder
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (kg)	Value (₹'000)	Qty (kg)	Value (₹'000)
All Countries	2	18	33	76630
USA	1	7	13	30417
Hong Kong	-	-	10	23404
Spain	-	-	10	22809
UK	1	11	-	-

**Table – 21: Imports of Gold-Clad Metal / Base Metals, NES
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	3959	++	4965
USA	++	3713	++	4705
Germany	-	-	++	183
Canada	-	-	++	77
Japan	++	246	-	-

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FUTURE OUTLOOK

Historically, investors have purchased gold as a safe haven, hedge against economic failures, portfolio diversifier and store of wealth. In 2016, anticipated global consumption of gold is expected to increase, because consumption in jewellery and other industries is expected to increase alongside the increasing gold price. Domestic gold production is expected to increase, and worldwide gold production is expected to remain unchanged in 2016 owing to the startup of new mines, the ramp up of recently developed mines and the selective mining at some mines to increase ore grades and reduce operating costs, being offset by the shutdown of high cost operation.

India is a traditional and stable market for gold consumption. The present and future production of gold will not be sufficient to meet the ever increasing demand. Therefore, efforts will be required to reduce the gap between production and demand. The projected import at the growth

rate of 11% during 2012-17 are 9,305 tonnes at an average of 1,861 tonnes per year, as per the report of the Working Group for 12th Five Year Plan (of the erstwhile Planning Commission of India). During the 12th plan period, gold production is projected at 28 tonnes from mines and 16 tonnes as by-product, totalling 44 tonnes by 2015-16, this after factoring in the expansion of existing producers and the proposed new mines that were in the pipe-line under the Private Sector, viz., MSPL, Geomysore, Deccan Gold, etc.

As per the World Gold Council's report, 2017 "GST's impact on India's gold market ", GST represents a radical step forward for India's economy. While it could present short-term challenges to the Gold Industry. It will boost the economy and make the Gold Industry more transparent to the benefit of gold buyers. This should support India's gold demand, which is expected to be between 650-750 tonnes in 2017-18, and touching to 850-950 tonnes by 2020.

