



TOBACCO

PRODUCTION MANUAL

FLUE-CURED (VIRGINIA)

- Neutral Flavor
- Improved Flavor

VIRGINIA

- Neutral Flavor
- Improved Flavor R1
- Improved Flavor R2



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MESSAGE



I HAVE tremendous respect for the Techno-Updating Task Force, headed by Deputy Administrator for Operations Dr. Roberto R. Bonoan, assisted by the managers of the Industrial Research Department (IRD) and the Farm Technology and Services Department (FTSD), and the branch office managers who worked hard on this **Tobacco Production Manual (2012-2021 Edition)**, in close collaborations with the private tobacco companies, and input suppliers.

This **Manual** is a revision of the 2018 edition, so expect some changes, particularly on NTA-recommended crop protection agents, from the results of both NTA and private tobacco companies' researches, and some technology innovations guided by the principles and objectives of Good Agricultural Practices.

The Task Force prepared this resource material that is envisioned to help our tobacco growers produce quality leaves that meet the standards of both the local and global markets, in an environmentally sustainable manner. This contains step-by-step guide from seedbedding to field practices, harvesting and post-harvest operations and updated lists of agricultural inputs. Also included are the elimination of non-tobacco related materials (NTRMs) and the safe use and management of crop protection agents (CPAs).

Our TPROs and Agriculturists, Science Research Specialists and other Extension Service Providers will find this Manual an important tool for and a reinforcement to the other trainings provided by the Agency, specifically in assisting the tobacco farmers in getting the maximum return from their tobacco farming enterprises.

ROBERT VICTOR G. SEARES JR.
Administrator/CEO

FOREWORD



GIVEN the standards of both the local and global markets for cured tobacco leaves, the Tobacco Production Manual is developed to give step-by-step guide for our extension workers in accomplishing their tasks to assist our tobacco growers in producing quality tobacco leaves.

As usual, the **Techno-Updating Task Force** pursued the task of identifying mature information and technology components that are incorporated in this Techno-Guide. The members were identified experts in tobacco production from the NTA Branch Offices, mostly senior officials, in collaboration with experts from the private sector. Per Special Order No. 0367 dated July 1, 2020, the members were divided into three Focused Discussion Groups, one for each tobacco type. During their series of workshops, they only agree to one objective, and that is to **achieve quality** in the production for the benefit of the industry.

Quality can only be realized in farm if the package of technology, which is continuously updated, is strictly followed from seedbedding to field practices, harvesting and post-harvest operations. Our extension workers need to be continuously reminded of this, and this Techno-Guide will serve as a handy guidebook for their effective and efficient field work.

We expect that the efforts of our TWG in accomplishing this Techno-Guide for our contract growers will also benefit programs designed in support of the **Sustainable Tobacco Enhancement Program (STEP)**, which aims to increase of tobacco yield levels and improvement of farmers' incomes.

ROBERTO R. BONOAN, Ph.D.
Deputy Administrator for Operations
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PRODUCTION TECHNOLOGY FOR VIRGINIA NEUTRAL FLAVOR

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV	PVY
Reams 266		MT	R	R		
DH 48			R		S	
Coker 254		S		S		
Golden Harvest						
Giant Coker		S				
K326	LT	R	R	S	S	S

Legend: *R* – resistant; *MT* – moderately tolerant; *S* – susceptible; *LT* – low tolerant

Accredited Source of Seeds: NTA and Company ONLY

2. Sowing Date: September to October 31

3. Seedling Production:

Conventional Elevated Seedbed

Semi-Float Seedbed

Seedling Tray

Note: Apply NTA-recommended soil conditioner.

4. Transplanting Cut-off Date: December 15

Reminder: Transplanting can be done earlier.

5. Transplanting Method: Furrow

6. Distance of Planting:

0.90 m – 1.00 m x 0.42 – 0.50 m

7. Number of plants/hectare: 20,000 – 26,455

8. Replanting: Within **5 days** after transplanting (DAT)

9. Fertilizer Source, Method and Time of Application

Option 1 (62-36-48 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
4 bags	10-18-24	basal, single band along furrows, 0 DAT
4 bags	21-0-0	sidedress, single band, 21–28 DAT

Option 2 (62-36-73 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
4 bags	10-18-24	basal, single band along furrows, 0 DAT
4 bags	21-0-0	sidedress, single band, 21– 28 DAT
1 bag	0-0-50	sidedress, single band, 21– 28 DAT

Option 3 CONLEAF (41-36-98 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
4 bags	10-18-24	basal, single band along furrows, 0 DAT
2 bags	21-0-0	sidedress, single band, 21– 28 DAT
1 bag	0-0-50	sidedress, single band, 21– 28 DAT

Option 4 (57-27-61 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
3 bags	10-18-24	basal, single band along furrows, 0 DAT
4 bags	21-0-0	sidedress, single band, 21– 28 DAT
1 bag	0-0-50	sidedress, single band, 21– 28 DAT

Reminder: Adjust the amount of fertilizer if the total plant population has exceeded 26,000/ha.

Recommended Soil Conditioner

K-Humate Soil Conditioner
Broadcast/Incorporate 100 g K-Humate per 10 square meter seedbed before sowing
Mix 3 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows

Recommended Biostimulant Foliar

CERES Biostimulant Foliar		
40 ml / 16 liters	First Foliar Spray	15 DAT
60 ml / 16 liters	Second Foliar Spray	30 DAT
60 ml / 16 liters	Third Foliar Spray	45 DAT
60 ml / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Plant Growth Enhancer

AMO Plant Growth Regulator		
1 tbs / 16 liters	First Foliar Spray	15 DAT
1 tbs / 16 liters	Second Foliar Spray	30 DAT
1 tbs / 16 liters	Third Foliar Spray	45 DAT
1 tbs / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Foliar Liquid Fertilizer

VAKSI K Liquid Phospite		
45 ml / 16 liters	First Foliar Spray	15 DAT
45 ml / 16 liters	Second Foliar Spray	30 DAT
45 ml / 16 liters	Third Foliar Spray	45 DAT
45 ml / 16 liters	Fourth Foliar Spray	60 DAT

10. Watering, Irrigation Method and Schedule

Watering

	Method and Schedule
1st	at transplanting @ 1 liter/plant
2nd	5 DAT @ 1 liter/plant
3rd	14 DAT @ 2–3 liters/plant
3rd	Optional

Irrigation

1st	21 to 28 DAT, after hilling-up, alternate furrows
2nd	28 to 31 DAT, alternate furrows
3rd	42 to 45 DAT, all furrows
4th	after 3rd priming, all furrows
5th	after the 5th priming, depending on soil moisture; alternate furrows

11. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on Economic Threshold Level (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs, and prevent insect resistance development.

Insect Pest	Economic Threshold Level (ETL)
Cutworm	5 out of 100 plants (5%) with recent cutworm damage
Budworm	2 budworm larvae in 4 random sample groups of 10 plants each
Aphids	5 out of 50 plants have at least 50 aphids in a leaf
Leaf Miners	Treat when 2-5 miners are seen per plant
Loopers	Treat when 10% or more of the plants checked are infested with live worms of any size.
Katydid	Treat when 5 katydids are seen per 50 plants.

Note: Refer to **Appendix 1** for LIST OF NTA RECOMMENDED CROP PROTECTION AGENTS (CPAs), and **Appendix 2** for SAFE USE AND MANAGEMENT OF CPAs.

FLOWER head removal at full bloom and field sanitation are important IPM strategies that can sustainably reduce insect infestation on tobacco.

12. Harvesting

Harvest mature leaves as indicated by the following:

- leaf color changes from light green to yellow green
- yellowing of the leaf tips
- midrib turns light green

Important:

Harvest as needed.

Haul leaves immediately after harvest and unload under the shade, using cheesecloth, bamboo

slats, C48 carton, or buri (*silag*) as matting material.

Pile the harvested leaves PROPERLY with the butt ends down.

Sort, stick, and pile the leaves properly in shaded area and hang the leaves inside the barn within the day.

Start firing within 12 hours after hanging/loading.

13. Sorting Before Sticking

Stick sorted leaves according to **ripeness, injury, and length**.

14. Flue-Curing Barn

Dimension and Fixtures

	0.5 ha-capacity barn	1.0 ha-capacity barn
Inside dimension	L = 3.8 m; W = 3.0 m; H = 5.7 m	L = 3.75 m; W = 3.75 m; H = 5.7 m
Height of first tier	1.8 m	1.8 m
No. of tiers	5 + additional tier at the ridge (2 hangers)	5 + additional tier at the ridge (3 hangers)
No. of rows	4	5
Distance between tiers	0.75 m	0.75 m
No. of bottom vents	8 (2 per side)	8 (2 per side)
Size of bottom vents	L = 30 cm; W = 15 cm, with adjustable up and down cover	L = 30 cm; W = 15 cm, with adjustable up and down cover
Top vent	Ridge type; L = 3.6 m; W = 0.3 m	Ridge type; L = 3.6 m; W = 0.3 m
Flue-tube	Single passing	Double passing
Capacity	812 sticks	1,100 sticks
Length of stick	60 cm	60 cm
Number of leaves per stick	46	46
Distance bet. poles	10 cm	10 cm

Reminder: Plant only according to the capacity of the existing barn.

Furnace Type

Modified Anawang furnace

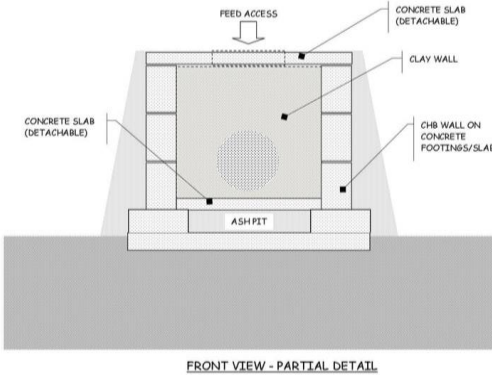


Figure 1. Front view of the modified Anawang furnace

Modified Venturi furnace

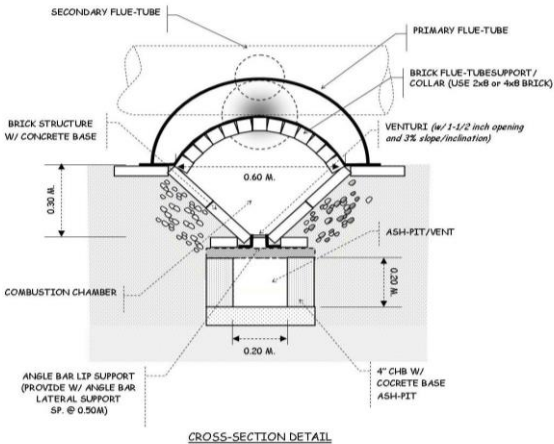


Figure 2. Front view cross-section detail of the modified Venturi furnace

Non-traditional or Additional Fuel

Biomass (Corn cob, ricehull, coconut husk, tobacco stalks)

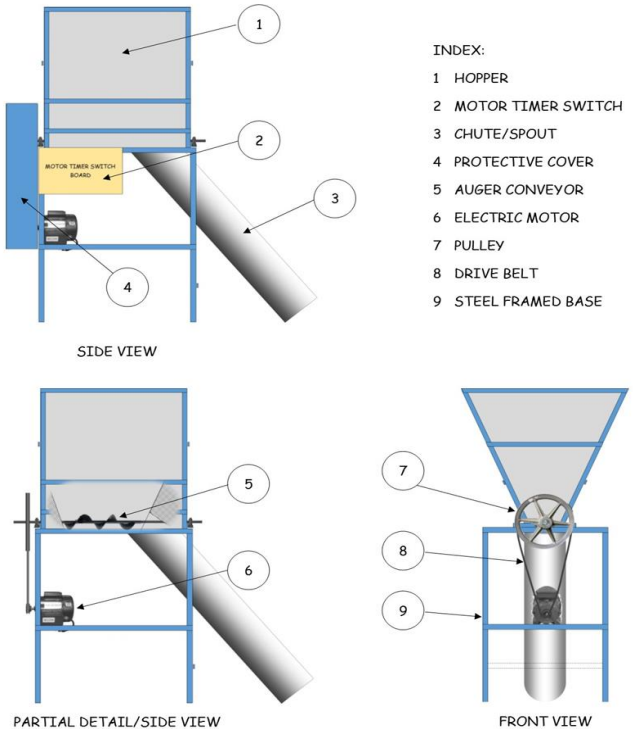


Figure 3. Schematic diagram of the automated corn cob/ricehull dispenser

Fixture

Removable chicken wire mesh 15 cm below the leaves on the first tier.

Insulator-like C48 carton in case of barn with GI wall.

Psychrometer to monitor temperature and relative humidity inside the barn.

Curing graph/chart guide.

Automated corn cob/ricehull dispenser for Anawang furnace.

15. Curing

Start firing within 12 hours after hanging/loading.

Follow strictly the Curing Graph (see *pages* 18-19).

16. Classification of Cured Leaves

The cured leaves must be classified based on the following:

Leaf position, Color, Length, Injury/damage

17. Straight Laid Open Bale (SLOB) System

The size of the bale box varies according to the requirement of the company in relation to the size of its grading ramp but the weight should not be more than 50 kg.

Pre-classify the leaves by leaf position.

Put leaves of the same stalk position and quality in a bale.

Reminder: The moisture content of the leaves must not exceed 18%.

18. Target Yield (kg/ha): **2,250**

Quality	Grades	% distribution
HIGH	AA-C	70
MEDIUM	D-F	20
LOW	R	10

Note: Refer to the NTA Harmonized Grades for the Locally Grown Virginia Tobacco.

See **Appendix 3** for the elimination of Non-Tobacco Related Materials (NTRMs).

PRODUCTION TECHNOLOGY FOR VIRGINIA IMPROVED FLAVOR

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV	PVY
NC 2326	S	S	LT	S	S	
K326	LT	R	S	S	S	
CC67	R	R	HR		R	
PVH 2254	HT	R	HR	S	R/HR	HR
PVH 2233	LT	R	HR	M	R/HR	R
PVH 2310		R	R	M	R	R

Legend: R – resistant; HT – highly tolerant; MT – moderately tolerant; S – susceptible; LT – low tolerant; M – Medium

Accredited Source of Seeds: NTA and Company ONLY

2. Sowing Date: September to October 31

Note: Seedbed site assessment is a prerequisite in early transplanting to determine the suitability of the area for seedbedding, especially in low-lying areas that are prone to flooding.

3. Seedling Production:

Conventional Elevated Seedbed
Semi-Float Seedbed
Seedling Tray

4. Transplanting Cut-off Date: December 15 to 31

5. Transplanting Method: Furrow or Ridge

6. Distance of Planting:

1.2 m x 0.45 m	1.2 m x 0.5 m	1.1 m x 0.45	1.0 m x 0.5 m
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7. Number of Plants per ha:

18,518	16,667	20,202	20,000
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8. Replanting: Within **5 days** after transplanting (DAT)

9. Fertilizer Rate, Source, Method and Time of Application

Option 1 – ULPI (103-72-146 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
8 bags	10-18-24	basal, single band along furrows, 0 DAT
2 bags	0-0-50	basal, single band along furrows, 0 DAT
4 bags	21-0-0	sidedress, single band, 10–14 DAT
2 bags	21-0-0	sidedress, single band, 25– 28 DAT

Option 2 – TMI & Conleaf (82-72-146 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
8 bags	10-18-24	basal, single band along furrows, 0 DAT
2 bags	0-0-50	basal, single band along furrows, 0 DAT
4 bags	21-0-0	sidedress, single band along furrows, 18 – 21 DAT

Option 3 – TMI (88.5-92-150 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
4 bags	18-46-0	basal, single band along furrows, 0 DAT
2 bags	0-0-50	basal, single band along furrows, 0 DAT
4 bags	0-0-50	sidedress, single band along furrows, 18 – 21 DAT
5 bags	21-0-0	sidedress, single band along furrows, 18 – 21 DAT

Recommended Soil Conditioner

K-Humate Soil Conditioner	
Broadcast/Incorporate 100 g K-Humate per 10 square meter seedbed before sowing	
Mix 3 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows	

Recommended Biostimulant Foliar

CERES Biostimulant Foliar		
40 ml / 16 liters	First Foliar Spray	15 DAT
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60 ml / 16 liters	Third Foliar Spray	45 DAT
60 ml / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Plant Growth Enhancer

AMO Plant Growth Regulator		
1 tbs / 16 liters	First Foliar Spray	15 DAT
1 tbs / 16 liters	Second Foliar Spray	30 DAT
1 tbs / 16 liters	Third Foliar Spray	45 DAT
1 tbs / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Foliar Liquid Fertilizer

VAKSI K Liquid Phospite		
45 ml / 16 liters	First Foliar Spray	15 DAT
45 ml / 16 liters	Second Foliar Spray	30 DAT
45 ml / 16 liters	Third Foliar Spray	45 DAT
45 ml / 16 liters	Fourth Foliar Spray	60 DAT

10. Watering, Irrigation Method and Schedule

Watering

	Method and Schedule
1st	at transplanting @ 1 liter/plant
2nd	5 DAT @ 1 liter/plant
3rd	14 DAT @ 2-3 liters/plant

Irrigation

1st	18 to 28 DAT, all furrows, 15% water level of the ridge after re-ridging
2nd	25 to 38 DAT, in alternate furrows at 50% water level of the ridge

- 3rd 32 to 48 DAT, all furrows at 50% water level of the ridge
- 4th after 1st priming, all furrows at 20% water level of the ridge
- 5th after 3rd priming, all furrows at 10-15% water level of the ridge
- 6th after the 5th priming, depending on soil moisture

11. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on Economic Threshold Level (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs and prevent insect resistance development.

Insect Pest	Economic Threshold Level (ETL)
Cutworm	5 out of 100 plants (5%) with recent cutworm damage
Budworm	2 budworm larvae in 4 random sample groups of 10 plants each
Aphids	5 out of 50 plants have at least 50 aphids in a leaf
Leaf Miners	Treat when 2-5 miners are seen per plant
Loopers	Treat when 10% or more of the plants checked are infested with live worms of any size.
Katydid	Treat when 5 katydids are seen per 50 plants.

Note: Refer to **Appendix 1** for LIST OF NTA RECOMMENDED CROP PROTECTION AGENTS (CPAs), and **Appendix 2** for SAFE USE AND MANAGEMENT OF CPAs.

12. Topping Time

Number of leaves
16 – 22

Time of Topping
Bud-top at 50% of the total population at button stage

13. Suckercide:

Active Ingredients	Brand name	AI Concentration	FPA Toxicity Category	Target	Vol/ha (li)	Vol/li water (ml)	Solution/plant (ml)
Flumetralin	Flumex 15 EC	150 g/li	III	suckers	3-4	15-20	10-15
Flumetralin	Flupro 14 EC	140 g/li	III	suckers	3-4	15-20	10-15

Legend: EC- Emulsifiable concentrate

14. Harvesting

Harvest mature leaves as indicated by the following:

- leaf color changes from light green to yellow green
- yellowing of the leaf tips
- midrib turns light green

Important:

Harvest as needed, do not wait until topping is done. Haul leaves immediately after harvest and unload under the shade, using cheesecloth, bamboo slats, C48 carton, and buri (*silag*) as matting material. Pile the harvested leaves PROPERLY with the butt ends down.

Sort, stick and pile the leaves properly in shaded area and hang the leaves inside the barn within the day.

Start firing within 12 hours after hanging/loading.

15. Curing

Start firing within 12 hours after hanging/loading.

Follow strictly the Curing Graph (see *pages* 18-19).

16. Flue-Curing Barn

Dimension and Fixtures

	0.5 ha-capacity barn	1.0 ha-capacity barn
Inside dimension	L = 3.8 m; W = 3.0 m; H = 5.7 m	L = 3.75 m; W = 3.75 m; H = 5.7 m
Height of first tier	1.8 m	1.8 m
No. of tiers	5 + additional tier at the ridge (2 hangers)	5 + additional tier at the ridge (3 hangers)
Distance between tiers	0.75 m	0.75 m
Number of bottom vents	8 (2 per side)	8 (2 per side)
Size of bottom vents	L = 30 cm; W = 15 cm, with adjustable up and down cover	L = 30 cm; W = 15 cm, with adjustable up and down cover
Top vent	Ridge type; L = 3.6 m; W = 0.3 m	Ridge type; L = 3.6 m; W = 0.3 m
Flue tube	Single passing	Double passing
Capacity	812 sticks	1,100 sticks
Length of stick	60 cm	60 cm
Number of leaves per stick	46	46
Distance bet. poles	10 cm	10 cm

Reminder: Plant only according to the capacity of the existing barn.

Furnace Type

Modified Anawang furnace (see Fig. 1, *page 6*)

Modified Venturi furnace (see Fig. 2, *page 6*)

Non-traditional or Additional Fuel

Biomass (Corn cob, ricehull, coconut husk, tobacco stalks)

Fixture

Removable chicken wire mesh 15 cm below the leaves on the first tier

Insulator-like C48 carton in case of barn with GI wall

Psychrometer to monitor temperature and relative humidity inside the barn

Curing graph/chart guide

Automated corn cob/ricehull dispenser for Anawang furnace (see Figure 3, *page 7*)

17. Sorting Before Sticking

Stick sorted leaves according to: **ripeness, injury, and length.**

18. Classification of Cured Leaves

The cured leaves must be classified based on the following: **leaf position, color, length, and injury/Damage.**

18. Straight Laid Open Bale (SLOB) System

The size of the bale box varies according to the requirement of the company in relation to the size of its grading ramp but the weight should not be more than 50 kg.

Pre-classify the leaves by leaf position.

Put leaves of similar size and quality in a bale.

Reminder: The moisture content of the leaves must not exceed 18%.

19. Target Yield (kg/ha): **2,500**

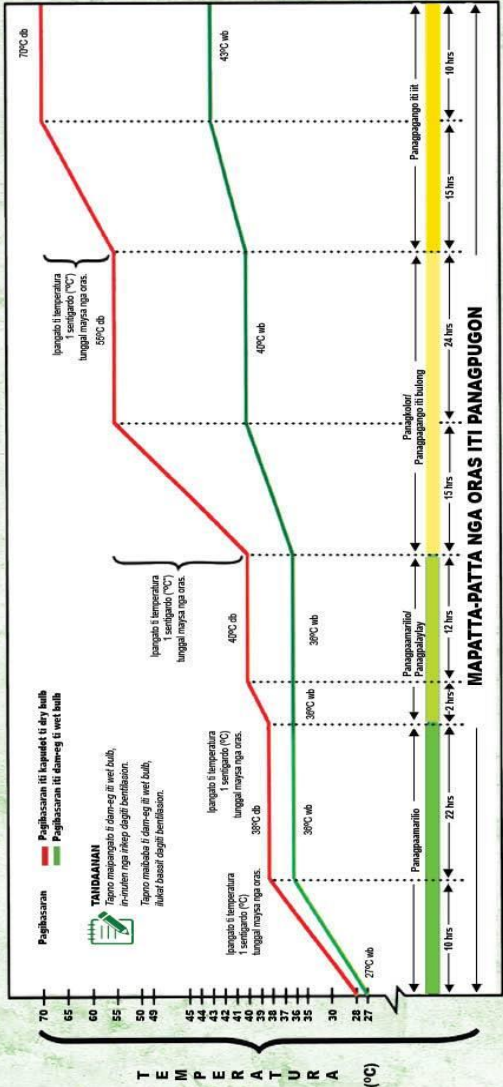
Quality	Grades	% distribution
HIGH	AA-C	70
MEDIUM	D-F	20
LOW	R	10

Note: Refer to the NTA Harmonized Grades for the Locally Grown Virginia Tobacco.

See **Appendix 3** for the elimination of Non-Tobacco Related Materials (NTRMs).

CURING GRAPH

PAGIBASARAN ITI UMNO A PANAGBASA ITI DRY KEN WET BULB ITI PANAGPAGANGO ITI BULONG TI BIRHINIA A TABAKO ITI KADAWYAN A PANAGPUGON



ZANDAANAN

Mabalin a baiwan ti kapat nga oras ti kada addang ti pagpangayo wemmo panagpugon, ngem depende daytoy ti panagbatiw ti maris dagiti bulong.

Ti makita a langa wemmo maris dagiti bulong kabayatan ti pamakapugonda ti mangibaga no ania ti kasapulian a temperatura iti dry bulb wemmo wet bulb.

TEMPERATURA

Kaipasan a makargaan ti pugon, ipangato ti temperatura iti uneg ti pugon iti 1 sentigrado (°C) iti kada oras, agingga iti 38 sentigrado iti dry bulb.

BENTILASION/PAGPASNGAWAN

Iluikat wemmo rikep ti bentilasion wemmo pagpasngawan tapno mamantiner ti 36 sentigrado (°C) a temperatura ti wet bulb.

IMANTINER A PUDOT

Mantineren ti 38 sentigrado (°C) iti dry bulb ken 36 sentigrado (°C) iti wet bulb agingga nga agamanillo dagiti bulong, wemmo sumagmamano laengen ti berde kadagiti uratda, kadagiti adda ti kababaan a pagsad-ayan.

BALLAAG

Saan a baybay-an a bumaba iti 35 sentigrado (°C) iti temperatura ti wet bulb tapno saan nga agbalin a dumuyaw a berde wemmo kasla saputi ti lanwalawwa ti pamakakolor dagiti bulong.

Ipangato ti temperatura iti dry bulb agingga iti 40 sentigrado (°C). Masapul a dagiti bulong a naktanum wemmo natuduan ket mapalaylay, iti 43 sentigrado (°C) iti dry bulb.

Tapno mamantiner ti 36 sentigrado (°C) ti dam-eg iti wet bulb, ilukat wemmo rikep ti bentilasion wemmo pagpasngawan.

Mantineren ti 40 sentigrado (°C) iti dry bulb ken 36 sentigrado (°C) iti wet bulb agingga nga agamanillo wemmo manglayayen amin a bulong iti kababaan a pagsad-ayan.

No saan pay a napalaylay amin a bulong, ipangato iti 43 sentigrado (°C) ti temperatura ti dry bulb tapno naan-anayen ti panagpalaylay ken tapno agamanillo amin a bulong.

No agamanillo aminen a bulong ken husto ti pamakalalaylay dagitoy, in-inuten nga ipangato ti temperatura iti dry bulb iti 1 sentigrado (°C) iti kada oras agingga iti 55 sentigrado (°C).

Ilawawa ti pamakalukat ti bentilasion tapno saan a lumabes iti 40 sentigrado (°C) ti dam-eg iti wet bulb kabayatan ti panagpakolor ken panagpamaga. Tapno saan a lumalat dagiti bulong, saan a baybay-an a ngumato iti 40 sentigrado (°C) ti temperatura ti wet bulb ken salabay a dumanon iti 55 sentigrado (°C) ti temperatura ti dry bulb.

Mantineren ti 55 sentigrado (°C) iti dry bulb ken 40 sentigrado (°C) iti wet bulb agingga a magango amin dagiti bulong kadagiti kababaan a pagsad-ayan.

No ipangato ti temperatura ti nangathgato ngem 55 sentigrado (°C) iti dry bulb ken 40 sentigrado (°C) iti wet bulb salabay ti pamakagango dagiti lamina dagiti bulong kadagiti kababaan a pagsad-ayan, mabalain pay laeng a lumalat dagitoy.

No nagango aminen dagiti bulong, iti uneg ti pugon, ipangato ti temperatura iti dry bulb iti 1 sentigrado (°C) iti kada oras agingga iti 70 sentigrado (°C).

No saan la keldi nga aglabes iti 43 sentigrado (°C) ti kapudot iti wet bulb, mabalainen nga in-inuten nga rikep dagiti bentilasion.

Mantineren ti 70 sentigrado (°C) agingga a magango amin dagiti bulong nga adda iti kangatuan a pagsad-ayan.

Makiset ti bulong no nangathgato ngem 70 sentigrado (°C) ti temperatura a kas makita iti panagjabbaga dagiti lamina wemmo baagi dagiti bulong.



PRODUCTION TECHNOLOGY FOR BURLEY NEUTRAL FLAVOR

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV
TN 90	S	S	MT	S	R
CC812G	HR	S	R	MR	S
NC 7	S	HR	R	HR	R
KT 206	S	S	HR	S	R
GF 1888	HR	R			R

Legend: *HR* – highly resistant; *R* – resistant; *MR* – moderately resistant; *MT* – moderately tolerant; *S* – susceptible

Accredited Source of seeds: NTA and Company ONLY

2. Sowing Date: September to October 31
 ULPI – up to November 15
3. Seedling Production:
 - Conventional Elevated Seedbed
 - Semi-Float Seedbed
 - Seedling Tray

Note: Apply NTA-recommended soil conditioner.
4. Transplanting Cut-off Date: January 15
5. Transplanting Method: Furrow Planting / Ridge
 Planting wherever applicable
6. Distance of Planting: 0.80 – 0.9 m x 0.45 – 0.50 m
7. Number of plants/hectare: 24,000 – 25,000
8. Replanting: Within **5 days** after planting

9. Fertilizer Rate, Source, Time and Method of Application

Option 1 – ULPI 235-54-122 kg N-P₂O₅-K₂O/ha

Quantity	Source	Method and Time
6 bags	10-18-24	band application along planting furrows at transplanting
8 bags	46-0-0	sidedress as band along the furrows after off-barring at 10–14 DAT
1 bag	21-0-0	sidedress as band along the furrows during hilling-up at 25–28 DAT
1 bag	21-0-0	fertigation at 35–40 DAT

Option 2 – TMI 198-54-72 kg N-P₂O₅-K₂O/ha

Quantity	Source	Method and Time
6 bags	10-18-24	band application along furrows at transplanting
4 bags	21-0-0	sidedress at 10–14 DAT
6 bags	21-0-0	sidedress at 21 DAT
6 bags	21-0-0	sidedress at 30–35 DAT

Recommended Soil Conditioner

K-Humate Soil Conditioner
Broadcast/Incorporate 100 g K-Humate per 10 square meter seedbed before sowing
Mix 1 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows

Recommended Biostimulant Foliar

CERES Biostimulant Foliar		
40 ml / 16 liters	First Foliar Spray	15 DAT
60 ml / 16 liters	Second Foliar Spray	30 DAT
60 ml / 16 liters	Third Foliar Spray	45 DAT
60 ml / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Plant Growth Enhancer

AMO Plant Growth Regulator		
1 tbs / 16 liters	First Foliar Spray	15 DAT
1 tbs / 16 liters	Second Foliar Spray	30 DAT
1 tbs / 16 liters	Third Foliar Spray	45 DAT
1 tbs / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Foliar Liquid Fertilizer

VAKSI K Liquid Phospite		
45 ml / 16 liters	First Foliar Spray	15 DAT
45 ml / 16 liters	Second Foliar Spray	30 DAT
45 ml / 16 liters	Third Foliar Spray	45 DAT
45 ml / 16 liters	Fourth Foliar Spray	60 DAT

10. Cultivation/Weeding

Off-barring 10 – 14 DAT

Hilling-up 1 25 – 28 DAT

Hilling-up 2 35 – 40 DAT

Manual weeding, if necessary

11. Watering, Irrigation Method and Schedule

Watering	Method and Schedule
1st	at transplanting @ 1 liter/plant
2nd	5 DAT @ 2 liters/plant

Irrigation

1st	10 to 14 DAT all furrows
2nd	26 to 29 DAT all furrows
3rd	35 to 42 DAT all furrows
4th	after 1st priming, alternate furrows
5th	after 3rd or 4th priming, depending on soil moisture, alternate furrows

12. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on ECONOMIC THRESHOLD LEVEL (ETL) to avoid CPA residues on tobacco,

reduce farmers' exposure to CPAs and prevent insect resistance development.

Insect Pest	Economic Threshold Level (ETL)
Cutworm	5 out of 100 plants (5%) with recent cutworm damage
Budworm	2 budworm larvae in 4 random sample groups of 10 plants each
Aphids	5 out of 50 plants have at least 50 aphids in a leaf
Leaf Miners	Treat when 2-5 miners are seen per plant
Loopers	Treat when 10% or more of the plants checked are infested with live worms of any size.
Katydid	Treat when 5 katydids are seen per 50 plants.

Note: Refer to **Appendix 1** for LIST OF NTA RECOMMENDED CROP PROTECTION AGENTS (CPAs), and **Appendix 2** for SAFE USE AND MANAGEMENT OF CPAs.

TOPPING before full bloom and field sanitation are important IPM strategies that can sustainably reduce insect infestation on tobacco.

13. Other Crop Protection Measures

Use of birds' perches at strategic locations in the field and plant repellants (e.g., MARIGOLD) and attractants at field boundaries.

14. Harvesting and Handling

Harvest ripe and mature leaves.

Important:

Haul leaves immediately after harvest and unload under the shade, using cheesecloth, bamboo slats, C48 cartons and buri (*silag*) as matting material.

Pile the leaves upright with the butt ends down. Sort, stick, and hang the leaves within the day.

15. Air-Curing Shed: **Dimension**

Floor	L = 20.0 m; W = 4.5 m
Height	3.0 m
No. of tiers	3
Distance of tiers from the ground	0.85 m
Number of units/ha	3

Barn Fixture: Psychrometer/Hygrometer is needed to monitor relative humidity and temperature inside the barn/shed.

16. Air Curing

Hang stucked leaves at 15 cm apart for good air circulation inside the barn.

Relative humidity (RH) of 65–70% should be observed inside the barn particularly during yellowing to lamina drying by closing or opening its sidings; higher than 70%, open the sidings; lower than 65%, close the sidings.

17. Sorting and Bundling

Sort and bundle according to: **Leaf position, Color, Length, and Injury/Damage.**

18. Baling/Market Preparation – Straight Laid Open Bale (SLOB) System

Prepare or bale tobacco leaves according to market tie-up specifications.

Reminder: The moisture content of the leaves must not exceed 18%.

19. Target Yield (kg/ha): at least **2,000**

	Grades	% distribution
HIGH	A-C	70
MEDIUM	D-F	20
LOW	R	10

Refer to the NTA Harmonized Grades for the Locally Grown Virginia Tobacco.

See **Appendix 3** for the elimination of Non-Tobacco Related Materials (NTRMs).

PRODUCTION TECHNOLOGY FOR BURLEY IMPROVED FLAVOR FOR REGION 1

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV	PVY
TN 90	S	S	MT	S	R	
CC812G	HR	S	R	MR	S	
NC 7	S	HR	R	HR	R	
KT 206	S	S	HR	S	R	
GF 1888	HR				R	
HB-4488P (TMI)	S	R	R	LT	R	R
HB-4155P (TMI)	MT	S	R	MT	R	R

Legend: HR – highly resistant; R – resistant; MR – moderately resistant; MT – moderately tolerant; S – susceptible; LT – low tolerant

Accredited Source of seeds: NTA and Company ONLY

2. Sowing Date: September to October 31
ULPI – Up to November 15
3. Seedling Production:
 - Conventional Elevated Seedbed
 - Semi-Float Seedbed
 - Seedling Tray

Note: Apply NTA-recommended soil conditioner.
4. Transplanting Cut-off Date: January 30
5. Transplanting Method: Furrow Planting / Ridge Planting wherever applicable
6. Distance of Planting: 1.0 m x 0.40 – 0.45 m
7. Number of Plants/hectare: 22,200 to 24,000

8. Replanting: Within **5 days** after planting
9. Fertilizer Rate, Source, Time and Method of Application

Option 1 – ULPI (265-108-194 kg N-P₂O₅-K₂O/ha)

Quantity	Source	Method and Time
12 bags	10-18-24	band application along planting furrows, then cover with ridge, 0 DAT
2 bags	0-0-50	band application along planting furrows, then cover with ridge, 0 DAT
8 bags	46-0-0	band application, 10–14 DAT
1 bag	21-0-0	band application after off-barring, 25–28 DAT
1 bag	21-0-0	fertigation, at 35–40 DAT

Option 2 – TMI (228-108-194 kg N-P₂O₅-K₂O/ha)

Quantity	Source	Method and Time
12 bags	10-18-24	band application along planting furrows, then cover with ridge, 0 DAT
4 bags	21-0-0	band application, 10–14 DAT
2 bags	0-0-50	band application after off-barring, 21 DAT
6 bags	21-0-0	band application after off-barring, 21 DAT
6 bags	21-0-0	band application after hilling-up, 30–35 DAT

Recommended Soil Conditioner

K-Humate Soil Conditioner
Broadcast/Incorporate 100 g K-Humate per 10 square meter seedbed before sowing
Mix 1 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows

Recommended Biostimulant Foliar

CERES Biostimulant Foliar		
40 ml / 16 liters	First Foliar Spray	15 DAT
60 ml / 16 liters	Second Foliar Spray	30 DAT
60 ml / 16 liters	Third Foliar Spray	45 DAT
60 ml / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Plant Growth Enhancer

AMO Plant Growth Regulator		
1 tbs / 16 liters	First Foliar Spray	15 DAT
1 tbs / 16 liters	Second Foliar Spray	30 DAT
1 tbs / 16 liters	Third Foliar Spray	45 DAT
1 tbs / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Foliar Liquid Fertilizer

VAKSI K Liquid Phospite		
45 ml / 16 liters	First Foliar Spray	15 DAT
45 ml / 16 liters	Second Foliar Spray	30 DAT
45 ml / 16 liters	Third Foliar Spray	45 DAT
45 ml / 16 liters	Fourth Foliar Spray	60 DAT

10. Cultivation/Weeding

- Off-barring 10 – 18 DAT
- Hilling-up 1 25 – 28 DAT
- Hilling-up 2 35 – 40 DAT
- Manual weeding, if necessary

11. Watering, Irrigation Method and Schedule

Watering

- 1st at transplanting @ 3 liters/plant
- 2nd 5 DAT @ 3 liters/plant in time for replanting

Irrigation

- 1st at 10 – 18 DAT, after first fertilizer sidedress, alternate furrows
- 2nd at 25 – 28 DAT, after the second fertilizer sidedress, alternate furrows
- 3rd at 35 DATm after third fertilizer sidedress, alternate furrows
- 4th and succeeding irrigation will be as needed, depending on soil moisture and weather condition. Irrigate every two weeks if harvesting is by priming; if stalk-cut, irrigate 7–10 days interval before stalk cutting.

Time of irrigation will follow the sidedressing schedule.

12. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on ECONOMIC THRESHOLD LEVEL (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs and prevent insect resistance development.

Insect Pest	Economic Threshold Level (ETL)
Cutworm	5 out of 100 plants (5%) with recent cutworm damage
Budworm	2 budworm larvae in 4 random sample groups of 10 plants each
Aphids	5 out of 50 plants have at least 50 aphids in a leaf
Leaf Miners	Treat when 2-5 miners are seen per plant
Loopers	Treat when 10% or more of the plants checked are infested with live worms of any size.
Katydid	Treat when 5 katydids are seen per 50 plants.

Note: Refer to **Appendix 1** for LIST OF NTA RECOMMENDED CROP PROTECTION AGENTS (CPAs), and **Appendix 2** for SAFE USE AND MANAGEMENT OF CPAs.

TOPPING before full bloom and field sanitation are important IPM strategies that can sustainably reduce insect infestation on tobacco.

13. Other Crop Protection Measures

Use of birds' perches at strategic locations in the field and plant repellants (e.g., MARIGOLD) and attractants at field boundaries.

14. Topping

Number of leaves

18 – 22

Time of Topping

Bud-top when 30% of the total population reach button stage

15. Suckercide:

Active Ingredients	Brand name	AI Concentration	FPA Toxicity Category	Target	Vol/ha (li)	Vol/li water (ml)	Solution /plant (ml)
Flumetralin	Flumex 15 EC	150 g/li	III	suckers	3–4	10–20	10–15
Flumetralin	Flupro 14 EC	140 g/li	III	suckers	3–4	12.5	10–15

Legend: EC- Emulsifiable concentrate

16. Harvesting

For Stalk-Cut Tobacco: Prime twice with 2–3 mature leaves at 55 and 65–70 DAT; stalk cut at 84–90 DAT.

For Priming: Start at 55–60 DAT, then at 7–10 days interval thereafter.

For harvesting, initial harvesting of 2 – 3 leaves is done prior or just after topping. Subsequent priming is undertaken starting 21 0 28 days after topping at weekly interval until all the leaves are harvested.

Important:

Haul leaves/stalk immediately after harvest and unload under the shade, using cheesecloth, bamboo slats, C48 cartons and buri (*silag*) as matting material.

Pile the leaves upright with the butt ends down; hang the stalk immediately inside the barn.

Sort, stick, and hang the leaves inside the curing shed within the day.

17. Air-Curing Shed: **Dimension**

	Option 1 (Priming)	Option 2 (Stalk Cutting)	Adjustable Clamp
Floor	L= 20.0 m; W= 4.5 m	L= 20.0 m; W= 5.0 m	18.0 m; 16.0 m
Height	3.0 m	2.5 m	2.5 m
No. of tiers	3	1	1
Distance of tier from the ground	0.85 m	n/a	n/a
Height of 1st tier from the ground	1.0 m	1.8 m	1.8 m
Number of units/ha	3	3	3

For harvesting by priming, with 1 priming before/after topping, wait for 21 – 28 days after topping before the next harvest and 7 – 10 thereafter for next primings (hand priming only. No STALK CUTTING.

For stalk cut, with 1 – 2 primings at 2 – 3 leaves per priming when the leaves are mature.

Barn Fixture: Hygrometer is needed to monitor relative humidity and temperature inside the shed.

18. Air Curing

Hang sticked and stalk-cut at 25 cm apart for good air circulation inside the barn.

Relative humidity (RH) of 65–70% should be observed inside the barn particularly during yellowing to lamina drying by closing or opening its sidings; higher than 70%, open the sidings; lower than 65%, close the sidings.

19. Unloading

Pile and condition leaves in preparation for stripping.

20. Stripping, Sorting and Classification

Strip in accordance to leaf position considering **color, length, and injury**.

Note: NO SUNDRYING

21. Straight Laid Open Bale (SLOB) System / Bundling

Prepare/Bale tobacco leaves according to market tie-up specifications.

Reminder: The moisture content of the leaves must not exceed 18%.

19. Target Yield (kg/ha): **2,600**

	Grades	% distribution
HIGH	A-C	70
MEDIUM	D-F	20
LOW	R	10

Refer to the NTA Harmonized Grades for the Locally Grown Virginia Tobacco.

See **Appendix 3** for the elimination of Non-Tobacco Related Materials (NTRMs).

PRODUCTION TECHNOLOGY FOR BURLEY IMPROVED FLAVOR FOR REGION 2

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV
TN 90	S	S	MT	S	R
CC812G	HR	S	R	MR	S
NC 7	S	HR	R	HR	R
KT 206 LC	S	S	HR	S	R
GF1888	HR	R			R

Legend: HR – highly resistant; R – resistant; MR – moderately resistant; MT – moderately tolerant; S – susceptible

Accredited Source of Seeds: NTA and Company ONLY

2. Sowing Date: October to December 10
3. Seedling Production:
 - Conventional Elevated Seedbed
 - Semi-Float Seedbed
 - Seedling Tray

Note: Apply NTA-recommended soil conditioner.
4. Transplanting Cut-off Date: January 30
5. Transplanting Method: Furrow Planting / Ridge Planting wherever applicable
6. Distance of Planting:
 - 1.0 m x 0.42 m 1.10 m x 0.38 m 1.20 m x 0.35 m
7. Number of Plants/hectare: 24,000
8. Replanting: Within 5 days after planting

9. Fertilizer Rate, Source, Time and Method of Application

265-108-194 kg N-P₂O₅-K₂O/ha

Quantity	Source	Method and Time
12 bags	10-18-24	basal, band application along the furrow before ridge construction
2 bags	0-0-50	basal, band application along the furrow before ridge construction
4 bags	46-0-0	1st application at 10-14 DAT and second application at 25-28 DAT
4 bags	46-0-0	25-28 DAT perpendicular to the tip of the canopy of the leaf
2 bags	21-0-0	3 rd sidedress, band application after off-barring at 35-40 DAT
Optional		
4 kg	Foliar (17-8-17)	apply as spray starting at 10 DAT applied at weekly interval until topping time

Recommended Soil Conditioner

K-Humate Soil Conditioner
Broadcast/Incorporate 100 g K-Humate per 10 square meter seedbed before sowing
Mix 1 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows

Recommended Biostimulant Foliar

CERES Biostimulant Foliar		
40 ml / 16 liters	First Foliar Spray	15 DAT
60 ml / 16 liters	Second Foliar Spray	30 DAT
60 ml / 16 liters	Third Foliar Spray	45 DAT
60 ml / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Plant Growth Enhancer

AMO Plant Growth Regulator		
1 tbs / 16 liters	First Foliar Spray	15 DAT
1 tbs / 16 liters	Second Foliar Spray	30 DAT
1 tbs / 16 liters	Third Foliar Spray	45 DAT
1 tbs / 16 liters	Fourth Foliar Spray	60 DAT

Recommended Foliar Liquid Fertilizer

VAKSI K Liquid Phospite		
45 ml / 16 liters	First Foliar Spray	15 DAT
45 ml / 16 liters	Second Foliar Spray	30 DAT
45 ml / 16 liters	Third Foliar Spray	45 DAT
45 ml / 16 liters	Fourth Foliar Spray	60 DAT

10. Cultivation/Weeding

- Off-barring 10 – 14 DAT
- Hilling-up 1 25 – 28 DAT
- Hilling-up 2 35 – 40 DAT
- Manual weeding, if necessary

11. Watering, Irrigation Method and Schedule

Watering	Method and Schedule
1st	at transplanting @ 1 liter/plant
2nd	5 DAT @ 1 liter/plant
3rd	10-14 DAT @ 2-3 liters/plant

Irrigation

- 1st 17-24 DAT, alternate furrow irrigation
- 2nd 25-34 DAT, alternate furrow irrigation
- 3rd 35-40 DAT, alternate furrow irrigation
- 4th after the first priming, all furrows and succeeding irrigations will depend on soil moisture

12. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on ECONOMIC THRESHOLD LEVEL (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs and prevent insect resistance development.

Insect Pest	Economic Threshold Level (ETL)
Cutworm	5 out of 100 plants (5%) with recent cutworm damage
Budworm	2 budworm larvae in 4 random sample groups of 10 plants each
Aphids	5 out of 50 plants have at least 50 aphids in a leaf
Leaf Miners	Treat when 2-5 miners are seen per plant
Loopers	Treat when 10% or more of the plants checked are infested with live worms of any size.
Katydid	Treat when 5 katydids are seen per 50 plants.

Note: Refer to **Appendix 1** for LIST OF NTA RECOMMENDED CROP PROTECTION AGENTS (CPAs), and **Appendix 2** for SAFE USE AND MANAGEMENT OF CPAs.

TOPPING before full bloom and field sanitation are important IPM strategies that can sustainably reduce insect infestation on tobacco.

13. Other Crop Protection Measures

Use of birds' perches at strategic locations in the field and plant repellants (e.g., MARIGOLD) and attractants at field boundaries.

14. Topping

Bud-top or when 30% of plants have one open flower.

Topping height: Bud topping at 18 to 22 leaves

15. Suckericide:

ACTIVE INGREDIENTS	BRAND NAME	AI Concentration	FPA Toxicity Category	Target	Vol/ha (li)	Vol/li water (ml)	Solution/plant (ml)
Flumetralin	Flumex 15 EC	150 g/li	III	suckers	3-4	15-20	10-15
Flumetralin	Flumex 14 EC	140 g/li	III	suckers	3-4	15-20	10-15

Legend: EC- Emulsifiable Concentrate

16. Harvesting, Priming, Stalk Cutting and Handling

Stalk-cutting: Initial harvesting by hand priming of 2–3 leaves. Stalk-cut at 85-90 DAT.

Hand Priming: Harvest ripe and matured leaves only at weekly interval, prime only what can be stucked in a day.

Important:

Haul leaves/stalk immediately after harvest and unload under the shade, using cheesecloth, and buri (*silag*) or bamboo slats as matting material during sorting and sticking.

Pile the leaves upright with the butt ends down; hang the stalk immediately inside the barn.

Sort leaves according to length, maturity and insect damage before sticking, and hang the leaves within the day.

Reminder: Stalk-cut 3-7 days after irrigation/rain.

17. Air-Curing Shed: **Dimension**

Floor	L= 20.0 m; W= 4.2 m	L= 20.0 m; W= 5 m	18 m x 6 m
Height	3 m	2.5	2.5

No. of tiers	3	1	1
Distance of tier from the ground	0.8 m	n/a	n/a
Height of 1 st tier from the ground	1 m	1.8 m	1.8 m
Number of units/ha	3	7-8	3

Barn Fixture: Hygrometer is needed to monitor relative humidity and temperature inside the barn/shed.

18. Air Curing

Hang stucked leaves at 15 cm apart for good air circulation inside the barn.

Maintain closed walls until yellowing is completed. Open walls when RH is above 70%.

19. Unloading

Pile dried stalk cut or stucked leaves for 3 days for pre-conditioning of leaves.

20. Stripping, Sorting and Classification

Stripping should be done when midribs are fully dried. Pile the leaves according to stalk position for conditioning within a period of 2-3 weeks.

When leaves are fully conditioned, classify according to: **color, length, thickness, injury.**

Pile for three days, then bale.

Reminder: Use *buri* mat, cheesecloth, bamboo slats or black plastic as matting material during these activities.

21. Straight Laid Open Bale (SLOB) System / Bundling

Pre-classify the leaves by leaf position.
Put leaves of similar size and quality in bale.
Do not bale leaves with swollen midrib.

Bale weight should not be lower than 20 kg for the lower leaves, upper leaves is 25 kg and reject not lower than 10 kg, per bale.

Reminder: The moisture content of the leaves must not exceed 18%.

22. Target Yield (kg/ha): **2,600 kg/ha**

	Grades	% distribution
HIGH	A-C	70
MEDIUM	D-F	20
LOW	R	10

Note: Refer to the NTA Harmonized Grades for the Locally Grown Virginia Tobacco.

See **Appendix 3** for the elimination of Non-Tobacco Related Materials (NTRMs).

Appendix 1 LIST OF NTA RECOMMENDED CROP

GROWTH STAGE	ACTIVE INGREDIENT	BRAND NAME	a.i. CONCENTRATION	FPVA TOXICITY CATEGORY	IRAC GROUP
Seedling	Propamocarb HCl ^{1,2}	Proplant, Previcur-N	722 g/li	IV	28
	Organic (Tea Tree Extract)	Timorex Gold	238 g/li	IV	46
	Abamectin ¹	Abamec 1.8 EC	18 g/li	Ib	6
Vegetative (10-34 DAT)	Indoxacarb ^{1,2}	Steward 30 WDG	300 g/kg	III	22
	Cinnamaldehyde	Tarssus XP 60SL	600 g/li	IV	UNE
	Organic (Tea Tree Extract)	Timorex Gold	238 g/li	IV	46
Early Maturity (35-50 DAT)	Bt + Pyridalyl ²	Dipel WP + Pleo	320 g/kg	IV	11A
			100 g/li		UN
	Chlorantraniliprole ¹	Prevathon 5 SC	50 g/li	IV	28
	Indoxacarb ²	Steward 30 WDG	300 g/kg	III	22
	Acephate	Blackhawk 40SL	400 g/li	III	1B
	Cinnamaldehyde	Tarssus XP 60SL	600 g/li	IV	UNE
Maturity (60 DAT) until the 3 rd or 4 th harvest depending on insect population and crop stand	Bt + Pyridalyl ²	Dipel WP + Pleo	320 g/kg	IV	11A
			100 g/li		UN
	Indoxacarb ²	Steward 30 WDG	300 g/kg	III	22
	Chlorantraniliprole ¹	Prevathon 5 SC	50 g/li	IV	28

Legend: Ib – extremely hazardous; toxic
 III – moderately hazardous; caution

II – highly hazardous; harmful
 IV – slightly hazardous; no warning statement

PROTECTION AGENTS

CHEMICAL GROUP	MODE OF ACTION	TYPE OF ACTIVITY	TARGET PESTS	DOSAGE PER 16 L
Carbamate	Lipid synthesis inhibitor	systemic	Pythium spp	
Liquid organic	Spore germination inhibitory	broad spectrum	damping off & leaf spots	25-50 ml
Avermectin	Glutamate-gated chloride channel (GluCl) allosteric modulators	contact	cutworm, budworm	15 ml
Oxadiazine	Voltage-dependent Sodium channel blocker	contact, stomach, ovicidal	cutworm, budworm, loopers, leaf miners	4 g
Biorational	Botanical essence including synthetic, extracts and unrefined oils with unknown or uncertain MOA	contact	thrips, whitefly	8-16 ml
Liquid Organic	Spore germination inhibitory	broad spectrum	Damping off & leaf spots	40-80 ml
Bt-organic	Microbial disruptors of insect midgut membranes	systemic	cutworm, budworm, loopers	30 g + 20 ml
Pyridalyl-synthetic	Compounds of unknown or uncertain MOA			
Diamide	Ryanodine receptor modulator: modulating release of Ca ultimately preventing muscle contraction	systemic	cutworm, budworm, loopers	25 ml
Oxadiazine	Voltage-dependent Na channel blocker	contact, stomach, ovicidal	cutworm, budworm, loopers, leaf miners	4 g
Organo-phosphate	Acetylcholinesterase (AChE) inhibitors. Nerve Action [Strong evidence that action at this protein is responsible for insecticidal effects.]	contact, stomach, systemic	Budworm, aphids	30 ml
Biorational	Botanical essence including synthetic, extracts and unrefined oils with unknown or uncertain MOA	contact,	Thrips, whitefly	8-16 ml
Bt-organic	Microbial disruptors of insect midgut membranes	systemic	cutworm, budworm, loopers	30 g + 20 ml
Pyridalyl-synthetic	Compounds of unknown or uncertain MOA			
Oxadiazine	Voltage-dependent Na channel blocker	contact, stomach, ovicidal	cutworm, budworm, loopers, leaf miners	4 g
Diamide	Ryanodine receptor modulator: modulating release of Ca ultimately preventing muscle contraction	systemic	cutworm, budworm, loopers	25 ml

Appendix 1 ... (con't)

PRODUCT VOLUME	NO. OF SPRAYINGS	Maximum Tankload/ (L for seedbed) per ha.	PRE-HARVEST INTERVAL (days)	REENTRY PERIOD (hours)
50-100 ml	drench & spray	10 sqm bed	No PHI limitation	No re-entry limitation
22.5 ml	3	0.5		When spray deposit has dried
48 g	2	6	7	24
288-576 ml	3	12	No PHI limitation	No re-entry limitation
160-320 ml	2	2	No PHI limitation	No re-entry limitation
330 g + 220 mL	1	11		
200 ml	1	8	7	24
40 g	1	10	7	24
360 ml	1	12	14	When spray deposit has dried
288-576 ml	3	12	No PHI limitation	No re-entry limitation
360 g + 240 ml	1	11		
40 g	1	10	7	12
300 ml	1	12	7	24

Legend:
 1 – ULPI
 2 – TM

SP - Soluble Powder
 SL - Soluble Liquid
 SC - Suspension Concentrate
 WP - Wettable Powder
 WDG- Water Dispersible Granule
 EC – Emulsifiable Concentrate

Appendix 2 SAFE USE AND MANAGEMENT OF CROP PROTECTION AGENTS

What do CPAs contain?

CPAs = active ingredient + filling material + other substances

Active ingredient	The poisonous element, the ingredient which actively kills the target pest.
Filling material	Material carrying the active substance or ingredient and determining the composition of the CPA (solid, liquid, granule, powder, etc.).
Other substances	Substances which increase the effect of CPA, facilitate its holding on to the leaf, increase shelf-life and prevent foaming, colors.
Application dosage	The quantity effective on the target disease or pest.

Using CPAs more than recommended dose does not increase their effect.

Re-entry period: Refers to the period of time immediately following the application of a pesticide during which unprotected workers should not enter a field.



Re-entry period warning signage installed in farm after application of CPA



Re-entry period warning signage

Pre-harvest interval: The recommended period between the final application of CPA and the

harvesting time. The value is indicated on the CPA's label.

Residue: Any quantity of CPAs remaining on agricultural crops following CPA application. CPA residue levels decline over time after an application. When CPAs are used carelessly and more than the required amount, residues on tobacco will be higher. There are residue limits set for each CPA. For this reason, tobacco sample should be taken regularly from tobacco farmers for residue analysis.

In order to prevent unacceptable residues:

- Registered CPAs should be used only for specific target pests of tobacco, i.e., Indoxacarb, should only be used to control budworms and cutworms.
- Compliance with application dosage indicated on the label is required.
- Compliance with the number and time of application of the CPA is required.
- CPAs should not be misused.
- Compliance with the pre-harvesting interval is required.

Tobacco with CPA residues above the acceptable limits has no commercial value. Application dosage and pre-harvest interval must be in line with the label instructions.

Toxicity classification: The toxicity of CPAs to humans and the environment must be well understood. The degree of toxicity of CPAs is divided into four categories. When using CPAs, choose those that cause minimum harm to human health and the environment.

Category I	EXTREMELY HAZARDOUS
Category II	HIGHLY HAZARDOUS
Category III	MODERATELY HAZARDOUS
Category IV	SLIGHTLY HAZARDOUS

Selection, Preparation and Application of CPAs

- Observations should be made regularly in the seedbed and field, and disease and pest levels should be determined precisely.
- CPA applications should be carried out only when required and the appropriate CPAs should be used for pests and diseases.
- It is recommended to wait for the level of pests to reach the economic threshold level to necessitate pest control; otherwise, applications may be made unnecessarily and entail extra cost to the farmers.
- The label of the CPAs should be read carefully and compliance with the instructions is required.
- Before applying CPAs, children and pets should be taken away from the site.
- When preparing the CPA, kitchen utensils, and laundry materials should not be used, and food not taken.
- The CPAs should be well stirred.
- The materials to be used for the CPA application should be carefully selected and checked.

During preparation and application of CPAs, appropriate personal protective equipment (PPE) or clothing should be used as follows: rubber gloves, masks, goggles, rubber boots or shoes, long-sleeved shirts and long pants.

- Should any of the CPAs come in contact with the body during application, wash with soap and water.

- CPAs should not be applied on windy or rainy days.
- Obstructed nozzles and hoses should never be unclogged by blowing.
- The CPAs should be applied so as to cover all parts of the plant.
- The CPA particles and vapor should not be inhaled.
- Persons suffering from colds, bronchitis and stomach disorders, or those having cracks and lesions on their hands are more sensitive to toxic substances. Such persons should not apply CPAs.
- Nursing mothers, pregnant women, children under 18, sick or disabled persons should not be involved in applying CPAs.
- Any spilled CPAs should be carefully cleaned up.
- After each application, the hands, face, and personal protective equipment should be washed with plenty of water.
- Any remaining CPA mixture should be applied to the crop. It should never be poured out to the environment.

Farmer wearing complete set of PPEs



After CPA Applications

- Empty CPA container should never be used for other purposes and should not be left around the seedbed or field.



Empty CPA sachets left in the field



Empty CPA bottles left in the field



Empty CPA containers stored inside the CPA lock-up storage



Proper segregation of empty CPA containers for disposal

Disposal of Empty CPA Containers

- Empty CPA containers should be rinsed out with clean water at least three times and this rinsing water should be poured into the prepared CPA solution.

Triple rinsing:

HUGASAN NG TATLONG (3) BESES ANG BASYO NG INYONG PESTISIDYO!

Tandaan: Ubusin muna ang laman ng basyo ng pestisidyo sa pamamagitan ng pagtaob nito sa strainer ng knapsack sprayer.

Sundin ang mga sumusunod na hakbang ng 3 beses (triple-rinse):

<p>1</p>	<p>2</p>	<p>3</p>
<p>Lagyan ng $\frac{1}{2}$ na dami ng tubig ang baso.</p>	<p>Isarang mabuti ang basyo at alugin sa loob ng 30 segundo.</p>	<p>Alisin ang tubig sa basyo sa pamamagitan ng pagtaob sa strainer ng knapsack sprayer sa loob ng 30 segundo.</p>

Ulitin ng tatlong beses ang proseso.

Butasan ang basyo upang hindi ito muling magamit at ipadala sa aprubadong taga-recycle ng basyo.



Laging magsuot ng damit pamproteksyon (PPE) kung hahawak ng pestisidyo.

Empty CPA containers should be crushed and punctured, then stored in closed bags off the ground and out of reach of children. Empty CPA containers may be returned to CPA suppliers for proper disposal.

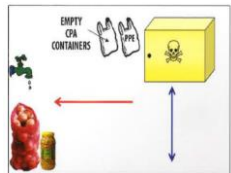


Storage of CPAs

- CPAs should be stored in their original containers, tightly closed, away from children, and locked in a cool, dry place.
- CPAs should always be kept in their original packages and not be transferred to other containers.
- CPAs should not be stored or prepared in living quarters such as kitchens, bedrooms, and stables.

Safekeeping of CPA containers inside the CPA lock-up storage

- There should be no foodstuff and drinks in places where CPAs are stored.
- Warning signs should be placed where CPAs are kept.



Appendix 3 ELIMINATION OF NON-TOBACCO RELATED MATERIALS (NTRMs)

NTRM is anything that is **NOT** tobacco. It is an important issue because its presence may jeopardize the **integrity** and **quality** of tobacco. NTRM is a major industry concern and must be addressed effectively.

Most of the NTRMs originate at the farm level and, therefore, this is where most of the efforts should be concentrated. NTRMs are categorized as follows:

CATEGORIES

1A	1B	2A	2B	3	4
ARTIFICIAL "Controllable"	NATURAL "Limited Control"	ORGANIC "Man-made"	ORGANIC "Natural"	METALS	ROCKS/ MULTI- MATERIALS
Foams (Styrofoam)	Feathers	Cigarette papers	Grass	Nails	Rocks
Nylon strings/netting	Cocoons	Cotton	Herbs	Clips	Stones
Rubber	Insects	Cotton strings	Natural woods	Metal shavings	Multi-materials
Plastics		Burlap	Fruits	Bolts	
Leathers		Burlap strings		Nuts	
Unknown materials		Manufactured woods		Blades (knife, razor)	
Cigarette butts		Papers			
		Metallic papers			

Examples of Sources of Common Non-Tobacco Related Materials



Other Non-Tobacco Related Materials



Feathers



Cocoons



Jute sack strings



Stones



Metals



Grasses

We must ensure that an effective NTRM elimination program is implemented and it should cover all the activities from the field until the cured tobacco leaves are delivered to the buying stations.

NTRM can be eliminated from tobacco by practicing the following at different stages of the crop:

Growing period

- Always keep the field weed-free and free from synthetic and non-biodegradable wastes especially plastics and rubber materials.
- Never dispose of garbage, especially plastic wastes, into the field or near the field.

Harvesting and hauling

- Use cheesecloth or jute sacks and other non-fibrous, non-treated biodegradable materials as leaf wraps during harvesting, hauling, and transport.
- Never use woven plastic sacks as leaf wrap during hauling and transport of leaves.

Sticking, sorting and baling

- Never eat and smoke at all times in the work area.
- *Buri* mat, bamboo slats, C48 cartons, cheesecloth and jute sacks can be used as matting during sticking, stripping, sorting, and baling.
- Farmers must use natural, non-treated materials for stringing and baling.
- Do not allow any fowl or domestic animals to roam around the curing sheds and work areas during the tobacco season to prevent introduction of feathers and waste matters to the tobacco.
- Never use polypropylene fabrics as temporary roofing as the material disintegrates once it gets brittle due to exposure to weather elements.
- Remove all biodegradable and non-biodegradable materials like animal manure, weeds and other plant debris, feathers, plastic wrapper, etc., in the work area.
- Put all garbage/trash bins very far away from the work area.

The **TECHNO-UPDATING TASK FORCE** of the National Tobacco Administration conducted workshops for its members to update information and technology components that are incorporated in this Tobacco Production Manual for Crop Year 2020-2021. The Task Force identified mature information and technology derived from the following sources: NTA Research and Development (R&D), private sector R&D, protocol research, adaptability trials of seed varieties by the National Seed Industry Council, and farmers' best practices as validated by the NTA. Unlike in previous techno-updating, this time the Task Force involved more officials, experts, and researchers for maximum inputs.

This Tobacco Production Manual for Virginia and Burley is an important tool for the agency's TPROs and Agriculturists, Science Research Specialists and other Extension Service Providers in helping the tobacco farmers get the maximum return from their tobacco farming enterprises.

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NTA TECHNO-UPDATING TASK FORCE 2020-2021

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